PROJECT MANUAL

IHS WHITERIVER HOSPITAL

Prepared for: INDIAN HEALTH SERVICE

100% CONSTRUCTION DOCUMENTS
Project No: 14904.000
5 MARCH 2026

VOLUME 2

Prepared by:

SMITHGROUP

PHOENIX, ARIZONA

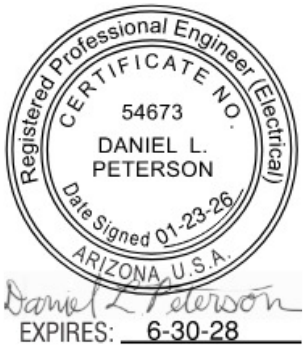
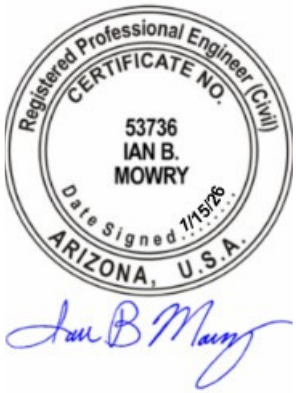
IHS REVIEW AND APPROVAL

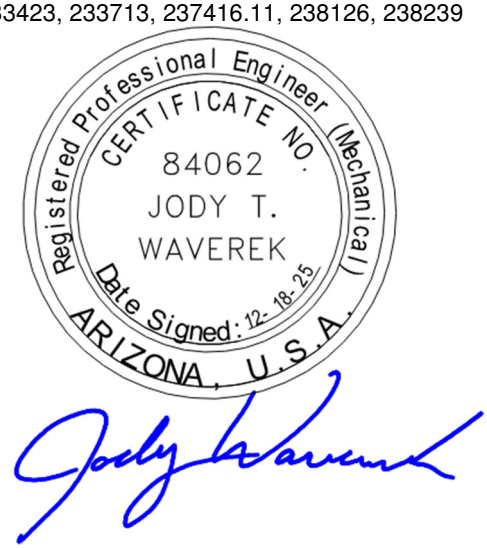
REVIEWED BY		DATE
CIVIL	Thomas Armitage -S	Digitally signed by Thomas Armitage -S Date: 2026.03.11 10:06:44 -05'00'
MECHANICAL	Hung M. Nguyen -S	Digitally signed by Hung M. Nguyen -S Date: 2026.03.11 09:54:17 -05'00'
APPROVED	Scott P. Fillerup -S	Digitally signed by Scott P. Fillerup -S DN: 0.9.2342.19200300.100.1.1=2000120248 + CN=Scott P. Fillerup -S, OU=People, OU=IHS, OU=HHS, O=U.S. Government, C=US Date: 2026.03.10 16:16:07-07'00' — DATE
DES PROJECT MANAGER		
CONCURRENCE	Denman K. Ondelacy -S	Digitally signed by Denman K. Ondelacy -S Date: 2026.03.10 17:10:59 -07'00' — DATE
DES DEPUTY DIRECTOR	Roger N. Dahozy -S	Digitally signed by Roger N. Dahozy -S Date: 2026.03.11 16:28:17 -07'00'
AREA FACILITY PROGRAM DIRECTOR	Kenny R. Hicks -S	Digitally signed by Kenny R. Hicks -S Date: 2026.03.11 15:01:50 -07'00'
AREA OEHE DIRECTOR		

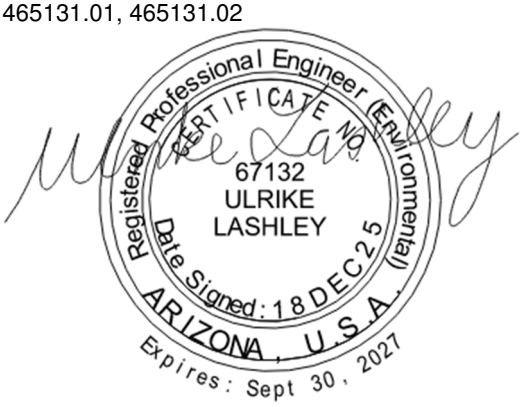
DOCUMENT 000107 - SEALS PAGE

Include on this Seals Page Document the seals of the design professionals of record required by statute to affix their seal to the documents. Where required, include a description of the Specification Sections prepared under the direction of each design professions *EDIT FOR YOUR PROJECT-USE DIVISION AND/OR SECTION NUMBERS*. If such listing is required, you may alternatively use the MasterSpec seals page instead of this SmithGroup seals page.

Architect SmithGroup, Inc. Phoenix, AZ Matthew Hess, AIA, NCARB Responsible for Divisions 01-49 Sections except where indicated as prepared by other design professionals of record. 	Structural Engineer PK Associates and Pimara Paul Koehler Scottsdale, Arizona Christa Chau, PE, SE Responsible for: Division 03, Sections 030000 and 032000; Division 04, Section 042000; Division 05, Sections 051200 and 053100; and Division 31, Section 316329
Civil Engineer Dibble & Associates Consulting Engineers, Inc. Phoenix, Arizona Christina Shannon Mauck, PE Responsible for: Division 01, Section 015713, Division 02, Section 024100, Division 09, Section 099713, Division 31, Sections 312213, 312300, 312316.16, 312323.13, 312333, 312500, Division 32, Sections 321123, 321216, 321313, 321315, Division 33, Sections 331000, 331623, 333000, 333213, 333723, 334213 	Fire Protection Engineer SmithGroup, Inc. Phoenix, AZ Andrew Ochsankehl, PE Responsible for: Division 13, Section 131200*; Division 21, Sections 211300, 213000, 210533; Division 27, Section 273226; Division 28, Section 283111 *Fire Protection Related Requirements Only

Electrical Engineer SmithGroup, Inc. Phoenix, AZ Daniel L. Peterson, PE Responsible for: Division 26, except for those Sections labeled with “WWTP”  	Communications (AV, IT, Security) Designer SmithGroup, Inc. Washington, DC David K. Glenn, RCDD Responsible for: Division 27, Sections 270413, 270526, 270528, 270536, 270544, 270553, 271100, 271300, 271500, 272100, 273226, 274116, 275113, 275119, 275123, 275223, 275313, 275316 and 275319; and Division 28, Sections 280413, 280513, 280526, 280528, 281300, 281600, 282300 and 285000
Landscape Architect SmithGroup, Inc. Phoenix, AZ Richard P. Jones, PLA Responsible for: Division 32, Sections 321316, 321373, 321716, 321723, 323113, 323119, 323213, 324020, 328000, 329100, 329220, 329300 	Civil Engineer Dibble & Associates Consulting Engineers, Inc. Phoenix, Arizona Ian B. Mowry, PE Responsible for: Division 31, Sections 312213, 312300, 312316, 312323, 312500; Division 32, Sections 321123, 321216, 321315; Division 33, Section 4213; Division 34, Sections 340114, 347113, 347116 

Structural Engineer Morrison-Maierle Phoenix, Arizona Michael Brennan, PE Responsible for structural specifications for the WWTPs: Division 03: 033000; Division 05: 051400, 055000, 055200, 055300; Division 13: 133419; Division 41: 413313, 413313.01 	Electrical Engineer Morrison-Maierle Phoenix, Arizona Michael Brandt, PE Responsible for electrical specifications for the WWTPs: Division 26: 260400, 260519, 260523, 260526, 260529, 260533, 260536, 260543, 260544, 260548.16, 260553, 260573.13, 260573.16, 260573.19, 260913, 260923, 262213, 262413, 262416, 262419, 262713, 262726, 262813, 262816, 262923, 263213, 263353, 263600, 264313, 265100, 265600
Plumbing Engineer Morrison-Maierle Phoenix, Arizona Jody Waverek, PE Responsible for plumbing specifications for the WWTPs: Division 22: 220517, 220518, 220519, 220523.12, 220523.14, 220529, 220548, 220553, 220719, 221116, 221119, 221123, 221123.13, 221316, 221429, 223300, 224213.13, 224213.16, 224216.13, 224216.16, 224223, 224500 	Mechanical Engineer Morrison-Maierle Phoenix, Arizona Jody Waverek, PE Responsible for mechanical specifications for the WWTPs: Division 23: 230513, 230529, 230548, 230553, 230593, 230713, 230716, 230900, 233113, 233300, 233423, 233713, 237416.11, 238126, 238239 

Environmental Engineer Morrison-Maierle Phoenix, Arizona Ulrike Lashley, PE Responsible for the following specifications for the WWTPs: Division 09: 099600; Division 10: 101400.01, 104352; Division 40: 400205, 400510, 400510.03, 400510.04, 400510.09, 400510.12, 400510.13, 400510.30, 400553, 400555, 400557, 406110, 406115, 406116, 406120, 406120.01, 406120.02, 406120.03, 406120.04, 406121, 406124, 406127, 406128, 406140, 406160, 406171, 406176, 406177, 406180, 406181, 406182, 406191; Division 41: 413313.17; Division 43: 431030, 431111, 432256, 432321, 432331, 432331.01, 432358, 433230, 433269, 434010; Division 46: 460754, 460754.01, 460754.02, 460754.03, 460754.04, 460754.05, 460754.06, 460754.07, 460754.08, 460754.09, 460754.10, 461155, 461155.01, 461155.02, 461155.03, 461155.04, 462113, 462113.01, 462113.02, 462113.03, 465035, 465035.01, 465035.02, 465131, 465131.01, 465131.02  	Hazardous Building Materials Mabbett & Associates, Inc. Stoneham, Massachusetts Michael Delaney, Asbestos Designer Responsible for: 028200, 028313

END OF DOCUMENT 000107

TABLE OF CONTENTS

Volume 1

DIVISION 00 - PROCUREMENT AND CONTRACTING REQUIREMENTS

SECTION 001000 - SOLICITATION, CONTRACT LINE-ITEM NUMBER (CLIN) SCHEDULE
SECTION 002000 - INSTRUCTIONS FOR PROCUREMENT
SECTION 002100 - INSTRUCTIONS
SECTION 002113 - INSTRUCTIONS TO BIDDERS
SECTION 002116 - INSTRUCTIONS TO PROPOSERS
SECTION 002200 - SUPPLEMENTARY INSTRUCTIONS
SECTION 002216 - SUPPLEMENTARY INSTRUCTIONS TO PROPOSERS
SECTION 003000 - AVAILABLE INFORMATION
SECTION 004000 - PROCUREMENT FORMS AND SUPPLEMENTS
SECTION 004300 - BID BOND FORM
SECTION 004373 - PROPOSED CONSTRUCTION SCHEDULE FORM
SECTION 004500 - REPRESENTATIONS AND CERTIFICATIONS
SECTION 005000 - CONTRACTING FORMS AND SUPPLEMENTS
SECTION 005100 - NOTICE OF AWARD
SECTION 005200 - AGREEMENT FORMS
SECTION 006000 - PROJECT FORMS
SECTION 006100 - BOND FORMS
SECTION 006200 - CERTIFICATES
SECTION 007000 - CONDITIONS OF THE CONTRACT
SECTION 007100 - CONTRACTING DEFINITIONS
SECTION 007200 - GENERAL CONDITIONS
SECTION 007300 - SUPPLEMENTAL CONDITIONS

DIVISION 01 - GENERAL REQUIREMENTS

SECTION 011000 - SUMMARY
SECTION 012300 - OPTIONS
SECTION 012500 - SUBSTITUTION PROCEDURES
SECTION 012510 - SUBSTITUTION REQUEST FORM
SECTION 012600 - CONTRACT MODIFICATION PROCEDURES
SECTION 012614 - REQUESTS FOR INFORMATION
SECTION 012900 - PAYMENT PROCEDURES
SECTION 012973 - SCHEDULE OF VALUES
SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION
SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION
SECTION 013300 - SUBMITTAL PROCEDURES
SECTION 013330 - SUBMITTAL COMPLIANCE FORM
SECTION 013526 - GOVERNMENT SAFETY REQUIREMENTS
SECTION 013573 - DELEGATED DESIGN REQUIREMENTS AND PROCEDURES
SECTION 014200 - REFERENCES
SECTION 014339 - EXTERIOR WALLS MOCKUPS
SECTION 014500.00 10 - QUALITY CONTROL
SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS
SECTION 015713 - TEMPORARY EROSION AND SEDIMENT CONTROL
SECTION 015731 - INDOOR AIR QUALITY (IAQ) MANAGEMENT
SECTION 016000 - PRODUCT REQUIREMENTS
SECTION 017300 - EXECUTION
SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL
SECTION 017700 - CLOSEOUT PROCEDURES
SECTION 017823 - OPERATION AND MAINTENANCE DATA
SECTION 017839 - PROJECT RECORD DOCUMENTS
SECTION 017900 - DEMONSTRATION AND TRAINING
SECTION 018113 - SUSTAINABLE DESIGN REQUIREMENTS
SECTION 018900 - SITE CONSTRUCTION PERFORMANCE REQUIREMENTS
SECTION 019113 - GENERAL COMMISSIONING REQUIREMENTS
SECTION 019119 - BUILDING ENCLOSURE COMMISSIONING
SECTION 019200 - FACILITY OPERATION, MAINTENANCE, AND TROUBLESHOOTING MOBILE GRAPHICAL INFORMATION MANAGEMENT PLATFORM

DIVISION 02 - EXISTING CONDITIONS

SECTION 024100 - SITE DEMOLITION
SECTION 028200 - ASBESTOS ABATEMENT
SECTION 028313 - LEAD HAZARD CONTROL

DIVISION 03 – CONCRETE

SECTION 032000 - CONCRETE REINFORCEMENT
SECTION 033000 - CAST-IN-PLACE CONCRETE
SECTION 033000 - CAST-IN-PLACE CONCRETE - WWTP
SECTION 033543 - POLISHED CONCRETE FINISHING
SECTION 035400 - CAST UNERLAYMENT

DIVISION 04 – MASONRY

SECTION 042000 - UNIT MASONRY ASSEMBLIES
SECTION 042500 - TERRA COTTA RAINSCREEN SYSTEM
SECTION 042505 - STABILIZED RAMMED EARTH
SECTION 042613 - MASONRY VENEER

DIVISION 05 – METALS

SECTION 051200 - STRUCTURAL STEEL FRAMING
SECTION 051400 - STRUCTURAL ALUMINUM
SECTION 053100 - STEEL DECKING
SECTION 054000 - COLD FORMED METAL FRAMING
SECTION 054300 - SLOTTED CHANNEL FRAMING
SECTION 055000 - METAL FABRICATIONS
SECTION 055000 - METAL FABRICATIONS-WWTP
SECTION 055113 - METAL PAN STAIRS
SECTION 055119 - METAL GRATING STAIRS
SECTION 055200 - HANDRAILS AND RAILIINGS
SECTION 055300 - FABRICATED GRATING

DIVISION 06 - WOOD, PLASTICS, AND COMPOSITES

SECTION 061053 - MISCELLANEOUS ROUGH CARPENTRY
SECTION 061600 - SHEATHING
SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS
SECTION 066119 - QUARTZ SURFACING FABRICATIONS
SECTION 066400 - PLASTIC PANELING
SECTION 068300 - COMPOSITE PANELING

DIVISION 07 - THERMAL AND MOISTURE PROTECTION

SECTION 071113 - BITUMINOUS DAMPPROOFING
SECTION 071326 - SELF-ADHERING SHEET WATERPROOFING
SECTION 071413 - HOT FLUID-APPLIED RUBBERIZED ASPHALT WATERPROOFING
SECTION 071900 - WATER REPELLENTS
SECTION 072100 - THERMAL INSULATION
SECTION 072600 - VAPOR RETARDERS
SECTION 072726 - FLUID-APPLIED MEMBRANE AIR BARRIERS
SECTION 074213.13 - FORMED METAL WALL PANELS
SECTION 074213.23 - METAL COMPOSITE MATERIAL WALL PANELS
SECTION 074213.33 - FORMED METAL SCREENWALL PANELS
SECTION 074293 - SOFFIT PANELS
SECTION 075419 - POLYVINYL-CHLORIDE (PVC) ROOFING
SECTION 076200 - SHEET METAL FLASHING AND TRIM
SECTION 077129 - MANUFACTURED ROOF EXPANSION JOINTS
SECTION 077200 - ROOF ACCESSORIES
SECTION 077273 - VEGETATED ROOF SYSTEMS
SECTION 078100 - APPLIED FIREPROOFING
SECTION 078123 - INTUMESCENT FIREPROOFING
SECTION 078413 - PENETRATION FIRESTOPPING
SECTION 078443 - JOINT FIRESTOPPING
SECTION 079200 - JOINT SEALANTS
SECTION 079219 - ACOUSTICAL JOINT SEALANTS
SECTION 079513.13 - INTERIOR EXPANSION JOINT COVER ASSEMBLIES
SECTION 079513.16 - EXTERIOR EXPANSION JOINT COVER ASSEMBLIES

Volume 2

DIVISION 08 – OPENINGS

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES
SECTION 081216 - ALUMINUM FRAMES
SECTION 081416 - FLUSH WOOD DOORS
SECTION 081473 - SLIDING WOOD DOORS
SECTION 083113 - ACCESS DOORS AND FRAMES
SECTION 083313 - COILING COUNTER DOORS
SECTION 083323 - OVERHEAD COILING DOORS
SECTION 083343 - OVERHEAD COILING SMOKE CURTAINS

SECTION 083516 - SIDE-FOLDING SECURITY GRILLES
SECTION 084123 - INTERIOR ALUMINUM-FRAMES ENTRANCES AND STOREFRONTS
SECTION 084126 - ALL-GLASS ENTRANCES
SECTION 084229.23 - SLIDING AUTOMATIC ENTRANCES
SECTION 084243 - INTENSIVE CARE UNIT/CRITICAL CARE UNIT (ICU/CCU) ENTRANCES
SECTION 084313 - ALUMINUM-FRAMED STOREFRONTS
SECTION 084413 - GLAZED ALUMINUM CURTAIN WALLS
SECTION 085619 - PASS WINDOWS
SECTION 086200 - UNIT SKYLIGHTS
SECTION 087100 - DOOR HARDWARE
SECTION 088000 - GLAZING
SECTION 088113 - DECORATIVE GLASS GLAZING
SECTION 088300 - MIRRORS
SECTION 088813 - FIRE-RATED GLAZING

DIVISION 09 – FINISHES

SECTION 090561.13 - MOISTURE VAPOR EMISSION CONTROL
SECTION 092116.23 - GYPSUM BOARD SHAFT WALL ASSEMBLIES
SECTION 092216 - NON-STRUCTURAL METAL FRAMING
SECTION 092900 - GYPSUM BOARD
SECTION 093013 - CERAMIC TILING
SECTION 095113 - ACOUSTICAL PANEL CEILINGS
SECTION 095423 - LINEAR METAL CEILINGS
SECTION 095446 - ACOUSTICAL BAFFLE SYSTEM
SECTION 096513 - RESILIENT BASE AND ACCESSORIES
SECTION 096516 - RESILIENT SHEET FLOORING
SECTION 096519 - RESILIENT TILE FLOORING
SECTION 096566 - RESILIENT ATHLETIC FLOORING
SECTION 096623 - RESINOUS MATRIX TERRAZZO FLOORING
SECTION 096723 - RESINOUS FLOORING
SECTION 096813 - TILE CARPETING
SECTION 097200 - WALL COVERINGS
SECTION 097723 - FABRIC-WRAPPED PANELS
SECTION 098316 - ACOUSTICAL CEILING INSULATION
SECTION 098433 - SOUND ABSORBING WALL UNITS
SECTION 099113 - EXTERIOR PAINTING

SECTION 099123 - INTERIOR PAINTING
SECTION 099600 - HIGH-PERFORMANCE COATINGS
SECTION 099600 - HIGH-PERFORMANCE COATINGS - WWTP
SECTION 099713 - COATINGS FOR WELDED STEEL WATER STORAGE TANK

DIVISION 10 – SPECIALTIES

SECTION 101100 - VISUAL DISPLAY UNITS
SECTION 101400 - SIGNAGE
SECTION 101400.01 - IDENTIFYING DEVICES
SECTION 102113.14 - STAINLESS-STEEL TOILET COMPARTMENTS
SECTION 102123 - CUBICLE CURTAINS AND TRACK
SECTION 102239 - FOLDING PANEL PARTITIONS
SECTION 102600 - WALL AND DOOR PROTECTION
SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES
SECTION 103100 - MANUFACTURED FIREPLACES
SECTION 104352 - FIRST AID AND SAFETY EQUIPMENT
SECTION 104413 - FIRE PROTECTION CABINETS
SECTION 104416 - FIRE EXTINGUISHERS
SECTION 105113 - METAL LOCKERS
SECTION 107516 - GROUND-SET FLAGPOLES
SECTION 108219 - EXTERIOR SOUND PANELS

DIVISION 11 – EQUIPMENT

SECTION 110800 - EQUIPMENT COMMISSIONING
SECTION 111313 - LOADING DOCK BUMPERS
SECTION 111316 - LOADING DOCK SEALS
SECTION 111319 - STATIONARY LOADING DOCK EQUIPMENT
SECTION 111326 - LOADING DOCK LIGHTS
SECTION 114000 - FOODSERVICE EQUIPMENT
SECTION 117000 - HEALTHCARE EQUIPMENT
SECTION 117100 - MEDICAL STERILIZING EQUIPMENT
SECTION 117311 - PATIENT LIFTS
SECTION 118129 - FACILITY FALL PROTECTION
SECTION 118201 - HYDRAULIC CART TIPPER
SECTION 118226 - FACILITY WASTE COMPACTORS

DIVISION 12 – FURNISHINGS

SECTION 122413 - ROLLER WINDOW SHADES
SECTION 123553 - GENERAL REQUIREMENTS FOR LABORATORY CASEWORK AND FUME HOODS
SECTION 123553.03 - ADAPTABLE LABORATORY CASEWORK SYSTEMS
SECTION 123553.19 - WOOD LABORATORY CASEWORK
SECTION 123570 - HEALTHCARE CASEWORK
SECTION 123623.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS
SECTION 123661.16 - SOLID SURFACING COUNTERTOPS
SECTION 123661.19 - QUARTZ AGGLOMERATE COUNTERTOPS
SECTION 124816 - ENTRANCE FLOOR GRILLES
SECTION 126100 - FIXED UPHOLSTERED SEATING

DIVISION 13 - SPECIAL CONSTRUCTION

SECTION 131200 - ALUMINUM ROOFTOP HELISTOPS
SECTION 131224 - EXTERIOR WATER FEATURE
SECTION 133419 - METAL BUILDING SYSTEMS
SECTION 134900 - RADIATION PROTECTION
SECTION 134920 - RFI/EMI SHIELDING

DIVISION 14 - CONVEYING EQUIPMENT

SECTION 142100 - ELECTRIC TRACTION ELEVATORS
SECTION 149200 - PNEUMATIC TUBE SYSTEM – 6 INCH

Volume 3

DIVISION 21 - FIRE SUPPRESSION

SECTION 210533 - HEAT TRACING FOR FIRE-SUPPRESSION PIPING
SECTION 210800 - FIRE SUPPRESSION SYSTEMS COMMISSIONING
SECTION 211300 - FIRE SPRINKLER AND STANDPIPE SYSTEMS
SECTION 213000 - FIRE PUMPS, PUMP CONTROLLERS, AND OTHER APPURTENANCES

DIVISION 22 – PLUMBING

SECTION 220513 - COMMON MOTOR REQUIREMENTS FOR PLUMBING EQUIPMENT
SECTION 220516 - EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING
SECTION 220517 - SLEEVES AND SLEEVE SEALS FOR PLUMBING PIPING
SECTION 220517 - SLEEVES AND SLEEVE SEALS PLUMBING PIPING-WWTP
SECTION 220518 - ESCUTCHEONS FOR PLUMBING PIPING
SECTION 220518 - ESCUTCHEONS FOR PLUMBING PIPING - WWTP
SECTION 220519 - METERS AND GAGES FOR PLUMBING PIPING
SECTION 220519 - METERS AND GAGES FOR PLUMBING PIPING - WWTP
SECTION 220523.12 - BALL VALVES FOR PLUMBING PIPING
SECTION 220523.12 - BALL VALVES FOR PLUMBING PIPING - WWTP
SECTION 220523.13 - BUTTERFLY VALVES FOR PLUMBING PIPING
SECTION 220523.14 - CHECK VALVES FOR PLUMBING PIPING
SECTION 220523.14 - CHECK VALVES FOR PLUMBING PIPING - WWTP
SECTION 220523.15 - GATE VALVES FOR PLUMBING PIPING
SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT
SECTION 220529 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT - WWTP
SECTION 220533 - HEAT TRACING FOR PLUMBING PIPING
SECTION 220548 - VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT
SECTION 220548 - VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT - WWTP
SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT–
SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT - WWTP
SECTION 220716 - PLUMBING EQUIPMENT INSULATION
SECTION 220719 - PLUMBING PIPING INSULATION
SECTION 220719 - PLUMBING PIPING INSULATION - WWTP
SECTION 220800 - PLUMBING SYSTEMS COMMISSIONING
SECTION 221113 - FACILITY WATER DISTRIBUTION PIPING
SECTION 221116 - DOMESTIC WATER PIPING
SECTION 221116 - DOMESTIC WATER PIPING - WWTP
SECTION 221117 - RECLAIMED-WATER PIPING
SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES
SECTION 221119 - DOMESTIC WATER PIPING SPECIALTIES - WWTP
SECTION 221123 - DOMESTIC WATER PUMPS
SECTION 221123 - DOMESTIC WATER PUMPS - WWTP
SECTION 221123.13 - DOMESTIC-WATER PACKAGED BOOSTER PUMPS

SECTION 221123.13 - DOMESTIC-WATER PACKAGED BOOSTER PUMPS - WWTP
SECTION 221316 - SANITARY WASTE AND VENT PIPING
SECTION 221316 - SANITARY WASTE AND VENT PIPING - WWTP
SECTION 221323 - SANITARY WASTE INTERCEPTORS
SECTION 221413 - FACILITY STORM DRAINAGE PIPING
SECTION 221423 - STORM DRAINAGE PIPING SPECIALTIES
SECTION 221429 - SUMP PUMPS
SECTION 221429 - SUMP PUMPS - WWTP
SECTION 223100 - DOMESTIC WATER SOFTENERS
SECTION 223200 - DOMESTIC WATER FILTRATION EQUIPMENT
SECTION 223300 - ELECTRIC, DOMESTIC-WATER HEATERS
SECTION 223300 - ELECTRIC, DOMESTIC-WATER HEATERS - WWTP
SECTION 224213.13 - COMMERCIAL WATER CLOSETS
SECTION 224213.13 - COMMERCIAL WATER CLOSETS - WWTP
SECTION 224213.16 - COMMERCIAL URINALS
SECTION 224213.16 - COMMERCIAL URINALS - WWTP
SECTION 224216.13 - COMMERCIAL LAVATORIES
SECTION 224216.13 - COMMERCIAL LAVATORIES - WWTP
SECTION 224216.16 - COMMERCIAL SINKS
SECTION 224216.16 - COMMERCIAL SINKS - WWTP
SECTION 224223 - COMMERCIAL SHOWER
SECTION 224223 - COMMERCIAL SHOWER - WWTP
SECTION 224300 - HEALTHCARE PLUMBING FIXTURES
SECTION 224500 - EMERGENCY PLUMBING FIXTURES
SECTION 224500 - EMERGENCY PLUMBING FIXTURES - WWTP
SECTION 224700 - DRINKING FOUNTAINS AND WATER COOLERS
SECTION 226113 - COMPRESSED-AIR PIPING FOR LABORATORY AND HEALTHCARE FACILITIES
SECTION 226119 - COMPRESSED-AIR EQUIPMENT FOR LABORATORY AND HEALTHCARE FACILITIES
SECTION 226213 - VACUUM PIPING FOR LABORATORY AND HEALTHCARE FACILITIES
SECTION 226219 - VACUUM EQUIPMENT FOR LABORATORY AND HEALTHCARE FACILITIES
SECTION 226313 - GAS PIPING FOR LABORATORY AND HEALTHCARE FACILITIES

SECTION 226400 - MEDICAL GAS ALARMS
SECTION 226713 - PROCESSED WATER PIPING FOR LABORATORY AND HEALTHCARE FACILITIES
SECTION 226719 - PROCESSED WATER EQUIPMENT FOR LABORATORY AND HEALTHCARE FACILITIES

DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

SECTION 230130.51 - HVAC AIR-DISTRIBUTION SYSTEM CLEANING
SECTION 230513 - COMMON MOTOR REQUIREMENTS FOR HVAC AND PLUMBING EQUIPMENT
SECTION 230513 - COMMON MOTOR REQUIREMENTS FOR HVAC AND PLUMBING EQUIPMENT - WWTP
SECTION 230516 - EXPANSION FITTINGS AND LOOPS FOR HVAC PIPING
SECTION 230517 - SLEEVES AND SLEEVE SEALS FOR HVAC AND PLUMBING PIPING
SECTION 230518 - ESCUTCHEONS FOR HVAC PIPING
SECTION 230519 - METERS AND GAGES FOR HVAC PIPING
SECTION 230523 - GENERAL-DUTY VALVES FOR HVAC PIPING
SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT
SECTION 230529 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT - WWTP
SECTION 230548 - VIBRATION AND SEISMIC CONTROLS FOR HVAC
SECTION 230548 - VIBRATION AND SEISMIC CONTROLS FOR HVAC - WWTP
SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT
SECTION 230553 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT - WWTP
SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC
SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC - WWTP
SECTION 230713 - DUCT INSULATION
SECTION 230713 - DUCT INSULATION - WWTP
SECTION 230716 - HVAC EQUIPMENT INSULATION
SECTION 230716 - HVAC EQUIPMENT INSULATION - WWTP
SECTION 230719 - HVAC PIPING INSULATION
SECTION 230800 - HVAC SYSTEMS COMMISSIONING
SECTION 230900 - INSTRUMENTATION AND CONTROL FOR HVAC
SECTION 231113 - FACILITY FUEL-OIL PIPING
SECTION 231126 - FACILITY LIQUEFIED-PETROLEUM GAS PIPING
SECTION 232113 - HYDRONIC PIPING
SECTION 232116 - HYDRONIC PIPING SPECIALTIES
SECTION 232123 - HYDRONIC PUMPS
SECTION 2323000 - REFRIGERANT PIPING

SECTION 232513 - WATER TREATMENT FOR CLOSED-LOOP HYDRONIC SYSTEMS
SECTION 233113 - METAL DUCTS
SECTION 233113 - METAL DUCTS - WWTP
SECTION 233300 - AIR DUCT ACCESSORIES
SECTION 233300 - AIR DUCT ACCESSORIES - WWTP
SECTION 233416 - CENTRIFUGAL HVAC FANS
SECTION 233423 - HVAC POWER VENTILATORS
SECTION 233423 - HVAC POWER VENTILATORS - WWTP
SECTION 233433 - AIR CURTAINS
SECTION 233600 - AIR TERMINAL UNITS
SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES
SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES - WWTP
SECTION 233723 - HVAC GRAVITY VENTILATORS
SECTION 234100 - PARTICULATE AIR FILTRATION
SECTION 234200 - GAS-PHASE AIR FILTRATION
SECTION 235213 - ELECTRIC BOILERS
SECTION 235700 - HEAT EXCHANGERS FOR HVAC
SECTION 236423.13 - AIR-COOLED, SCROLL WATER CHILLERS
SECTION 236423.14 - AIR SOURCE CHILLER-HEATER
SECTION 236426 - AIR-COOLED CENTRIFUGAL WATER CHILLERS
SECTION 237200 - AIR-TO-AIR ENERGY RECOVERY EQUIPMENT
SECTION 237323 - CUSTOM OUTDOOR CENTRAL-STATION AIR-HANDLING UNITS
SECTION 237416.11 - PACKAGED, SMALL-CAPACITY, ROOFTOP AIR-CONDITIONING UNITS
SECTION 237416.11 - PACKAGED, SMALL-CAPACITY, ROOFTOP AIR-CONDITIONING UNITS - WWTP
SECTION 238123.12 - LARGE CAPACITY (7 TONS (25 KW AND LARGER), COMPUTER-ROOM AIR-CONDITIONERS
SECTION 238123.13 - COMPUTER-ROOM AIR-CONDITIONERS
SECTION 238126 - SPLIT-SYSTEM AIR-CONDITIONERS
SECTION 238126 - SPLIT-SYSTEM AIR-CONDITIONERS - WWTP
SECTION 238214 - CHILLED BEAMS
SECTION 238216 - AIR COILS
SECTION 238219 - FAN COIL UNITS
SECTION 238239 - UNIT HEATERS
SECTION 238239 - UNIT HEATERS - WWTP
SECTION 238316 - RADIANT-HEATING HYDRONIC PIPING
SECTION 238413 - HUMIDIFIERS
SECTION 238610 - BI-POLAR IONIZATION AIR PURIFICATION SYSTEM

DIVISION 25 - INTEGRATED AUTOMATION

NOT APPLICABLE

Volume 4

DIVISION 26 – ELECTRICAL

SECTION 260400 - COMMON WORK RESULTS FOR ELECTRICAL
SECTION 260400 - COMMON WORK RESULTS FOR ELECTRICAL - WWTP
SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES
SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES – WWTP
SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES
SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES - WWTP
SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS
SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS - WWTP
SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS
SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS - WWTP
SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS
SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS - WWTP
SECTION 260536 - CABLE TRAYS FOR ELECTRICAL SYSTEMS - WWTP
SECTION 260539 - UNDERFLOOR RACEWAYS FOR ELECTRICAL SYSTEMS
SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS - WWTP
SECTION 260543 - UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS-WWTP - M-M
SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING
SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING - WWTP
SECTION 260548.16 - SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS
SECTION 260548.16 - SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS - WWTP
SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS
SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS - WWTP
SECTION 260573.13 - OVERCURRENT PROTECTIVE DEVICE SHORT-CIRCUIT STUDY
SECTION 260573.13 - OVERCURRENT PROTECTIVE DEVICE SHORT-CIRCUIT STUDY - WWTP
SECTION 260573.16 - OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY

SECTION 260573.16 - OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY - WWTP
SECTION 260573.19 - OVERCURRENT PROTECTIVE DEVICE ARC-FLASH STUDY
SECTION 260573.19 - OVERCURRENT PROTECTIVE DEVICE ARC-FLASH STUDY – WWTP
SECTION 260800 - ELECTRICAL SYSTEMS COMMISSIONING
SECTION 260913 - ELECTRICAL POWER MONITORING AND CONTROL
SECTION 260913 - ELECTRICAL POWER MONITORING AND CONTROL - WWTP
SECTION 260923 - LIGHTING CONTROL DEVICES
SECTION 260923 - LIGHTING CONTROL DEVICES - WWTP
SECTION 260943 - NETWORK LIGHTING CONTROLS
SECTION 260943.23 - RELAY-BASED LIGHTING CONTROLS
SECTION 262213 - LOW-VOLTAGE DISTRIBUTION TRANSFORMERS
SECTION 262213 - LOW-VOLTAGE DISTRIBUTION TRANSFORMERS - WWTP
SECTION 262300 - LOW-VOLTAGE SWITCHGEAR
SECTION 262313 - PARALLELING LOW-VOLTAGE SWITCHGEAR
SECTION 262413 - SWITCHBOARDS
SECTION 262413 - SWITCHBOARDS - WWTP
SECTION 262416 - PANELBOARDS
SECTION 262416 - PANELBOARDS - WWTP
SECTION 262419 - MOTOR CONTROL CENTERS - WWTP
SECTION 262713 - ELECTRICITY METERING
SECTION 262713 - ELECTRICITY METERING - WWTP
SECTION 262726 - WIRING DEVICES
SECTION 262726 - WIRING DEVICES - WWTP
SECTION 262743 - ELECTRIC-VEHICLE SERVICE EQUIPMENT - AC LEVEL 1 AND LEVEL 2
SECTION 262813 - FUSES
SECTION 262813 - FUSES - WWTP
SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS
SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS - WWTP
SECTION 262923 - VARIABLE-FREQUENCY MOTOR CONTROLLERS
SECTION 262923 - VARIABLE-FREQUENCY MOTOR CONTROLLERS - WWTP
SECTION 263100 - PHOTOVOLTAIC COLLECTORS
SECTION 263213 - ENGINE GENERATORS
SECTION 263213 - ENGINE GENERATORS - WWTP
SECTION 263233 - ROTARY UNINTERRUPTIBLE POWER UNITS
SECTION 263353 - STATIC UNINTERRUPTIBLE POWER SUPPLY
SECTION 263353 - STATIC UNINTERRUPTIBLE POWER SUPPLY - WWTP

SECTION 263600 - TRANSFER SWITCHES
SECTION 263600 - TRANSFER SWITCHES - WWTP
SECTION 263650 - GENERATOR DOCKING STATIONS
SECTION 264113 - LIGHTNING PROTECTION FOR STRUCTURES
SECTION 264313 - SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS - WWTP
SECTION 264313 - SURGE PROTECTION FOR LOW-VOLTAGE ELECTRICAL POWER CIRCUITS-WWTP
SECTION 265100 - INTERIOR LIGHTING
SECTION 265100 - INTERIOR LIGHTING - WWTP
SECTION 265600 - EXTERIOR LIGHTING
SECTION 265600 - EXTERIOR LIGHTING - WWTP

DIVISION 27 – COMMUNICATIONS

SECTION 270413 - COMMON SUBMITTAL REQUIREMENTS FOR COMMUNICATIONS
SECTION 270526 - GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS
SECTION 270528 - PATHWAYS FOR COMMUNICATIONS SYSTEMS
SECTION 270536 - CABLE TRAYS FOR COMMUNICATIONS SYSTEMS
SECTION 270544 - SLEEVES AND SLEEVE SEALS FOR COMMUNICATIONS PATHWAYS AND CABLING
SECTION 270553 - IDENTIFICATION FOR COMMUNICATIONS SYSTEMS
SECTION 270800 - COMMUNICATIONS SYTEMS COMMISSIONING
SECTION 271100 - COMMUNICATIONS EQUIPMENT ROOM FITTINGS
SECTION 271300 - COMMUNICATIONS BACKBONE CABLING
SECTION 271500 - COMMUNICATIONS HORIZONTAL CABLING
SECTION 272100 - DATA COMMUNICATIONS NETWORK EQUIPMENT
SECTION 273226 - TWO-WAY COMMUNICATIONS SYSTEM
SECTION 274116 - INTEGRATED AUDIOVISUAL SYSTEMS AND EQUIPMENT
SECTION 275113 - PAGING SYSTEMS
SECTION 275119 - SOUND MASKING SYSTEMS
SECTION 275123 - EMERGENCY HELP POINTS AND CALL BOXES
SECTION 275223 - NURSE CALL AND CODE BLUE SYSTEMS
SECTION 275313 - SYNCHRONIZED CLOCK SYSTEM
SECTION 275316 - PATIENT, INFANT, AND EQUIPMENT RFID TRACKING SYSTEMS
SECTION 275319 - DISTRIBUTED ANTENNA STSYTEMS

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

SECTION 280413 - COMMON SUBMITTAL REQUIREMENTS FOR ELECTRONIC SAFETY AND SECURITY
SECTION 280513 - CONDUCTORS AND CABLES FOR ELECTRONIC SAFETY AND SECURITY
SECTION 280526 - GROUNDING AND BONDING FOR ELECTRONIC SAFETY AND SECURITY
SECTION 280528 - PATHWAYS FOR ELECTRONIC SAFETY AND SECURITY
SECTION 280544 - SLEEVES AND SLEEVE SEALS FOR ELECTRONIC SAFETY AND SECURITY PATHWAYS AND CABLING
SECTION 280800 - ELECTRONIC SAFETY AND SECURITY SYSTEMS COMMISSIONING
SECTION 281300 – ACCESS CONTROL
SECTION 281600 - INTRUSION DETECTION SYSTEM
SECTION 282300 - VIDEO SURVEILLANCE
SECTION 283111 - DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM
SECTION 285000 - SECURITY CONTROL SYSTEM

Volume 5

DIVISION 31 – EARTHWORK

SECTION 312213 - ROUGH GRADING
SECTION 312300 - EXCAVATION AND FILL
SECTION 312316.16 - STRUCTURAL EXCAVATION FOR MINOR STRUCTURES
SECTION 312323.13 - BACKFILL
SECTION 312333 - TRENCHING AND BACKFILL
SECTION 312500 - EROSION AND SEDIMENTATION CONTROLS
SECTION 313116 - TERMITE CONTROL
SECTION 316329 - DRILLED CONCRETE PIERS AND SHAFTS

DIVISION 32 - EXTERIOR IMPROVEMENTS

SECTION 321123 - AGGREGATE BASE COURSES
SECTION 321216 - ASPHALT PAVING
SECTION 321223 - IMPRINTED ASPHALT
SECTION 321313 - CONCRETE PAVING
SECTION 321315 - CONCRETE WALKS, CURBS AND GUTTERS
SECTION 321316 - DECORATIVE CONCRETE PAVING
SECTION 321373 - CONCRETE PAVING JOINT SEALANTS
SECTION 321716 - MANUFACTURED TRAFFIC-CALMING DEVICES
SECTION 321723 - PAVEMENT MARKINGS
SECTION 323113 - CHAIN LINK FENCES AND GATES
SECTION 323119 - DECORATIVE METAL FENCES AND GATES
SECTION 323213 - CAST-IN-PLACE CONCRETE RETAINING WALLS
SECTION 324020 - PIPE AND TUBE RAILINGS
SECTION 328000 - IRRIGATION SYSTEM
SECTION 329100 - SOIL PREPARATION (TOPSOIL)
SECTION 329220 - NATIVE SEEDING
SECTION 329300 - EXTERIOR PLANTINGS

DIVISION 33 - UTILITIES

SECTION 331000 - WATER UTILITIES
SECTION 331623 - WELDED STEEL WATER STORAGE TANK AND FOUNDATION
SECTION 333000 - SANITARY SEWERAGE UTILITIES
SECTION 333213 - PACKAGE LIFT STATION
SECTION 333723 - SLIDE GATE
SECTION 334213 - STORMWATER CULVERTS AND DRAINAGE FACILITIES

DIVISION 34 - TRANSPORTATION

SECTION 340114 - SIGNING AND MARKING
SECTION 344113 - TRAFFIC SIGNALS
SECTION 347100 - ADOT REQUIREMENTS
SECTION 347113 - VEHICLE BARRIERS
SECTION 347116 - IMPACT ATTENUATING DEVICES

DIVISION 40 - PROCESS INTERCONNECTIONS

SECTION 400205 - PIPING SCHEDULE
SECTION 400510 - PIPING - GENERAL
SECTION 400510.03 - DPS - EPOXY LINED DUCTILE IRON PIPE AND FITTINGS
SECTION 400510.04 - DPS - MILL TYPE STEEL PIPE AND FITTINGS (GENRAL SERVICE)
SECTION 400510.09 - DPS STAINLESS STEEL PIPE AND FITTINGS
SECTION 400510.12 - DPS - POLYVINYL CHLORIDE (PVC) PIPE AND FITTINGS
SECTION 400510.13 - DPS - CHLORINATED POLYVINYL CHLORIDE (CPVC) PIPE AND FITTINGS
SECTION 400510.30 - DPS HIGH DENSITY POLYETHYLENE (HDPE) PIPE AND TUBING
SECTION 400533 - MANUAL VALVES
SECTION 400555 - SELF CONTAINED AUTOMATIC VALVES
SECTION 400557 - POWER OPERATED GATE AND VALVE ASSEMBLIES
SECTION 406110 - PROCESS INSTRUMENTATION AND CONTROLS SYSTEM (PICS) GENERAL
SECTION 406115 - PICS SCOPE OF WORK
SECTION 406116 - PICS ENCLOSURES
SECTION 406120 - PROCESS CONTROL NARRATIVES (PCNs)
SECTION 406120.01- PCN-INFLUENT PUMP STATION
SECTION 406120.02 - PCN-EQ BASIN TRANSFER PUMP STATION
SECTION 406120.03 - PCN-AEORBIC SLUDGE DIGESTER
SECTION 406120.04 - PCN-EFFLUENT PUMPING SYSTEM
SECTION 406121 - PICS PROCESS TAPS AND PRIMARY ELEMENTS
SECTION 406124 - PICS INSTRUMENTATION CABLE
SECTION 406127 - PICS INDUSTRIAL ETHERNET NETWORK
SECTION 406128 - PICS MISCELLANEOUS EQUIPMENT
SECTION 406140 - PICS INSTRUMENTATION REQUIREMENTS
SECTION 406160 - PICS PLC I-O INDEX
SECTION 406171 - INSTRUMENT SPECIFICATIONS
SECTION 406176 - PLANT CONTROL SYSTEM (PCS) SOFTWARE REQUIREMENTS
SECTION 406177 - PLANT CONTROL SYSTEM (PCS) HARDWARE AND SOFTWARE
SECTION 406180 - PICS TESTING, CALIBRATION, AND INSTALLATION VERIFICATION
SECTION 406181 - PICS COMMISSIONING AND START-UP
SECTION 406182 - PICS PERSONNEL TRAINING
SECTION 406191- PICS SPARE PARTS

DIVISION 41 - MATERIAL PROCESSING AND HANDLING EQUIPMENT

SECTION 412213.17 - DAVIT AND GANTRY CRANES
SECTION 413313 - OVERHEAD TRAVELING CRANES
SECTION 413313.01 - DETAIL SPECIFICATION - TREATMENT PLANT BRIDGE CRANE

DIVISION 43 - PROCESS GAS AND LIQUID HANDLING, PURIFICATION, AND STORAGE EQUIPMENT

SECTION 431030 - SUBMERSIBLE NON-CLOG CENTIFUGAL PUMPS
SECTION 431111 - BLOWERS
SECTION 432256 - SUBMERSIBLE MIXERS
SECTION 432321 - RECLAIMED EFFLUENT PUMPING SYSTEMS
SECTION 432331 - NPW PUMPING SYSTEMS
SECTION 432331.01 - PCN NON-POTABLE WATER SYSTEM
SECTION 432332 - RECLAIMED WATER PUMPING SYSTEM
SECTION 432358 - POSITIVE DISPLACEMENT ROTARY LOBE PUMPS
SECTION 433230 - ODOR CONTROL BIOTRICKLING SYSTEM
SECTION 433269 - CHEMICAL FEED SKID – PERISTALTIC PUMPS
SECTION 434010 - CHEMICAL STORAGE AND CONTAINMENT

DIVISION 46 – WATER AND WASTEWATER EQUIPMENT

SECTION 460754 - MEMBRANE BIOREACTOR PACKAGE PLANT SYSTEM
SECTION 460754.01 - DES-SKID COMPONENTS
SECTION 460754.02 - DES-SUBMERSIBLE MIXERS
SECTION 460754.03 - DES-FLEXIBLE MEMBRANE DIFFUSERS
SECTION 460754.04 - DES-SUBMERSIBLE PUMPS
SECTION 460754.05 - DES SELF-PRIMING CENTRIFUGAL PUMPS
SECTION 460754.06 - DES-REGENERATIVE BLOWERS
SECTION 460754.07 - DES-PROCESS INSTRUMENTATION
SECTION 460754.08 - PACKAGE MBR SYSTEM - LAYOUT DRAWINGS
SECTION 460754.09 - PACKAGE MBR SYSTEM - P&ID DDRAWINGS
SECTION 460754.10 - DES-CHEMICAL FEED SKIDS
SECTION 461155 - SLUDGE DEWATERING SYSTEM - GENERAL
SECTION 461155.01 - DES VOLUTE PRESS
SECTION 461155.02 - DES POLYMER BLENDING SYSTEM
SECTION 461155.03 - DES SCREW CONVEYOR
SECTION 461155.04 - PCN-SLUDGE DEWATERING SYSTEM
SECTION 462113 - SCREENING AND GRIT REMOVAL SYSTEM - GENERAL

SECTION 462113.1 - DES - COARSE SCREENING AND GRIT REMOVAL PACKAGE SYSTEM
SECTION 462113.2 - DES - FINE SCREENING
SECTION 462113.3 - DES - MANUAL BAR SCREEN
SECTION 465035 - WASTEWATER ULTRAVIOLET DISINFECTION SYSTEM
SECTION 465035.01 - DES-HOSPITAL WASTEWATER ULTRAVIOLET DISINFECTION SYSTEM
SECTION 465035.02 - DES HON-DAH WASTEWATER ULTRAVIOLET DISINFECTION SYSTEM
SECTION 465131 - AERATION EQUIPMENT – GENERAL
SECTION 465131.01 - DES-FINE BUBBLE AERATION
SECTION 465131.02 - DES-COARSE BUBBLE AERATION

END OF TABLE OF CONTENTS

SECTION 081113 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior standard steel doors and frames.
   2. Exterior standard steel doors and frames.

1.2 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings in accordance with NAAMM-HMMA 803 or ANSI/SDI A250.8.

1.3 COORDINATION

A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data:
   1. Interior standard steel doors and frames.
   2. Exterior standard steel doors and frames.

B. Product Data Submittals: For each product.
   1. Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.

C. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
   2. Environmental Product Declaration: For each product.
   3. Material Ingredient Documentation: For each product.

D. Shop Drawings: Include the following:
   1. Elevations of each door type.
   2. Details of doors, including vertical- and horizontal-edge details and metal thicknesses.
   3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
   4. Locations of reinforcement and preparations for hardware.
   5. Details of each different wall opening condition.
   6. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
   7. Details of anchorages, joints, field splices, and connections.

8. Details of accessories.
9. Details of moldings, removable stops, and glazing.

E. Samples for Initial Selection: For hollow-metal doors and frames with factory-applied color finishes.

F. Samples for Verification:
1. Finishes: For each type of exposed finish required, prepared on Samples of not less than 3 by 5 inches.
2. Fabrication: Prepare Samples approximately 12 by 12 inches to demonstrate compliance with requirements for quality of materials and construction:
   a. Doors: Show vertical-edge, top, and bottom construction; core construction; and hinge and other applied hardware reinforcement. Include separate section showing glazing if applicable.
   b. Frames: Show profile, corner joint, floor and wall anchors, and silencers. Include separate section showing fixed hollow-metal panels and glazing if applicable.

G. Product Schedule: For hollow-metal doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For door inspector.
1. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
2. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
3. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.

B. Product Test Reports: For each type of fire-rated hollow-metal door and frame assembly, fire-rated borrowed-lite assembly, and thermally rated door assemblies for tests performed by a qualified testing agency indicating compliance with performance requirements.

C. Oversize Construction Certification: For assemblies required to be fire-rated and exceeding limitations of labeled assemblies.

D. Field quality-control reports.

1.7 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.8 QUALITY ASSURANCE

A. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies is to meet the qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:
1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies is to meet the qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
   1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow-metal doors and frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.
   1. Provide additional protection to prevent damage to factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow-metal doors and frames vertically under cover at Project site with head up. Place on minimum 4-inch- high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
   1. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.
   2. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
   3. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

B. Fire-Rated, Borrowed-Lite Assemblies: Assemblies complying with NFPA 80 and listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing in accordance with NFPA 257 or UL 9.

C. Thermally Rated Door Assemblies: Provide door assemblies with U-factor of not more than 0.38 deg Btu/F x h x sq. ft. when tested in accordance with ASTM C1363 or ASTM E1423.

D. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

E. Material Ingredients: Documentation that demonstrate the chemical inventory of the product to at least 0.1 percent (1000 ppm).

2.2 INTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A.
   1. Doors:
      a. Type: As indicated in the Door and Frame Schedule on Drawings.
      b. Thickness: 1-3/4 inches.
      c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch.
      d. Edge Construction: Model 2, Seamless.
      e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
      f. Core: Vertical steel stiffener.
      g. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated and temperature-rise-rated doors.
   2. Frames:
      a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch.
      b. Sidelite and Transom Frames: Fabricated from same thickness material as adjacent door frame.
      c. Construction: Full profile welded.
   3. Exposed Finish: Prime.

2.3 EXTERIOR STANDARD STEEL DOORS AND FRAMES

A. Construct hollow-metal doors and frames to comply with standards indicated for materials, fabrication, hardware locations, hardware reinforcement, tolerances, and clearances, and as specified.

B. Extra-Heavy-Duty Doors and Frames: ANSI/SDI A250.8, Level 3; ANSI/SDI A250.4, Level A.
   1. Doors:
      a. Type: As indicated in the Door and Frame Schedule on Drawings.
      b. Thickness: 1-3/4 inches.
      c. Face: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
      d. Edge Construction: Model 2, Seamless.
      e. Edge Bevel: Provide manufacturer's standard beveled or square edges.
      f. Top Edge Closures: Close top edges of doors with flush closures of same material as face sheets. Seal joints against water penetration.
      g. Bottom Edges: Close bottom edges of doors with end closures or channels of same material as face sheets. Provide weep-hole openings in bottoms of exterior doors to permit moisture to escape.
      h. Core: Polyisocyanurate.
      i. Fire-Rated Core: Manufacturer's standard laminated mineral board core for fire-rated doors.

2. Frames:
   a. Materials: Metallic-coated steel sheet, minimum thickness of 0.053 inch, with minimum A60 coating.
   b. Construction: Full profile welded.
3. Exposed Finish: Prime.

2.4 BORROWED LITES

A. Fabricate of metallic-coated steel sheet, minimum thickness of 0.053 inch.

B. Construction: Full profile welded.

C. Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as metal as frames.

D. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.

2.5 FRAME ANCHORS

A. Jamb Anchors:
   1. Type: Anchors of minimum size and type required by applicable door and frame standard, and suitable for performance level indicated.
   2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
   3. Postinstalled Expansion Anchor: Minimum 3/8-inch- diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.
   1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized in accordance with ASTM A153/A153M, Class B.

2.6 MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

C. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

D. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.

F. Mineral-Fiber Insulation: ASTM C665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively; passing ASTM E136 for combustion characteristics.

G. Glazing: Comply with requirements in Section 088000 "Glazing."

2.7 FABRICATION

A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted or as required to comply with published listing of qualified testing agency.

B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
   1. Sidelite and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by welding, or by rigid mechanical anchors.
   2. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
   3. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
      a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
      b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
   4. Terminated Stops (Hospital Stops): Terminate stops 6 inches above finish floor with a 45 -degree angle cut, and close open end of stop with steel sheet closure. Cover opening in extension of frame with welded-steel filler plate, with welds ground smooth and flush with frame.

C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule on Drawings, and templates.
   1. Reinforce doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.
   2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

D. Glazed Lites: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.
   1. Provide stops and moldings flush with face of door, and with beveled stops unless otherwise indicated.
   2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
   3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames. Provide loose stops and moldings on inside of hollow-metal doors and frames.

4. Coordinate rabbet width between fixed and removable stops with glazing and installation types indicated.
5. Provide stops for installation with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c. and not more than 2 inches o.c. from each corner.

2.8 STEEL FINISHES

A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
   1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

2.9 LOUVERS

A. Provide louvers for interior doors, where indicated, which comply with SDI 111, with blades or baffles formed of 0.020-inch- thick, cold-rolled steel sheet set into 0.032-inch-thick steel frame.
   1. Fire-Rated Automatic Louvers: Louvers constructed with movable blades closed by actuating fusible link, and listed and labeled for use in fire-rated door assemblies of type and fire-resistance rating indicated by same qualified testing and inspecting agency that established fire-resistance rating of door assembly.

B. Form corners of moldings with hairline joints. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.

PART 3 - EXECUTION

3.1 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.

B. Drill and tap doors and frames to receive non-templated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

A. Install hollow-metal doors and frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.

B. Hollow-Metal Frames: Comply with ANSI/SDI A250.11.
   1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
      a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
      b. Install frames with removable stops located on secure side of opening.
   2. Fire-Rated Openings: Install frames in accordance with NFPA 80.
   3. Floor Anchors: Secure with post-installed expansion anchors.

4. Solidly pack mineral-fiber insulation inside frames.
5. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
6. In-Place Concrete or Masonry Construction: Secure frames in place with post-installed expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
   a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
   b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
   c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
   d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

C. Hollow-Metal Doors: Fit and adjust hollow-metal doors accurately in frames, within clearances specified below.
1. Non-Fire-Rated Steel Doors: Comply with ANSI/SDI A250.8.
2. Fire-Rated Doors: Install doors with clearances in accordance with NFPA 80.
3. Smoke-Control Doors: Install doors in accordance with NFPA 105.
4. Clearances:
   a. Provide 1/8 inch at heads, jambs, and between pairs of doors.
   b. Floor clearance for fire-rated swinging doors shall not exceed 3/4 inch. Floor clearance shall be provided for the functional operation of all swinging doors and shall not be less than 1/8 inch.

D. Glazing: Comply with installation requirements in Section 088000 "Glazing" and with hollow-metal manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Owner will engage through the Contractor a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:
1. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
2. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 REPAIR

A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint in accordance with manufacturer's written instructions.

C. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION

SECTION 081216 - ALUMINUM FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior aluminum door frames and glazing frames.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, fire-resistance rating, and finishes.

B. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

C. Shop Drawings: For aluminum frames:
   1. Include elevations, sections, and installation details for each wall-opening condition.
   2. Include details for each frame type, including dimensioned profiles and metal thicknesses.
   3. Include locations of reinforcements and preparations for hardware.
   4. Include details of anchorages, joints, field splices, connections, and accessories.
   5. Include details of moldings, removable stops, and glazing.

D. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard sizes.

E. Samples for Initial Selection: For each type of exposed finish.
   1. Include Samples of seals, gaskets, and accessories involving color selection.

F. Samples for Verification: For each type of the following products:
   1. Framing Member and Finish: 12 inches long. Include trim.
   2. Corner Fabrication and Finish: 12-by-12-inch- long, full-size window corner, including full-size sections of extrusions with factory-applied finish.

G. Product Schedule: For aluminum frames. Use same designations indicated on Drawings. Coordinate with door hardware schedule and glazing.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum frames to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for fabrication and installation.
   1. Build mockup of each type of aluminum frame in typical wall area as shown on Drawings.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Frames: Frames for fire-rated door assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 orUL 10C.
   1. Oversize Fire-Rated Frames: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that frames comply with standard construction requirements for tested and labeled fire-rated frames except for size.
   2. Frames for Smoke- and Draft-Control Assemblies: Tested in accordance with UL 1784 and installed in compliance with NFPA 105.
      a. Air Leakage Rate: Maximum air leakage of 0.3 cfm/sq. ft. at the tested pressure differential of 0.3-inch wg.

2.2 INTERIOR ALUMINUM DOOR FRAMES, AND GLAZING FRAMES

A. Recycled Content of Aluminum Components: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Aluminum Framing: ASTM B221, with alloy and temper required to suit structural and finish requirements, and not less than 0.062 inch thick.

C. Door Frames: Extruded aluminum, reinforced for hinges, strikes, and closers.

D. Glazing Frames: Extruded aluminum, for indicated glass thicknesses.

E. Trim: Extruded aluminum, not less than 0.062 inch thick; removable, snap-in glazing stops and door stops, without exposed fasteners.

F. Frame and Trim Finish: Clear-anodized aluminum.

2.3 ACCESSORIES

A. Fasteners: Aluminum, nonmagnetic, stainless steel or other noncorrosive metal fasteners compatible with frames, stops, panels, reinforcement plates, hardware, anchors, and other items being fastened.

B. Door Silencers: Manufacturer's standard continuous mohair, wool pile, or vinyl seals in black color.

C. Smoke Seals: Intumescent strip or fire-rated gaskets in black.

D. Glazing Gaskets: Manufacturer's standard extruded or molded rubber or plastic, to accommodate glazing thickness indicated; in black.

2.4 Door Hardware: As specified in Section 087100 "Door Hardware." FABRICATION

A. Provide concealed corner reinforcements and alignment clips for accurately fitted hairline joints at butted and mitered connections.

B. Factory prepare aluminum frames to receive templated mortised hardware; include cutouts, reinforcements, mortising, drilling, and tapping, in accordance with the Door Hardware Schedule and templates furnished as specified in Section 087100 "Door Hardware."
   1. Locate hardware cutouts and reinforcements as required by fire-rated label for assembly.
   2. At frames receiving locks, provide additional internal reinforcement as needed to prevent excessive frame deflection.

C. Fabricate frames for glazing with removable stops to allow glazing replacement without dismantling frame.
   1. Locate removable stops on the inside of spaces accessed by keyed doors.

D. Fabricate components to allow secure installation without exposed fasteners.

2.5 GENERAL FINISH REQUIREMENTS

A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify that wall thickness does not exceed standard tolerances allowed by throat size of indicated aluminum frame.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install aluminum frames plumb, rigid, properly aligned, and securely fastened in place; in accordance with manufacturer's written instructions.
   1. At fire-protection-rated openings, install fire-rated frames in accordance with NFPA 80 and NFPA 105.

B. Install frame components in the longest possible lengths with no piece less than 48 inches; components 96 inches or shorter shall be one piece.
   1. Fasten to suspended ceiling grid on maximum 48-inch centers, using sheet metal screws or other fasteners approved by frame manufacturer.
   2. Use concealed installation clips to produce tightly fitted and aligned splices and connections.

3. Secure clips to extruded main-frame components and not to snap-in or trim members.
4. Do not leave screws or other fasteners exposed to view when installation is complete.

C. Glass: Install glass in accordance with Section 088000 "Glazing" and aluminum-frame manufacturer's written instructions.

3.3 ADJUSTING

A. Inspect installation, correct misalignments, and tighten loose connections.

B. Clean exposed frame surfaces promptly after installation, using cleaning methods recommended in writing by frame manufacturer and in accordance with AAMA 609 & 610.

C. Touch Up: Repair marred frame surfaces to blend inconspicuously with adjacent unrepaired surface as viewed by Architect. Remove and replace frames with damaged finish that cannot be satisfactorily repaired.

END OF SECTION

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Solid-core flush wood doors with plastic-laminate-faces.
   2. Light frames and louvers.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data Submittals: For each product, including the following:
   1. Door core materials and construction.
   2. Door edge construction
   3. Door face type and characteristics.
   4. Door trim for openings.
   5. Factory-machining criteria.
   6. Factory-finishing specifications.

B. Sustainable Design Submittals:
   1. Environmental Product Declaration: For each product.
   2. Material Ingredient Documentation: For each product.
   3. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
   4. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
   5. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data; and the following:
   1. Door schedule indicating door location, type, size, fire protection rating, and swing.
   2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
   3. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
   4. Dimensions and locations of blocking for hardware attachment.
   5. Dimensions and locations of mortises and holes for hardware.
   6. Clearances and undercuts.
   7. Doors to be factory finished and application requirements.
   8. Apply AWI Quality Certification Program label to Shop Drawings.

D. Samples for Initial Selection: For plastic-laminate door faces.

E. Samples for Verification:
   1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish.
   2. Plastic laminate, 6 inches square, for each color, texture, and pattern selected.

3. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.
4. Frames for light openings, 6 inches long, for each material, type, and finish required.

1.4 CLOSEOUT SUBMITTALS

A. Special warranties.

B. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

C. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.5 QUALITY ASSURANCE

A. Certified Wood: Provide an invoice including vendor's chain-of-custody number, product cost, and entity being invoiced.

B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

C. Manufacturer's Certification: Licensed participant in AWI's Quality Certification Program.

D. Fire-Rated Door Inspector Qualifications: Inspector for field quality-control inspections of fire-rated door assemblies complies with qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:
1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

E. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies complies with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

F. Provide the following upon request:
1. Qualification Data: For door inspector.
   a. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
   b. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
   c. Submit copy of DHI's Fire and Egress Door Assembly Inspector (FDAI) certificate.
2. Field quality-control reports.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons, and wrap bundles of doors in plastic sheeting.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.7 FIELD CONDITIONS

A. Environmental Limitations:
   1. Do not deliver or install doors until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and HVAC system is operating and maintaining temperature and relative humidity at levels designed for building occupants for the remainder of construction period.
   2. Do not deliver or install doors until building is enclosed and weathertight, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during remainder of construction period.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Delamination of veneer.
      b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
      c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
   2. Warranty also includes installation and finishing that may be required due to repair or replacement of defective doors.
   3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain flush wood doors from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Wood Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with UL 10C orNFPA 252.
   1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
   2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.

B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.3 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with AWI/AWMAC/WI's "Architectural Woodwork Standards."

1. Provide labels certificates from AWI certification program indicating that doors comply with requirements of grades specified.
   a. Contractor registers the Work under this Section with the AWI Quality Certification Program at www.awiqcp.org or by calling 855-345-0991.
2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with the Contract Documents in addition to those of the referenced quality standard.

B. Certified Wood: Wood products shall comply with requirements of ASTM D7612-10 (FSC, SFI, ATSM, CSA or PEFC certifications are acceptable).

C. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

D. Material Ingredients: Documentation that demonstrate the chemical inventory of the product to at least 0.1 percent (1000 ppm).

E. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

F. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

2.4 SOLID-CORE FLUSH WOOD DOORS WITH PLASTIC-LAMINATE FACES

A. Interior Doors, Solid Core with Plastic-Laminate Faces:
   1. Performance Grade: ANSI/WDMA I.S. 1A Extra Heavy Duty.
   2. Architectural Woodwork Standards Quality Grade: Premium.
   3. Plastic-Laminate Faces: High-pressure decorative laminates complying with ISO 4586-3, Grade HSH.
   4. Colors, Patterns, and Finishes: As indicated.
   5. Exposed Vertical and Top Edges: Plastic laminate that matches faces, applied before faces.
      a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
      b. Fire-Rated Pairs of Doors:
         1) Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
         2) Provide formed-steel edges and astragals with intumescent seals.
            a) Finish steel edges and astragals with baked enamel same color as doors.
            b) Finish steel edges and astragals to match door hardware (locksets or exit devices).

c. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
   1) Screw-Holding Capability: 550 lbf in accordance with WDMA T.M. 10.

6. Core for Non-Fire-Rated Doors:
   a. WDMA I.S. 10 structural composite lumber.
      1) Screw Withdrawal, Door Face: 550 lbf.
      2) Screw Withdrawal, Vertical Door Edge: 550 lbf.
7. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
   a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.
8. Construction:
   a. Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before faces and crossbands are applied.

2.5 LIGHT FRAMES AND LOUVERS

A. Metal Frames for Light Openings in Doors: Manufacturer's standard frame formed of 0.048-inch- thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated on Drawings.

B. Louvers for Fire-Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire-protection rating of 1-1/2 hours and less.
   1. Metal and Finish: Hot-dip galvanized steel, 0.040 inch thick, with baked-enamel- or powder-coated finish.

2.6 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.
   1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
   2. Comply with NFPA 80 requirements for fire-rated doors.

B. Factory machine doors for hardware that is not surface applied.
   1. Locate hardware to comply with DHI-WDHS-3.
   2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
   3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
   4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
   5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.

C. Openings: Factory cut and trim openings through doors.
   1. Light Openings: Trim openings with moldings of material and profile indicated.
   2. Glazing: Factory install glazing in doors indicated to be factory finished. Comply with applicable requirements in Section 088000 "Glazing."
   3. Louvers: Factory install louvers in prepared openings.

2.7 FACTORY FINISHING

A. Comply with referenced quality standard for factory finishing.
   1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
   2. Finish faces, all four edges, edges of cutouts, and mortises.

B. Factory finish doors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine doors and installed door frames, with Installer present, before hanging doors.
   1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
   2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Hardware: For installation, see Section 087100 "Door Hardware."

B. Install doors and frames to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

C. Install frames level, plumb, true, and straight.
   1. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches.
   2. Anchor frames to anchors or blocking built in or directly attached to substrates.
   3. Install fire-rated doors and frames in accordance with NFPA 80.
   4. Install smoke- and draft-control doors in accordance with NFPA 105.

D. Factory-Fitted Doors:
   1. Align and fit doors in frames with uniform clearances and bevels as indicated below.
      a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.
   2. Machine doors for hardware.
   3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
   4. Clearances:
      a. Provide 1/8 inch at heads, jambs, and between pairs of doors.
      b. Provide 1/8 inch from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
      c. Where threshold is shown or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
      d. Comply with NFPA 80 for fire-rated doors.
   5. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
   6. Bevel fire-rated doors 1/8 inch in 2 inches at lock edge; trim stiles and rails only to extent permitted by labeling agency.

E. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.

F. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Owner will engage through the Contractor a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:
   1. Provide inspection of installed Work through AWI's Quality Certification Program, certifying that wood doors and frames, including installation, comply with requirements of AWI/AWMCA/WI's "Architectural Woodwork Standards" for the specified grade.
   2. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, Section 5.2.
   3. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 081473 - SLIDING WOOD DOORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Sliding door, frame, and hardware assemblies.

B. Aluminum-Framed Top-Hung Sliding Doors.

1.2 RELATED REQUIREMENTS

A. Section 081416 - Flush Wood Doors: For flush solid-core wood sliding doors specified in this section used in Sliding Door System.

1.3 REFERENCE STANDARDS

A. AAMA 609 and 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document) 2015.

B. ANSI A156.18 - American National Standard for Materials and Finishes

C. ANSI A117.1 - American National Standard for Specifications to Make Buildings and Facilities Accessible and Usable to People with Physical Disabilities

D. AWS - Architectural Woodwork Standards

E. BHMA - Builders Hardware Manufacturers Association

F. DHI- Door and Hardware Institute

1.4 SUBMITTALS

A. See Section 013300 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions, information on glass and glazing, and descriptions of hardware and accessories.

C. Shop Drawings: indicate opening dimensions, elevations of different types, framed opening
tolerances, and installation requirements.

D. Samples: If requested by Architect, submit two samples, 12 inches long indicating typical sliding door frame construction, accessories, and finishes. Samples should be labeled with a full description to coordinate with the schedule.

E. Manufacturer's Certification: Certify that sliding glass doors meet or exceed expectations.

F. Manufacturer's Installation Instructions: Include complete preparation, installation, and cleaning requirements.

G. Manufacturer's qualification statement.

H. Installer's qualification statement.

I. Shop Drawings: Indicate details of each opening showing elevations, glazing, frame profiles, hardware, and different finish locations, if any.
   1. Refer to Section 08 for additional submittal requirements.

J. Informational Submittals:
   1. Provide Product Data:
      a. Specified door hardware must have warranties included.
      b. Provide product qualification data for Sliding Doors for: Architect, Installer, and Architectural Specification Consultant.

K. Closeout Submittals:
   1. Provide Maintenance and Operations Data corresponding to Division 01.
      a. Provide information and data about maintenance, repairs, and adjustment for Sliding Door System, in addition to replacement parts and how to preserve finishes within 72 hours of requests.
      b. Provide Complete Catalog cuts and pages for all parts of Sliding Door System.
      c. Provide parts list for each component of Sliding Door System.
      d. Provide name, address, and telephone number of local representative of Sliding Door System manufacturer.
      e. Warranty for Sliding Door System shall include reference numbers for manufacturer and identification of project it is specified in.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with a minimum of five years documented experience.

B. Drawings provided will indicate size, dimensional requirements of interior aluminum frames/doors and profiles.

1.6 WARRANTY

A. Provide manufacturer's standard warranty against defects in material and workmanship:
   1. For entire door opening assembly, provide two-year warranty period after Date of Substantial Completion.
   2. Interior Flush wood door slabs: See Section 081416 - Flush Wood Doors.
   3. Warranty shall be void unless units are stored in accordance with manufacturer's instructions prior to installation.
   4. Warranty shall be void unless units are installed by a factory certified installer.
   5. Assurance Program: Company specializing in manufacturing the products specified in this section shall offer Technical training and project support pre and post installation.

1.7 PERFORMANCE

A. Enhanced gasket and seals integrated in all door/frame interfaces with aluminum perimeter frames. Architect will verify wall thickness required for application.

B. Commercial grade anti-slam soft close and open system with back stop reinforcement. Closers test to a minimum of 100,000 cycles.

C. Concealed Floor Guide and Wall Mount Guide

D. Acoustical performance testing provided by third party. Manufacturer to submit test data as required.

1. Acoustic Rating: Minimum STC 35 rated sounds control assemblies tested at an independent acoustic laboratory in accordance with ASTM E90 Sealed-In-Place Standard.
2. 3-sided perimeter seal system as part of door assembly.

E. Air infiltration and smoke ratings provided by third party. Manufacturer to submit test data as required. Reference UL1784 Testing Data.

1.8 DELIVERY, STORAGE AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware and sliding door materials delivered to Project site. Keep all materials in their original, unopened containers/ packaging until installation.

B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item to package.

C. Manufacturer will be immediately notified of any damage caused during shipping.

D. Store and handle all materials according to manufacturer's instructions.

E. Store all materials indoors in dry, clean areas.

F. Protect all materials and finishes during the storage, handling, and installation to prevent damage.

1.9 COORDINATION

A. Coordinate layout and installation of floor-recessed door hardware with floor construction.

B. Verify if measurements for Sliding Door Systems are calculated from Door Slab Width or Clear Opening in Door Schedule.

C. Installation Templates: Distribute doors, frames, and other work specified to be factory prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.

D. Security: Coordinate installation of door hardware, sliding door materials and access control with Owner's security consultant.

E. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field verify existing conditions and coordinate installation of hardware and sliding door materials to suit opening conditions to provide proper door operation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
1. Serenity Sliding Door Systems.

2.2 INTERIOR ALUMINUM-FRAMED SLIDING DOORS

A. Provide clear aluminum top track, receiving channel, carriage assemblies, full gasketing, sidelights, transoms, pulls and or locks, and related components.

B. Assembly:
   1. Provide wall blocking within metal stud walls as required by manufacturer of sliding door assembly.
   2. Joints and Connections: Flush, hairline width, and waterproof, accurately, and rigidly joined corners.

C. Wood Door Finish: Refer to Section 081416 -Flush Wood Doors.

D. Frame Profiles: Extruded aluminum Cased Opening Frame with Snap on Trim with replaceable receiving channel.

E. Handles:
   1. Standard Back-to-Back Ladder Pull" 12" long x 1" diameter. Match door hardware finish for wood doors specified in Section 081416.

F. Track System Components:
   1. Clear Anodized finish pre-installed rolling track system set to manufacturer specifications.
      a. Preinstalled Track System Components
      b. Preinstalled Soft Close and Roller Assembly
   2. Fascia: Extruded Aluminum with end caps
   3. Quiet comfort roller system
   4. Automatic Door Bottom

G. Accessories:
   1. Acoustic Door Bottom
   2. Mechanical Spring Closer

H. STC Rating of Assembly:
   1. STC 35.
   2. NIC 40.

2.3 DOOR OPERATING HARDWARE

A. Manufacturers: Door hardware manufactures are as determined by the manufacture of the integrated Door Opening Assemblies in compliance with specified hardware requirements for applications as indicated.

B. Hardware Options: See Section 087100 - Door Hardware.

C. Door Leaves shall be factory machined and prepped for hardware, including function and pilot holes.
   1. 1-3/4" Flush Wood Door. Reference Spec Section 081416 - Flush Wood Doors.
      a. Standard Stile widths are 6" with a 10" bottom rail.
   2. Door Slab size 8" larger than clear opening width.

2.4 DOOR COMPONENTS

A. Extra Heavy Duty Clear Anodized Aluminum Track System

B. Receiving Channel

C. 3-sided Perimeter Seal System

D. Manufacturer's Soft Close and Open System

E. Pre-installed Track

F. Aluminum Cased Open Frame

G. Snap-on Trim

H. Bottom Door Guide

2.5 FINISHES

A. Door Hardware: Provide door hardware of the same finish, unless otherwise indicated.
   1. Where base material metal is specified to be different, provide finish that is an equivalent appearance in accordance with BHMA A156.18

B. Wood Door Finish: Refer to Section 081416 - Flush Wood Doors.

PART 3 - EXECUTION

3.1 VERIFICATION

A. Verify that wall thickness is consistent and matches wall types called out on plans.

B. Verify wall openings are plumb, square, level, and true.

C. Verify that openings are ready to receive work and opening dimensions and clearances are as indicated on approved shop drawings.

D. Verify that floor is level.

E. Notify the Architect if any conditions are present that could affect door installation or performance.

F. Do not begin Installation if the above conditions are not remedied.

3.2 INSTALLATION

A. Verify that all installers have reviewed all training materials in installation of Sliding Door Systems.
   1. Provide proper training for installation of Serenity Sliding Door System Products.

B. Install doors in accordance with manufacturer's requirements and instructions.

C. Coordinate frame anchor placement with wall construction.

D. Adjust sliding doors for correct orientation according to manufacturer's instructions.

3.3 TOLERANCES

A. Maintain dimensional tolerances and alignment with adjacent work.

B. Maximum Variation from Plumb: 1/16 inch.

C. Maximum Variation from Level: 1/16 inch.

D. Longitudinal or Diagonal Warp: Plus, or minus 1/8 inch from 10 foot straight edge.

3.4 MAINTENANCE

A. Damage to Sliding Door must be repaired in accordance with instructions of manufacturer and approval from architect and owner.

B. Protect sliding doors from damage during construction and installation.

C. Protect installed products from damage until Date of Substantial Completion.

3.5 CLEANING

A. Remove protective material from factory finished surfaces.

B. Remove labels and visible markings.

C. Wash surfaces by method recommended and acceptable to sealant and sliding door manufacturer; rinse and wipe surfaces clean.

END OF SECTION

SECTION 083113 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Access doors and frames.
   2. Fire-rated access doors and frames.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, fire ratings, material descriptions, dimensions of individual components and profiles, and finishes.

B. Samples: For each type of access door and frame and for each finish specified, complete assembly minimum 6 by 6 inches in size.

C. Product Schedule: For access doors and frames. Use same designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

A. Record Documents: For fire-rated doors, list of applicable room name and number in which access door is located.

1.4 QUALITY ASSURANCE

A. Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies meets the qualifications set forth in NFPA 80, Section 5.2.3.1 and the following:
   1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

B. Provide the following upon request:
   1. Qualification Data: For testing and inspecting agency.
      a. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, Section 5.2.3.1.
      b. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection and temperature-rise limit ratings indicated, in accordance with NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Concealed Flanges:
   1. Description: Face of door flush with frame; with concealed flange for gypsum board installation and concealed hinge.
   2. Optional Features: Gasketing, piano hinges, masonry anchors.
   3. Locations: Wall and ceiling.

4. Door Size: As indicated.
5. Stainless Steel Sheet for Door: Nominal 0.062 inch, 16 gage, ASTM A480/A480M No. 4 finish.
6. Frame Material: Same material and thickness as door.
7. Latch and Lock: Latch bolt, knurled-knob operated.

2.3 FIRE-RATED ACCESS DOORS AND FRAMES

A. Fire-Rated, Flush Access Doors with Concealed Flanges:
1. Description: Door face flush with frame, with a core of mineral-fiber insulation enclosed in sheet metal; with concealed flange for gypsum board installation, self-closing door, and concealed hinge.
2. Optional Features: Upward-opening doors for ceilings, gasketing, piano hinges, masonry anchors.
3. Locations: Wall and ceiling.
4. Door Size: As indicated.
5. Fire-Resistance Rating: Not less than that of adjacent construction.
6. Temperature-Rise Rating: 450 deg F at the end of 30 minutes.
7. Stainless Steel Sheet for Door: Nominal 0.038 inch, 20 gage, ASTM A480/A480M No. 4 finish.
8. Frame Material: Same material, thickness, and finish as door.
9. Latch and Lock: Self-closing, self-latching door hardware, operated by knurled-knob.

2.4 MATERIALS

A. Stainless Steel Plate, Sheet, and Strip: ASTM A240/A240M or ASTM A666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.

B. Stainless Steel Flat Bars: ASTM A666, Type 304. Remove tool and die marks and stretch lines, or blend into finish.

C. Frame Anchors: Same material as door face.

D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel in accordance with ASTM A153/A153M or ASTM F2329.

2.5 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
1. For concealed flanges with drywall bead, provide edge trim for gypsum panels securely attached to perimeter of frames.

D. Latch and Lock Hardware:
1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Stainless Steel Finishes:
   1. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.
   2. Polished Finish: ASTM A480/A480M No. 4 finish. Grind and polish surfaces to produce uniform finish, free of cross scratches.
      a. Run grain of directional finishes with long dimension of each piece.
      b. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Owner will engage through the Contractor a qualified inspector to perform inspections and to furnish reports to Architect.

B. Inspections:
   1. Fire-Rated Door Inspections: Inspect each fire-rated access door in accordance with NFPA 80, Section 5.2.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated access door indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION

SECTION 083313 - COILING COUNTER DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Counter door assemblies.
   2. Fire-rated and smoke-rated counter door assemblies.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of coiling counter door and accessory.
   1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
   2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.
   3. Include description of automatic closing device and testing and resetting instructions.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
   1. Include plans, elevations, sections, and mounting details.
   2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
   3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
   4. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
   5. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
   1. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
   1. Curtain slats.
   2. Bottom bar.
   3. Guides.
   4. Brackets.
   5. Hood.
   6. Locking device(s).
   7. Include similar Samples of accessories involving color selection.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For coiling counter doors to include in maintenance manuals.

B. Record Documents: For fire-rated doors, list of door numbers and applicable room name and number to which door accesses.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
   1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

B. Fire-Rated Door Inspector Qualifications: Inspector for field quality control inspections of fire-rated door assemblies is to meet the qualifications set forth in NFPA 80, section 5.2.3.1 and the following:
   1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

C. Provide the following upon request:
   1. Qualification Data: For Installer and testing and inspecting agency.
      a. Fire-Rated Door Inspector: Submit documentation of compliance with NFPA 80, section 5.2.3.1.
      b. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.
   2. Oversize Construction Certification: For door assemblies required to be fire-rated and that exceed size limitations of labeled assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain coiling counter doors from single source from single manufacturer.
   1. Obtain operators and controls from coiling counter door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Door Assemblies: Complying with NFPA 80; listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at as close to neutral pressure as possible in accordance with NFPA 252 or UL 10B.
   1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
   2. Temperature-Rise Limit: At exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F above ambient after 30 minutes of standard fire-test exposure.
   3. Smoke Control: In corridors and smoke barriers, provide doors that are listed and labeled with the letter "S" on the fire-rating label by a qualified testing agency for smoke- and draft-control based on testing in accordance with UL 1784; with maximum air-leakage rate of 3.0 cfm/sq. ft. of door opening at 0.10 inch wg for both ambient and elevated temperature tests.

B. Sound-Control Doors: Assemblies tested in a laboratory for sound-transmission-loss performance in accordance with ASTM E90, calculated in accordance with ASTM E413, and rated for not less than the STC value indicated.

2.3 COUNTER DOOR ASSEMBLY

A. Counter Door: Coiling counter door formed with curtain of interlocking metal slats.

B. Operation Cycles: Door components and operators capable of operating for not less than 20,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
   1. Include tamperproof cycle counter.

C. STC Rating: 26.

D. Door Curtain Material: Stainless steel.

E. Door Curtain Slats: Flat profile slats of 1-1/4-inch center-to-center height.
   1. Gasket Seal. Manufacturer's standard continuous gaskets between slats.

F. Bottom Bar: Manufacturer's standard continuous channel or tubular shape, fabricated stainless steel and finished to match door.

G. Curtain Jamb Guides: Stainless steel with exposed finish matching curtain slats. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.

H. Hood: Stainless steel.
   1. Shape: As indicated on Drawings.
   2. Mounting: As indicated on Drawings.

I. Integral Frame, Hood, and Fascia: Stainless steel.
   1. Mounting: As indicated on Drawings.

J. Sill Configuration: Integral metal sill.

K. Locking Devices: Equip door with locking device assembly.
   1. Locking Device Assembly: Single-jamb side locking bars, operable from inside with thumbturn and outside with cylinder.

L. Manual Door Operator: Push-up operation.

M. Curtain Accessories: Equip door with smoke seals, astragal, push/pull handles and automatic closing device.

N. Door Finish:
   1. Stainless Steel Finish: ASTM A480/A480M No. 4 (polished directional satin).
   2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.4 FIRE-RATED COUNTER DOOR ASSEMBLY

A. Fire-Rated Counter Door: Overhead fire-rated coiling door formed with curtain of interlocking metal slats.

B. Operation Cycles: Door components and operators capable of operating for not less than 20,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
   1. Include tamperproof cycle counter.

C. Fire Rating: As indicated, with temperature-rise limit and with smoke control.

D. STC Rating: 27.

E. Door Curtain Material: Stainless steel.

F. Door Curtain Slats: Flat profile slats of 1-1/4-inch center-to-center height.
   1. Insulated-Slat Interior Facing: Metal.

G. Curtain Jamb Guides: Stainless steel with exposed finish matching curtain slats.

H. Hood: Stainless steel.
   1. Shape: As indicated on Drawings.
   2. Mounting: As indicated on Drawings.

I. Integral Frame, Hood, and Fascia: Stainless steel.
   1. Mounting: As indicated on Drawings.

J. Sill Configuration: Integral metal sill.

K. Locking Devices: Equip door with locking device assembly.
   1. Locking Device Assembly: Single-jamb side locking bars, operable from inside with thumbturn and outside with cylinder.

L. Manual Door Operator: Push-up operation.
   1. Provide operator with manufacturer's standard removable operating arm.

M. Curtain Accessories: Equip door with smoke seals, automatic closing device, astragal push/pull handles.

N. Door Finish:
   1. Stainless Steel Finish: ASTM A480/A480M No. 4 (polished directional satin).
   2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.5 DOOR CURTAIN MATERIALS AND FABRICATION

A. Door Curtains: Fabricate coiling counter door curtain of interlocking metal slats in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
   1. Stainless Steel Door Curtain Slats: ASTM A240/A240M or ASTM A666, Type 304; sheet thickness of 0.025 inch; and as required.
   2. Insulation: Fill slats for acoustically insulated doors with manufacturer's standard acoustical insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, in accordance with ASTM E84 or UL 723. Enclose insulation completely within slat faces.
   3. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face.

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.
   1. Removable Posts and Jamb Guides: Manufacturer's standard.

2.6 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Stainless Steel: 0.025-inch- thick, stainless steel sheet, Type 304, complying with ASTM A240/A240M or ASTM A666.
2. Include automatic drop baffle on fire-rated doors to guard against passage of smoke or flame.

B. Integral Frame, Hood, and Fascia: Welded sheet metal assembly of the following sheet metal(s):
1. Stainless Steel: Type 304, complying with ASTM A240/A240M or ASTM A666.

C. Removable Metal Soffit: Formed or extruded from same metal and with same finish as curtain if hood is mounted above ceiling unless otherwise indicated.

2.7 LOCKING DEVICES

A. Locking Device Assembly: Fabricate with cylinder lock, spring-loaded dead bolt, operating handle, cam plate, and adjustable locking bars to engage through slots in tracks.
1. Lock Cylinders: As standard with manufacturer and keyed to building keying system.
2. Keys: Three for each cylinder.

2.8 CURTAIN ACCESSORIES

A. Smoke Seals: Equip each fire-rated door with replaceable smoke-seal perimeter gaskets or brushes for smoke and draft control as required for door listing and labeling by a qualified testing agency.

B. Weatherseals: Equip door with weather-stripping gaskets fitted to entire perimeter of door for air-resistant installation unless otherwise indicated.
1. At door head, use 1/8-inch- thick, replaceable, continuous-sheet baffle secured to inside of hood or field-installed on the header.
2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch- thick seals of flexible vinyl, rubber, or neoprene.

C. Astragal: Equip each door bottom bar with a replaceable, adjustable, continuous, compressible gasket of flexible vinyl, rubber, or neoprene as a cushion bumper.

D. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

E. Automatic-Closing Device: Equip each fire-rated door with an automatic-closing device or holder-release mechanism and governor unit complying with NFPA 80 and an easily tested and reset release mechanism. Testing for manually operated doors allows resetting by opening the door without retensioning the counterbalance mechanism. Automatic-closing device is to be designed for activation by the following:
1. Manufacturer's standard UL-labeled smoke detector and door-holder-release devices.
2. Manufacturer's standard UL-labeled heat detector and door-holder-release devices.

2.9 COUNTER DOOR ACCESSORIES

A. Integral Metal Sill: Fabricate sills as integral part of frame assembly of Type 304 stainless steel in manufacturer's standard thickness with ASTM A480/A480M No. 4 finish.

2.10 COUNTERBALANCE MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
   1. Fire-Rated Doors: Equip with auxiliary counterbalance spring and prevent tension release from main counterbalance spring when automatic closing device operates.

D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.11 MANUAL DOOR OPERATORS

A. General: Equip door with manual door operator by door manufacturer.

B. Push-up Door Operation: Design counterbalance mechanism so that required lift or pull for door operation does not exceed 25 lbf.

2.12 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.13 STAINLESS STEEL FINISHES

A. Surface Preparation: Remove tool and die marks and stretch lines, or blend into finish.

B. Polished Finishes: Grind and polish surfaces to produce uniform finish, free of cross scratches.
   1. Run grain of directional finishes with long dimension of each piece.
   2. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.
   3. Directional Satin Finish: ASTM A480/A480M No. 4.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Install coiling counter doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; in accordance with manufacturer's written instructions and as specified.

B. Install coiling counter doors, hoods, controls, and operators at the mounting locations indicated for each door.

C. Fire-Rated Doors: Install in accordance with NFPA 80.

D. Smoke-Control Doors: Install in accordance with NFPA 80 and NFPA 105.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage through the Contractor a qualified testing agency to perform tests and inspections and to furnish reports to Architect.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
   1. Test door release, closing, and alarm operations when activated by smoke detector or building's fire-alarm system. Test manual operation of closed door. Reset door-closing mechanism after successful test.
   2. Fire-Rated Door Inspections: Inspect each fire-rated door in accordance with NFPA 80, section 5.2.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each fire-rated door assembly indicating compliance with each item listed in NFPA 80 and NFPA 101.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.
   1. Complete installation and startup checks in accordance with manufacturer's written instructions.
   2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.5 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide tight fit around entire perimeter.

3.6 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service is to include 12 months' full maintenance by skilled employees of coiling-door Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies are to be manufacturer's authorized replacement parts and supplies.
   1. Perform maintenance, including emergency callback service, during normal working hours.
   2. Include 24-hour-per-day, seven-day-per-week, emergency callback service.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain coiling counter doors.

END OF SECTION

SECTION 083323 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Insulated service doors.

1.2 ACTION SUBMITTALS

A. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and pre-consumer recycled content and cost.

B. Product Data: For each type and size of overhead coiling door and accessory.
   1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.
   2. Include rated capacities, operating characteristics, electrical characteristics, and furnished accessories.

C. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
   1. Include plans, elevations, sections, and mounting details.
   2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
   3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
   4. For exterior components, include details of provisions for assembly expansion and contraction and for excluding and draining moisture to the exterior.
   5. Show locations of controls, locking devices, and other accessories.
   6. Include diagrams for power, signal, and control wiring.

D. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.
   1. Include similar Samples of accessories involving color selection.

E. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:
   1. Curtain slats.
   2. Bottom bar with sensor edge.
   3. Guides.
   4. Brackets.
   5. Hood.
   6. Include similar Samples of accessories involving color selection.

1.3 CLOSEOUT SUBMITTALS

A. Special warranty.

B. Maintenance Data: For overhead coiling doors to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.
   1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

B. Provide the following upon request:
   1. Qualification Data: For Installer.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain overhead coiling doors from single source from single manufacturer.
   1. Obtain operators and controls from overhead coiling-door manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design", the ABA standards of the Federal agency having jurisdiction and ICC A117.1.

B. Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:
   1. Design Wind Load: Calculate according to the wind design criteria indicated.
   2. Testing: According to ASTM E330/E330M.
   3. Deflection Limits: Design overhead coiling doors to withstand design wind load without evidencing permanent deformation or disengagement of door components.
   4. Operability under Wind Load: Design overhead coiling doors to remain operable under calculated wind load, acting inward and outward.

C. Seismic Performance: Overhead coiling doors are to withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.
   1. Component Importance Factor: 1.5.

2.3 DOOR ASSEMBLY

A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.

B. Operation Cycles: Door components and operators capable of operating for not less than 20,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.
   1. Include tamperproof cycle counter.

C. Air Infiltration: Maximum rate of 0.4 cfm/sq. ft. at 15 and 25 mph when tested in accordance with ASTM E283.

D. Insulated Door Curtain R-Value: 4.5 deg F x h x sq. ft./Btu.

E. Insulated Door Assembly U-Factor: 0.90 Btu/deg F x h x sq. ft..

F. Door Curtain Material: Galvanized steel.

G. Door Curtain Slats: Curved profile slats of 2-5/8-inch center-to-center height.
   1. Insulated-Slat Interior Facing: Metal.
   2. Gasket Seal. Manufacturer's standard continuous gaskets between slats.

H. Bottom Bar: Two angles, each not less than 1-1/2 by 1-1/2 by 1/8 inch thick; fabricated from hot-dip galvanized steel and finished to match door.

I. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.

J. Hood: Match curtain material and finish Galvanized steel.
   1. Shape: As indicated on Drawings.
   2. Mounting: As indicated on Drawings.

K. Electric Door Operator:
   1. Usage Classification: Heavy duty, 25 or more cycles per hour and more than 90 cycles per day.
   2. Operator Location: Front of hood.
   3. Safety: Listed in accordance with UL 325 by a qualified testing agency for commercial or industrial use; moving parts of operator enclosed or guarded if exposed and mounted at 8 ft. or lower.
   4. Motor Exposure: Exterior, wet, and humid.
   5. Motor Electrical Characteristics:
      a. Horsepower: As required.
      b. Voltage: 208 V ac, three phase, 60 Hz.
   6. Emergency Manual Operation: Chain type.
   7. Obstruction-Detection Device: Automatic photoelectric sensor electric sensor edge on bottom bar; self-monitoring type.
      a. Sensor Edge Bulb Color: Black.
   8. Control Station(s): Interior mounted.
   9. Other Equipment: Audible and visual signals.

L. Curtain Accessories: Equip door with weatherseals push/pull handles automatic-closing device.

M. Door Finish:
   1. Baked-Enamel or Powder-Coated Finish: Color matching Architect's sample.
   2. Interior Curtain-Slat Facing: Match finish of exterior curtain-slat face.

2.4 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Recycled Content: Post-consumer recycled content plus one-half pre-consumer recycled content shall not be less than 25 percent

2.5 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
   1. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural-steel sheet; complying with ASTM A653/A653M, with G90 zinc coating; nominal sheet thickness (coated) of 0.028 inch; and as required.
   2. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, in accordance with ASTM E84 or UL 723. Enclose insulation completely within slat faces.
   3. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010 inch.

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain, and a continuous bar for holding windlocks.

2.6 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
   1. Galvanized Steel: Nominal 0.028-inch- thick, hot-dip galvanized-steel sheet with G90 zinc coating, complying with ASTM A653/A653M.
   2. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

2.7 LOCKING DEVICES

A. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.8 CURTAIN ACCESSORIES

A. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.
   1. At door head, use 1/8-inch- thick, replaceable, continuous-sheet baffle secured to inside of hood or field-installed on the header.
   2. At door jambs, use replaceable, adjustable, continuous, flexible, 1/8-inch- thick seals of flexible vinyl, rubber, or neoprene.

B. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

2.9 COUNTERBALANCE MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, seamless carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. of span under full load.

C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.
   1. Fire-Rated Doors: Equip with auxiliary counterbalance spring and prevent tension release from main counterbalance spring when automatic-closing device operates.

D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.10 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
   1. Comply with NFPA 70.
   2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.

B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.

C. Door Operator Location(s): Operator location indicated for each door.
   1. Front-of-Hood Mounted: Operator is mounted to the right or left door head plate with the operator on coil side of the door-hood assembly and connected to the door drive shaft with drive chain and sprockets. Front clearance is required for this type of mounting.

D. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated for each door assembly.
   1. Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 in./sec. and not more than 12 in./sec., without exceeding nameplate ratings or service factor.
   2. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.

3. Coordinate wiring requirements and electrical characteristics of motors and other electrical devices with building electrical system and each location where installed.

E. Limit Switches: Equip each motorized door with adjustable switches interlocked with motor controls and set to automatically stop door at fully opened and fully closed positions.

F. Obstruction-Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel.
   1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
      a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door closes only with sustained or constant pressure on close button.
   2. Electric Sensor Edge: Automatic safety sensor edge, located within astragal or weather stripping mounted to bottom bar. Contact with sensor activates device. Connect to control circuit using manufacturer's standard take-up reel or self-coiling cable.
      a. Self-Monitoring Type: Four-wire-configured device designed to interface with door operator control circuit to detect damage to or disconnection of sensor edge.

G. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
   1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
   2. Exterior-Mounted Units: Full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

H. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.

I. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

J. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

K. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with the accessibility standard.

2.11 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.12 STEEL AND GALVANIZED-STEEL FINISHES

A. Baked-Enamel or Powder-Coat Finish: Manufacturer's standard baked-on finish consisting of prime coat and thermosetting topcoat. Comply with coating manufacturer's written instructions for cleaning, pretreatment, application, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; in accordance with manufacturer's written instructions and as specified.

B. Install overhead coiling doors, hoods, controls, and operators at the mounting locations indicated for each door.

C. Accessibility: Install overhead coiling doors, switches, and controls along accessible routes in compliance with the accessibility standard.

D. Power-Operated Doors: Install in accordance with UL 325.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage through the Contractor a qualified testing agency to perform tests and inspections and to furnish reports to Architect.

B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
   1. Test door release, closing, and alarm operations when activated by smoke detector or building's fire-alarm system. Test manual operation of closed door. Reset door-closing mechanism after successful test.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.4 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.
   1. Complete installation and startup checks in accordance with manufacturer's written instructions.
   2. After electrical circuitry has been energized, operate doors to confirm proper motor rotation and door performance.
   3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.5 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.
   1. Adjust exterior doors and components to be weather resistant.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

C. Adjust seals to provide tight fit around entire perimeter.

3.6 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service includes 12 months' full maintenance by skilled employees of coiling-door Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Parts and supplies are to be manufacturer's authorized replacement parts and supplies.
   1. Perform maintenance, including emergency callback service, during normal working hours.
   2. Include 24-hour-per-day, seven-day-per-week, emergency callback service.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION

SECTION 083343 - OVERHEAD COILING SMOKE CURTAINS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Smoke-protective curtain assemblies for elevator entrances.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 COORDINATION

A. Coordinate smoke curtain assemblies with power, signal, and smoke-detector systems specified in Division 26 and Division 28.

B. Coordinate elevator smoke-protective curtain assemblies with elevator hoistway door frames specified in Division 14.

C. Coordinate smoke-protective curtain assemblies with ceilings for operational clearances and maintenance access requirements.

D. Coordinate smoke-protective curtain assemblies with walls for support requirements, rating continuity above ceilings, and recessed wall switches.

E. Coordinate requirements for metal supports required for smoke-protective curtain assemblies.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of smoke-protective curtain assembly and draft curtain.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for smoke curtains.
   2. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
   3. Include ratings, operating components, electrical characteristics, control systems, and furnished specialties and accessories.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
   1. Include plans, elevations, sections, and attachment details.
   2. Include details of smoke curtain assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location of each field connection.
   3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
   4. Show locations of controls, detectors, and other accessories.
   5. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of material and finish options available for units with factory-applied finishes.
   1. Curtain guide.
   2. Bottom bar.

D. Samples for Verification: For each type of exposed finish, in manufacturer's standard sizes.
   1. Curtain guide
   2. Bottom bar.

E. Product Schedule: For smoke curtain assemblies. Use same designations indicated on Drawings.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For smoke curtain assemblies to include in emergency, operation, and maintenance manuals.

B. Field quality-control reports for required testing.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: An entity experienced in manufacturing smoke-and-draft-control curtain assemblies that have been successfully installed in compliance with requirements of authorities having jurisdiction.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

C. Smoke-Protective Curtain Assembly Inspector Qualifications: Inspector for field quality control inspections of smoke-protective curtain assemblies complying with NFPA 105.

D. Provide the following upon request:
   1. Qualification Data: For Installer, manufacturer, testing agency, and factory-authorized service representative.
   2. Evaluation Reports: For curtain assemblies, from ICC-ES or another qualified testing agency.

1.7 FIELD CONDITIONS

A. Field Measurements: Field-verify and coordinate dimensions and indicate measurements on Shop Drawings.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of curtain assemblies that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

A. Source Limitations: Obtain smoke-protective curtains from single source from single manufacturer.
   1. Obtain operators and controls from smoke-protective curtain manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Smoke Protective Curtain Assemblies: Provide smoke-protective curtains that are listed and labeled with the letter "S" on the rating label by a qualified testing agency for smoke- and draft-control based on testing in accordance with UL 1784; with maximum air-leakage rate of 3.0 cfm/sq. ft. of opening at 0.10 inch wg for both ambient and elevated temperature tests.

B. Curtain Fabric Fire-Test-Response Characteristics: Provide products that pass NFPA 701, as determined by testing of fabrics that were treated using treatment-application method intended for use for this Project by a testing and inspecting agency acceptable to authorities having jurisdiction.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Seismic Performance: Smoke-protective curtain assembly shall withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.
   1. Component Importance Factor: 1.5.

2.3 SMOKE-PROTECTIVE CURTAIN ASSEMBLIES FOR ELEVATOR ENTRANCES

A. Alarm-activated transparent-film smoke curtain assembly complying with ICC-ES AC77.

B. Smoke Containment: Assemblies complying with UL 1784 for air leakage and requirements of ASME 17.1/CSA B44.

C. Transparent-Film Curtain: Manufacturer's standard transparent film with flame-spread and smoke-developed indexes of 25 and 450, respectively, when tested in accordance with ASTM E84.

D. Operation: Controlled descent automatically by fail-safe motor-driven deployment and motorized rewind.

E. Curtain Attachment: Curtain shall form a pressure-resisting seal by one of the following methods:
   1. Magnetic Adhesion: With stainless steel elevator door frames, use magnets for closure with door frame.

F. Control System: Provide factory-assembled control unit as required for assembly specified.
   1. Fail-safe device with battery backup deploys on activation of building's smoke detector system or testing key switch in compliance with UL 864.
   2. Curtain Rewind Switch: Include switch to rewind screen into housing.
   3. Motor Operator: Provide factory-assembled electric operation system of size and capacity recommended in writing by curtain manufacturer for assembly specified, with electric motors and factory-prewired motor controls, control devices, and accessories required for proper operation.
   4. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by a qualified testing agency, and marked for intended location and application.

G. Housing Type: Sheet metal housings containing support rollers and associated electronics.
   1. Coordinate operator wiring requirements and electrical characteristics with building electrical system.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrate areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Smoke-Protective Curtains: Install smoke-protective curtain assemblies in accordance with manufacturer's written installation instructions and NFPA 105.
   1. Install smoke-protective curtain assemblies for elevator entrances in accordance with ASME 17.1/CSA B44.

B. Power-Operated Curtains: Install in accordance with UL 864.

C. Install anchorage devices to securely fasten assembly to substrate and building framing without distortion or stress.

D. Securely brace components suspended from structure.

E. Fit and align assembly, including vertical guides, level and plumb, to provide smooth operation.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage through the Contractor a qualified opening protective assembly inspector to perform tests and inspections and to furnish reports to Architect.

B. Testing Agency: Perform the following tests and inspections with the assistance of a factory-authorized service representative:
   1. Test release mechanism, closing, and alarm operations when activated by building's smoke detector system. Test manual operation of closed curtain. Reset closing mechanism after successful test.
   2. Inspections: Inspect each smoke-protective curtain assembly in accordance with NFPA 105.

C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

D. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

E. Prepare and submit separate inspection report for each smoke-protective curtain assembly indicating compliance with each item listed in NFPA 105.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling smoke curtains.

3.5 MAINTENANCE

A. Engage a manufacturer's authorized service representative to test, adjust, and maintain the smoke-protective assemblies once per year, as required by NFPA 105.

END OF SECTION

SECTION 083516 - SIDE-FOLDING SECURITY GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Folding security grilles.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for folding security grilles.

B. Shop Drawings:
   1. Include plans, elevations, sections, and installation details.
   2. Include clearances required for operation, and accessory items.

C. Samples for Initial Selection: For each type of exposed finish.
   1. Include Samples of hardware and accessories involving color and finish selection.

D. Samples for Verification: For each type of exposed finish.
   1. Include Samples of hardware and accessories to verify color and finish selection.

E. Product Schedule: For folding security grilles. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For folding security grilles to include in operation and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer of folding grilles.

B. Provide the following upon request:
   1. Qualification Data: For Installer.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install folding grilles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for building occupants after completion of construction during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 SIDE - FOLDING SECURITY GRILLES

A. Description: Top-supported, horizontal-sliding, manually operated folding grilles.

B. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Overhead Door, "Side-Folding Security Grille, Model 683, Standard Body, Brick Pattern", (Basis of Design).

C. Curtain: Constructed of 1/8 inch by 5/8 inch by 6 inch horizontal clear anodized aluminum links which slide into 5/16 inch vertical rods. Links held in place by 1/2 inch clear anodized aluminum S-126 spacer tubes on alternate rods.
   1. Panel Width: 6-5/16 inches.
   2. Finish: Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

D. Trolley Assemblies: As required for size and weight of partition, to ensure secure, easy, and quiet operation, but not less than 1-1/8 inch wide and adjustable 1 inch upward or downward without the removal of the curtain.

E. Track: Heavy extruded aluminum 1-3/8 inch wide by 1 5/8 inch high.
   1. Limit track deflection, independent of structural supporting system, to no more than 80 percent of bottom clearance. Design and fabricate track to support folding security grilles; to enable their operation without damage to track, folding unit, or adjacent surfaces; and with the following features:
   2. Ceiling Guard: Metal guard to protect adjacent ceiling surfaces from damage by folding grille operation; with finish matching other exposed metal.
   3. Center Stop: For center-opening folding grilles.

F. Intermediate posts shall be floor mounted. Provide intermediate posts spaced at a maximum of 10 foot intervals along curtain length.
   1. Provide intermediate posts with an adjustable concealed spring loaded drop bolt with cylinder locks keyed alike. Provide with dustproof floor sockets for all drop bolts.

G. The traveling end lead post shall have an attached full height protection plate and shall be self locking into a steel V-stop.
   1. Provide traveling lead post with a concealed hook bolt lock activated by a keyed cylinder that engages a full height wall channel when grille is in closed and locked position. Provide wall channel with rubber bumpers.
   2. When the grille is retracted and stacked in the opening, the traveling end lead post shall be fixable top and bottom.

H. Hardware: Manufacturer's standard heavy-duty, manually operated metal pulls and latches as follows:
   1. Finish: Clear-anodized aluminum.
   2. Latch: Operable from both sides of closed folding grille.
   3. Lock: Manufacturer's standard key-operated cylinder lock, operable from both sides.

I. Tiebacks: To maintain folding grille in stacked position.

J. Stacking Configuration: As indicated on Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. For folding grilles supported by or anchored to permanent construction, advise installers of specific requirements for placement of anchorage devices. Furnish installers of other work with templates and drawings indicating locations of anchorage devices and similar items.

3.3 INSTALLATION

A. General: Install folding grilles complying with manufacturer's written installation instructions. Install track in one piece.

B. Standard Floor Clearances: 1/4 to 3/4 inch maximum (above floor finish).

3.4 ADJUSTING

A. Adjust units to ensure smooth, quiet operation without warping or binding. Adjust hardware to function smoothly. Confirm that latches engage accurately and securely without forcing or binding.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain folding grilles.

END OF SECTION

SECTION 084123 - INTERIOR ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes nonthermal aluminum-framed entrance and storefront systems used at building interiors.

B. Related Requirements:
   1. Section 013573 "Delegated Design Requirements and Procedures" for definitions, submittal procedures, responsibilities, and scheduling requirements associated with delegated design assignment indicated in this Section.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and pre-consumer recycled content and cost.
   2. Product Data: For sealants, indicating VOC content.
   3. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
   1. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed entrances and storefronts, showing the following:
      a. Joinery, including concealed welds.
      b. Anchorage.
      c. Expansion provisions.
      d. Glazing.
   2. Include point-to-point wiring diagrams showing the following:
      a. Power requirements for each electrically operated door hardware.
      b. Location and types of switches, signal device, conduit sizes, and number and size of wires.

D. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

E. Delegated-Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
   1. Provide delegated-design submittals for aluminum-framed entrances and storefronts.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
   1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

B. Provide the following upon request:
   1. Qualification Data:
      a. For professional engineer's experience with providing delegated-design engineering services of the kind indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.
   2. Product Test Reports: For aluminum-framed entrances and storefronts, for tests performed by manufacturer and witnessed by a qualified testing agency.
   3. Source quality-control reports.

1.6 WARRANTY

A. Special Warranty: Installer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures, including, but not limited to, excessive deflection.
      b. Noise or vibration created by wind and thermal and structural movements.
      c. Deterioration of metals and other materials beyond normal weathering.
      d. Water penetration through fixed glazing and framing areas.
      e. Failure of operating components.
   2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.
   1. Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Delta E units when tested in accordance with ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D 4214.
      c. Cracking, peeling, or chipping.
   2. Warranty Period:
      a. Clear Anodized and Color Anodized finishes: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain all components of aluminum-framed entrance and storefront system, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design aluminum-framed entrances and storefronts.
   1. Material properties indicated in this Section shall be considered as minimum properties.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
   1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
   2. Failure also includes the following:
      a. Glass breakage.
      b. Loosening or weakening of fasteners, attachments, and other components.
      c. Failure of operating units.

C. Structural Loads:
   1. Design Loads: As indicated on Drawings.

D. Seismic Performance: Aluminum-framed entrances and storefronts shall withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.
   1. Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested in accordance with AAMA 501.6 at design displacement and 1.5 times the design displacement.

2.3 STOREFRONT SYSTEMS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Arcadia, "AFG451 STC Series", for 1-inch glazing, (Basis-of-Design).

B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
   1. Interior Framing Construction: Nonthermal.
   2. Glazing System: Retained mechanically with gaskets on four sides.
   3. Offset Glazed.
   4. Finish: Clear anodized.
   5. Fabrication Method: Field-fabricated stick system.
   6. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

7. Steel Reinforcement: As required by manufacturer.

C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

2.4 DOOR SYSTEMS

A. Manufacturers: Provide doors by same manufacturer as interior aluminum storefront system.

B. Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.
1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch- thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
2. Door Design: Medium stile; 3-1/2-inch nominal width unless otherwise indicated.
3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
   a. Provide nonremovable glazing stops on outside of door.
4. Finish: Match adjacent storefront framing finish.

2.5 ENTRANCE DOOR HARDWARE

A. Door Hardware: Hardware not specified in this Section is specified in Section 087100 "Door Hardware."

B. General: Provide entrance door hardware and entrance door hardware sets indicated in door and frame schedule for each entrance door, to comply with requirements in this Section.

C. Continuous-Gear Hinges: BHMA A156.26.

D. Weather Stripping: Manufacturer's standard replaceable components.
1. Compression Type: Made of ASTM D2000 molded neoprene or ASTM D2287 molded PVC.

2.6 GLAZING

A. Glazing: Comply with Section 088000 "Glazing" or Section 088853 "Security Glazing" for glass type indicated on Drawings.

B. Glazing Sealants: As recommended by manufacturer.
1. Sealant shall have a VOC content of 250 g/L or less.
2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.7 MATERIALS

A. Recycled Content: Post-consumer recycled content plus one-half pre-consumer recycled content shall not be less than 25 percent.

B. Sheet and Plate: ASTM B209.

C. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.

D. Structural Profiles: ASTM B308/B308M.

E. Steel Reinforcement:
   1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
   2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
   3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.

F. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM, and prepare surfaces in accordance with applicable SSPC standard.

2.8 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
   1. Reinforce members as required to receive fastener threads.
   2. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
   1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123/A123M or ASTM A153/A153M requirements.

2.9 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fitted joints with ends coped or mitered.
   3. Physical isolation of glazing from framing members.
   4. Accommodations for mechanical movements of glazing and framing to maintain required glazing edge clearances.
   5. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
   1. At interior and exterior doors, provide compression weather stripping at fixed stops.

F. Entrance Doors: Reinforce doors as required for installing entrance door hardware.

G. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.

H. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.10 ALUMINUM FINISHES

A. General: Aluminum finish is indicated on the Drawings. Comply with requirements for finish type as specified in paragraphs below.
   1. Color and Gloss: Match finish indicated in Drawings.

B. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Comply with manufacturer's written instructions.

B. Do not install damaged components.

C. Fit joints to produce hairline joints free of burrs and distortion.

D. Rigidly secure nonmovement joints.

E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

F. Seal perimeter and other joints watertight unless otherwise indicated.

G. Metal Protection:
   1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
   2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

H. Install joint filler behind sealant as recommended by sealant manufacturer.

I. Install components plumb and true in alignment with established lines and grades.

3.3 INSTALLATION OF GLAZING

A. Install glazing as specified in Section 088000 "Glazing."

3.4 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE DOORS

A. Install entrance doors to produce smooth operation and tight fit at contact points.

1. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware in accordance with entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

3.5 ERECTION TOLERANCES

A. Install aluminum-framed entrances and storefronts to comply with the following maximum tolerances:
   1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
   2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
   3. Alignment:
      a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
      b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
      c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
   4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

END OF SECTION

SECTION 084226 - ALL-GLASS ENTRANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes exterior, manual-swinging, all-glass entrance systems.

B. Related Requirements:
   1. Section 013573 "Delegated Design Requirements and Procedures" for definitions, submittal procedures, responsibilities, and scheduling requirements associated with delegated design assignment indicated in this Section.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for all-glass system.

B. Shop Drawings: For all-glass entrance systems.
   1. Include plans, elevations, and sections.
   2. Include details of fittings and glazing, including isometric drawings of fittings.
   3. Include door hardware locations, mounting heights, and installation requirements.

C. Samples for Initial Selection: For each type of exposed finish indicated.

D. Samples for Verification: For each type of exposed finish indicated, prepared on Samples of sizes indicated below:
   1. Metal Finishes: 6-inch- long sections of fittings, and other items.
   2. Glass: 6 inches square, showing exposed-edge finish.
   3. Door Hardware: For exposed door hardware of each type, in specified finish, full size.

E. Fabrication Sample: Patch fitting at pivot side and continuous rail fitting at bottom, made from 12-inch lengths of full-size components and showing details of the following:
   1. Joinery.
   2. Anchorage.
   3. Glazing.

F. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams. Coordinate final entrance door hardware schedule with all-glass entrance-system components, assemblies, and related work to ensure proper size, thickness, hand, function, and finish of entrance door hardware.

G. Delegated-Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
   1. Provide delegated-design submittals for all-glass entrance systems.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For all-glass entrance systems to include in maintenance manuals. Furnish a complete set of specialized tools and maintenance instructions as required for Owner's continued adjustment, maintenance, and removal and replacement of entrance door hardware.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation of units required for this Project.

B. Egress Door Inspector Qualifications: Inspector for field quality-control inspections of egress door assemblies shall comply with qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
   1. DHI's Fire and Egress Door Assembly Inspector (FDAI) certification.

C. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
   1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

D. Provide the following upon request:
   1. Qualification Data:
      a. For Installer.
      b. For egress door inspector.
         1) Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
         2) Submit copy of DHI's Fire and Egress Door Assembly Inspector (FDAI) certificate.
   2. Product Test Reports: For all-glass entrance systems, for tests performed by a qualified testing agency.
   3. Field quality-control reports.

1.6 MOCKUPS

A. Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
   1. Build mockup of typical all-glass entrance system as shown on Drawings.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of all-glass entrance systems that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:

a. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
b. Failure of operating components.

2. Warranty Period: Two years from date of Substantial Completion for assembly and components unless otherwise indicated.
   a. Concealed Floor Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain all components of all-glass entrance systems, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design all-glass entrance systems.
   1. Material properties indicated in this Section shall be considered as minimum properties.

B. General Performance: Comply with performance requirements specified, as determined by testing of all-glass entrance systems representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.

C. Structural Loads:
   1. Wind Design Criteria: As indicated on Drawings.
   2. Other Design Loads: As indicated on Drawings.
   3. Deflection Limits: Deflection normal to glazing plane is limited to 1/175 of clear span or 3/4 inch, whichever is smaller.

D. Seismic Performance: All-glass entrance systems shall withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

E. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

F. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the DOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.

2.3 EXTERIOR, MANUAL-SWINGING, ALL-GLASS ENTRANCE SYSTEMS

A. Fitting Configuration:
   1. Door Fittings: Patch fitting at top and continuous rail fitting at bottom (BP-Style).
   2. Sidelight Fittings: Continuous rail fitting at top and bottom.

B. Fitting Material: Aluminum.

C. Rail Fittings:
   1. Height:
      a. Top Rail: As indicated.
      b. Bottom Rail: As indicated.
   2. Profile: Square.

3. End Caps: Manufacturer's standard precision-fit end caps for rail fittings.

D. Accessory Fittings:
1. Overhead doorstop.
2. Center-housing lock.
3. U-channel.

E. Anchors and Fastenings: Concealed.

F. Weather Stripping: Pile type; replaceable without removing all-glass entrance doors from pivots.

G. Materials:
1. Aluminum: ASTM B221, with strength and durability characteristics of not less than Alloy 6063-T5.
a. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.4 GLASS

A. Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated surfaces), Type I (transparent), Quality-Q3, tested for surface and edge compression in accordance with ASTM C1048 and for impact strength in accordance with 16 CFR 1201 for Category II materials.
1. Class 1: Clear monolithic.
a. Thickness: As required by Delegated Design, but not less than 12 mm.
b. Locations: As indicated.
2. Exposed Edges: Machine ground and flat polished.
3. Butt Edges: Flat ground.
4. Corner Edges: Lap-joint corners with exposed edges polished.

2.5 ENTRANCE DOOR HARDWARE

A. General: Entrance door hardware units in sizes, quantities, and types recommended by manufacturer for all-glass entrance systems indicated. For exposed parts, match metal and finish of fittings.

B. Concealed Floor Closers and Top Pivots: Center hung; ANSI/BHMA A156.4, Grade 1; including cases, bottom arms, top walking beam pivots, plates, and accessories required for complete installation.
1. Swing: Single acting.
a. Positive Dead Stop: Coordinated with hold-open angle if any, or at angle selected.
2. Hold Open: Automatic, at angle selected.
3. Opening-Force Requirements:
a. Egress Doors: Not more than 15 lbf to release the latch and not more than 30 lbf to set the door in motion and not more than 15 lbf to open the door to its minimum required width.

C. Concealed Overhead Holder: ANSI/BHMA A156.8, Grade 1, with dead-stop setting coordinated with concealed floor closer.

D. Push-Pull Set: As selected from manufacturer's full range.

E. Single-Door and Active-Leaf Locksets: Center-housing combination deadbolt and latchbolt with lever handles.
   1. Deadbolt operated by key outside and thumbturn inside.

F. Inactive-Leaf Locksets: Bottom-fitting or bottom-rail deadbolt.
   1. Deadbolt operated by key outside and thumbturn inside.

G. Cylinders: As specified in Section 087100 "Door Hardware."

H. Exit Devices: UL 305.
   1. Function: Operation by push-pull when inside operator is locked down (dogged).
   2. Latching: At threshold or floor plate and door head.
   3. Style: Concealed vertical rod in housing style indicated.
   4. Provide exit devices on both leaves of pairs of doors.

I. Threshold: Not more than 1/2 inch high.

2.6 FABRICATION

A. Provide holes and cutouts in glass to receive hardware, fittings, and accessory fittings before tempering glass. Do not cut, drill, or make other alterations to glass after tempering.
   1. Fully temper glass using horizontal (roller-hearth) process, and fabricate so that when glass is installed, roll-wave distortion is parallel with bottom edge of door or lite.

B. Factory assemble components and factory install hardware and fittings to greatest extent possible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF EXTERIOR, MANUAL-SWINGING, ALL-GLASS ENTRANCE SYSTEMS

A. Install all-glass entrance systems and associated components in accordance with manufacturer's written instructions.

B. Set units level, plumb, and true to line, with uniform joints.

C. Maintain uniform clearances between adjacent components.

D. Lubricate hardware and other moving parts in accordance with manufacturer's written instructions.

E. Set, seal, and grout floor closer cases as required to suit hardware and substrate indicated.

3.3 FIELD QUALITY CONTROL

A. Inspection Agency: Owner will engage through the Contractor a qualified inspector to perform inspections and to furnish reports to Architect.

1. Egress Door Inspections: Inspect each all-glass entrance door equipped with panic hardware, each all-glass entrance door located in an exit enclosure, each electrically controlled all-glass egress door, and each all-glass entrance door equipped with special locking arrangements, in accordance with NFPA 101, Section 7.2.1.15.

B. All-glass entrance systems will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.4 ADJUSTING AND CLEANING

A. Adjust all-glass entrance doors and hardware to produce smooth operation and tight fit at contact points and weather stripping.

1. For all-glass, entrance doors accessible to people with disabilities, adjust closers to provide a three-second closer sweep period for doors to move from a 70-degree open position to 3 inches from the latch measured to the leading door edge.

B. Remove excess sealant and glazing compounds and dirt from surfaces.

END OF SECTION

SECTION 084229.23 - SLIDING AUTOMATIC ENTRANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes sliding automatic entrances.

1.2 DEFINITIONS

A. AAADM: American Association of Automatic Door Manufacturers.

B. Activation Device: A control that, when actuated, sends an electrical signal to the door operator to open the door.

C. Safety Device: A control that, to avoid injury, prevents a door from opening or closing.

D. For automatic door terminology, refer to BHMA A156.10 for definitions of terms.

1.3 COORDINATION

A. Templates: Distribute for doors, frames, and other work specified to be factory prepared for installing automatic entrances.

B. Coordinate hardware with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish. Coordinate hardware for automatic entrances with hardware required for rest of Project.

C. Electrical System Roughing-in: Coordinate layout and installation of automatic entrances with connections to power supplies and access-control system, remote activation devices, and remote monitoring systems.

D. System Integration: Integrate sliding automatic entrances with other systems as required for a complete working installation.
   1. Provide electrical interface control capability for activation of sliding automatic entrances by security access system on doors with electric locking.
   2. Provide electrical interface to deactivate door operators on activation of fire alarm system.
   3. Provide electrical interface to allow for remote monitoring of automatic entrance door panel status.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for automatic entrances.
   2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Shop Drawings: For sliding automatic entrances.
   1. Include plans, elevations, sections, hardware mounting heights, and attachment details.

2. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.
4. Indicate locations of activation and safety devices.
5. Include hardware schedule and indicate hardware types, functions, quantities, and locations.

C. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

D. Delegated Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
1. Provide delegated-design submittals for automatic entrances.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For automatic entrances, safety devices, and control systems to include in operation and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer with Company Certificate issued by AAADM indicating that manufacturer has a Certified Inspector on staff.

B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation and maintenance of units required for this Project and who employs a Certified Inspector.
1. Maintenance Proximity: Not more than two hours' normal travel time from Installer's place of business to Project site.

C. Certified Inspector Qualifications: Certified by AAADM.

D. Provide the following upon request:
1. Qualification Data: For Installer, manufacturer, and Certified Inspector.
2. Product Certificates: For each type of automatic entrance. Include emergency-exit features of automatic entrances serving as a required means of egress.
3. Product Test Reports: For each type of automatic entrance, for tests performed by a qualified testing agency.
4. Field quality-control reports.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of automatic entrances that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:
   a. Structural failures including, but not limited to, excessive deflection.
   b. Faulty operation of operators, controls, and hardware.
   c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
2. Warranty Period: Two years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer agrees to repair or replace components on which finishes fail in materials or workmanship within specified warranty period.

1. Deterioration includes, but is not limited to, the following:
   a. Color fading more than 5 Hunter units when tested in accordance with ASTM D2244.
   b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 AUTOMATIC ENTRANCE ASSEMBLIES

A. Source Limitations: Obtain sliding automatic entrances from single source from single manufacturer.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Power-Operated Door Standard: BHMA A156.10.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design automatic entrances.
   1. Material properties indicated in this Section shall be considered as minimum properties.

B. Structural Performance: Automatic entrances shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated in accordance with ASCE/SEI 7.
   1. Wind Design Criteria: As indicated on the Drawings.
   2. Other Design Loads: As indicated on the Drawings.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

D. Operating Temperature Range: Automatic entrances shall operate within minus 20 to plus 122 deg F.

E. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 1.25 cfm/sq. ft. of fixed entrance-system area when tested in accordance with ASTM E283 at a minimum static-air-pressure difference of 6.24 lbf/sq. ft..

F. Opening Force:
   1. Power-Operated Doors: Not more than 50 lbf required to manually set door in motion if power fails, and not more than 15 lbf required to open door to minimum required width.
   2. Breakaway Device for Power-Operated Doors: Not more than 50 lbf required for a breakaway door or panel to open.

G. Entrapment-Prevention Force:
   1. Power-Operated Sliding Doors: Not more than 30 lbf required to prevent stopped door from closing.

2.3 SLIDING AUTOMATIC ENTRANCES

A. General: Provide manufacturer's standard automatic entrances, including doors, sidelites, framing, headers, carrier assemblies, roller tracks, door operators, controls, and accessories required for a complete installation.

B. Sliding Automatic Entrances:
   1. Operator Features:
      a. Power opening and closing.
      b. Drive System: Chainorbelt.
      c. Adjustable opening and closing speeds.
      d. Adjustable hold-open time between zero and 30 seconds.
      e. Obstruction recycle.
      f. On-off/hold-open switch to control electric power to operator, key operated.
   2. Sliding-Door Carrier Assemblies and Overhead Roller Tracks: Carrier assembly that allows vertical adjustment; consisting of nylon- or delrin-covered, ball-bearing-center steel wheels operating on a continuous roller track, or ball-bearing-center steel wheels operating on a nylon- or delrin-covered, continuous roller track. Support doors from carrier assembly by cantilever and pivot assembly.
      a. Rollers: Minimum of two ball-bearing roller wheels and two antirise rollers for each active leaf.
   3. Sliding-Door Threshold: Threshold members and bottom-guide-track system with stainless steel, ball-bearing-center roller wheels.
      a. Configuration, No Threshold: No threshold across door opening and surface-mounted guide-track system at sidelites.
   4. Controls: Activation and safety devices in accordance with BHMA standards.
      a. Activation Device, Motion Sensor: Mounted on each side of door header to detect pedestrians in activating zone and to open door.
      b. Activation Device, Switch: Push-plate switch to activate door operator.
      c. Safety Device, Photoelectric Beams: Two photoelectric beams mounted in sidelite jambs on each side of door to detect pedestrians in presence zone and to prevent door from closing.
      d. Sidelite Safety Device: Presence sensor, mounted above each sidelite on side of door opening through which doors travel, to detect obstructions and to prevent door from opening.
      e. Opening-Width Control: Two-position switch that in the normal position allows sliding doors to travel to full opening width and in the alternate position reduces opening to a selected partial opening width.
   5. Finish: Finish framing, door(s), and header with clear anodic finish .

2.4 ENTRANCE COMPONENTS

A. Framing Members: Extruded aluminum, minimum 0.125 inch thick and reinforced as required to support imposed loads.
   1. Nominal Size: As indicated on Drawings.
   2. Extruded Glazing Stops and Applied Trim: Minimum 0.062-inch wall thickness.

B. Stile and Rail Doors: 1-3/4-inch- thick, glazed doors with minimum 0.125-inch- thick, extruded-aluminum tubular stile and rail members. Mechanically fasten corners with reinforcing brackets that are welded, or incorporate concealed tie-rods that span full length of top and bottom rails.
   1. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
   2. Stile Design: As indicated on Drawings.
   3. Rail Design: As indicated on Drawings.

C. Sidelite(s): 1-3/4-inch- deep sidelite(s) with minimum 0.125-inch- thick, extruded-aluminum tubular stile and rail members matching door design.
   1. Glazing Stops and Gaskets: Same materials and design as for stile and rail door.

D. Headers: Fabricated from minimum 0.125-inch- thick extruded aluminum and extending full width of automatic entrance units to conceal door operators and controls. Provide hinged or removable access panels for service and adjustment of door operators and controls. Secure panels to prevent unauthorized access.
   1. Mounting: Concealed, with one side of header flush with framing.
   2. Capacity: Capable of supporting doors of up to 175 lb per leaf over spans of up to 14 feet without intermediate supports.
      a. Provide sag rods for spans exceeding 14 feet.

E. Brackets and Reinforcements: High-strength aluminum with nonstaining, nonferrous shims for aligning system components.

F. Signage: As required by cited BHMA standard.
   1. Application Process: Door manufacturer's standard process.
   2. Provide sign materials with instructions for field application after glazing is installed.

2.5 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
   1. Extrusions: ASTM B221.
   2. Sheet: ASTM B209.

B. Steel Reinforcement: Reinforcement with corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Use surface preparation methods in accordance with recommendations in SSPC-SP COM and prepare surfaces in accordance with applicable SSPC standard.

C. Glazing: As specified in Section 088000 "Glazing."

D. Sealants and Joint Fillers: As specified in Section 079200 "Joint Sealants."

E. Nonmetallic, Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout; complying with ASTM C1107/C1107M; of consistency suitable for application.

F. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

G. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.6 DOOR OPERATORS AND CONTROLS

A. General: Provide operators and controls, which include activation and safety devices, in accordance with BHMA standards, for condition of exposure, and for long-term, maintenance-free operation under normal traffic load for type of occupancy indicated.

B. Door Operators: Provide door operators of size recommended by manufacturer for door size, weight, and movement.
   1. Door Operator Performance: Door operators shall open and close doors and maintain them in fully closed position when subjected to Project's design wind loads.
   2. Electromechanical Operators: Concealed, self-contained, overhead units powered by fractional-horsepower, permanent-magnet dc motor; with closing speed controlled mechanically by gear train and dynamically by braking action of electric motor; with solid-state microprocessor controller; complying with UL 325; and with manual operation with power off.

C. Photoelectric Beams: Pulsed infrared, sender-receiver assembly for recessed mounting. Beams shall not be active when doors are fully closed.

D. Push-Plate Switch: Momentary-contact door-control switch with flat push-plate actuator, with contrasting-colored, engraved message.
   1. Configuration, Square: Square push plate with 4-by-4-inch junction box.
      a. Mounting: Surface mounted on wall.
   2. Push-Plate Material: Stainless steel, as selected by Architect from manufacturer's full range.
   3. Message: International symbol of accessibility and "Push to Open."

E. Electrical Interlocks: Unless units are equipped with self-protecting devices or circuits, provide electrical interlocks to prevent activation of operator when door is locked, latched, or bolted.

2.7 HARDWARE

A. General: Provide units in sizes and types recommended by automatic entrance and hardware manufacturers for entrances and uses indicated. Finish exposed parts to match door finish unless otherwise indicated.

B. Breakaway Device for Power-Operated Doors: Device that allows door to swing out in direction of egress to full 90 degrees from any operating position. Maximum force to open door shall be as stipulated in "Performance Requirements" Article. Interrupt powered operation of door operator while in breakaway mode.
   1. Include two adjustable detent devices mounted in each breakaway panel; one top mounted and one bottom mounted to control breakaway force.
      a. Panel Closer: Factory-installed concealed hydraulic door closer.

C. Deadlocks: Deadbolt operated by exterior cylinder and interior thumb turn, with minimum 1-inch- long throw bolt; BHMA A156.5, Grade 1.
      a. Keying: Integrate into building master key system.
      b. Keys: Threefor each cylinder.
   2. Deadbolts: Laminated-steel hook, mortise type, BHMA A156.5, Grade 1.

3. Three-Point Locking for Stile and Rail Sliding Doors: Mechanism in stile of active door leaf that automatically extends lockbolts into overhead carrier assembly and threshold.
4. Lock/Unlock Indicator: Lock position indicators integrated with locking system. Stile is mounted on secure side of door. Visual display of lock position as follows: "OPEN" in black letters when unlocked, and "LOCKED" in red letters when locked.
5. Armored Strike: Reinforced security strike plate.

D. Automatic Locking: Electrically controlled device mounted in header that automatically locks sliding door in closed position, preventing door panels from sliding manually. Provide fail- secure operation if power fails.
1. Power Interruption: Lock shall be engaged, preventing doors from sliding manually.
2. Means of Egress: Standard breakaway feature.

E. Access-Control Locking: Electrically controlled device mounted in header that automatically locks sliding door in closed position, preventing door panels from sliding manually. Provide fail- secure operation if power fails.
1. Power Interruption: Lock shall be engaged, preventing doors from sliding manually.
2. Means of Egress: Vertical rod exit device.
3. Include locking devices for sidelites to prevent manual breakout.

F. Uninterrupted Power Supply: UL 1778, fully integrated unit mounted within header.
1. Power Interruption: Supply power to operator, controls, activation device, and safety systems of sliding automatic door for up to 1.5 hours of normal operation.
2. Include low-battery shutdown feature to safely open or close door prior to complete battery discharge.
3. Include audible battery replacement alarm to indicate that battery will no longer accept a charge and replacement is required.

G. Weather Stripping: Replaceable components.
1. Sliding Type: AAMA 701/702, made of wool, polypropylene, or nylon woven pile with nylon-fabric or aluminum-strip backing.

2.8 FABRICATION

A. General: Factory fabricate automatic entrance components to designs, sizes, and thicknesses indicated and to comply with indicated standards.
1. Form aluminum shapes before finishing.
2. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
3. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match framing.
   a. Where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration, use self-locking devices.
   b. Reinforce members as required to receive fastener threads.

4. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

B. Framing: Provide automatic entrances as prefabricated assemblies. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site.
1. Fabricate tubular and channel frame assemblies with welded or mechanical joints. Provide subframes and reinforcement as required for a complete system to support required loads.
2. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
3. Form profiles that are sharp, straight, and free of defects or deformations.
4. Provide components with concealed fasteners and anchor and connection devices.
5. Fabricate components with accurately fitted joints, with ends coped or mitered to produce hairline joints free of burrs and distortion.
6. Fabricate exterior components to drain water passing joints, condensation occurring within framing members, and moisture migrating within system to exterior. Provide anchorage and alignment brackets for concealed support of assembly from building structure.
7. Allow for thermal expansion of exterior units.

C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.

D. Door Operators: Factory fabricated and installed in headers, including adjusting and testing.

E. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated, in accordance with GANA's "Glazing Manual."

F. Hardware: Factory install hardware to greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site. Cut, drill, and tap for factory-installed hardware before applying finishes.
1. Provide sliding-type weather stripping, mortised into door, at perimeter of doors.

G. Controls:
1. General: Factory install activation and safety devices in doors and headers as required by BHMA A156.10 for type of door and direction of travel.
2. Install photoelectric beams in vertical jambs of sidelites, with dimension above finished floor as follows:
a. Top Beam: 48 inches.
b. Bottom Beam: 24 inches.

2.9 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Apply organic and anodic finishes to formed metal after fabrication unless otherwise indicated.

C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.10 ALUMINUM FINISHES

A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm; Black.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of automatic entrances.

B. Examine roughing-in for electrical systems to verify actual locations of power connections before automatic entrance installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install automatic entrances in accordance with manufacturer's written instructions and cited BHMA A156.10 for direction of pedestrian travel, including signage, controls, wiring, and connection to the building's power supply.
   1. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
   2. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
   3. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous coating.

B. Entrances: Install automatic entrances plumb and true in alignment with established lines and grades without warp or rack of framing members and doors. Anchor securely in place.
   1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
   2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
   3. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within system to exterior.
   4. Level recesses for recessed thresholds using nonshrink grout.

C. Door Operators: Connect door operators to electrical power distribution system.

D. Access-Control Devices: Connect access-control devices to access-control system, as specified in Section 281300 "Access Control Software and Database Management."

E. Controls: Install and adjust activation and safety devices in accordance with manufacturer's written instructions and cited BHMA standard for direction of pedestrian travel. Connect control wiring in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

F. Glazing: Install glazing as specified in Section 088000 "Glazing."

G. Sealants: Comply with requirements specified in Section 079200 "Joint Sealants" to provide weathertight installation.
   1. Set bottom-guide-track system, framing members and flashings in full sealant bed.
   2. Seal perimeter of framing members with sealant.

H. Signage: Apply signage on both sides of each door, as required by cited BHMA standard for direction of pedestrian travel.

I. Wiring within Automatic Entrance Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's written limitations on bending radii. Provide and use lacing bars and distribution spools.

3.3 FIELD QUALITY CONTROL

A. Certified Inspector: Owner will engage a Certified Inspector to test and inspect components, assemblies, and installations, including connections.

B. Automatic entrances will be considered defective if they do not pass tests and inspections.

C. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjust hardware, moving parts, door operators, and controls to function smoothly, and lubricate as recommended by manufacturer; comply with requirements of applicable BHMA standards.
   1. Adjust exterior doors for tight closure.

B. Readjust door operators and controls after repeated operation of completed installation equivalent to three days' use by normal traffic (100 to 300 cycles).

C. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

3.5 CLEANING

A. Clean glass and metal surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Repair damaged finish to match original finish.
   1. Comply with requirements in Section 088000 "Glazing" for cleaning and maintaining glass.

3.6 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of automatic entrance Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper automatic entrance operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
   1. Engage a Certified Inspector to perform safety inspection after each adjustment or repair and at end of maintenance period. Furnish completed inspection reports to Owner.
   2. Perform maintenance, including emergency callback service, during normal working hours.
   3. Include 24-hour-per-day, 7-day-per-week emergency callback service.

3.7 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain automatic entrances.

END OF SECTION

SECTION 084243 - INTENSIVE CARE UNIT/CRITICAL CARE UNIT (ICU/CCU) ENTRANCES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes manually operated, trackless, intensive care unit/critical care unit (ICU/CCU) entrances.

1.2 COORDINATION

A. Recesses: Coordinate sizes and locations of recesses in concrete floors for recessed tracks. Concrete, reinforcement, and formwork requirements are specified elsewhere.

B. Templates: Distribute for doors, frames, and other work specified to be factory prepared for installing ICU/CCU entrances.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each configuration of ICU/CCU entrance indicated.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
   2. Environmental Product Declaration (EPD): For each product.

C. Shop Drawings: For each ICU/CCU installation.
   1. Include plans, elevations, sections, hardware mounting heights, and attachment details.

D. Samples for Initial Selection: For units with factory-applied color finishes.

E. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Provide the following upon request:
   1. Qualification Data: For Installer.

1.6 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings to receive ICU/CCU entrances by field measurements before fabrication.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of ICU/CCU entrances that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.

b. Faulty operation of hardware.
c. Deterioration of metals, metal finishes, and other materials beyond normal use.
2. Warranty Period: Two years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer agrees to repair finishes or replace components that show evidence of deterioration of factory-applied finishes within specified warranty period.
1. Deterioration includes, but is not limited to, the following:
a. Color fading more than 5 Delta units when tested in accordance with ASTM D2244.
b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

A. Source Limitations: Obtain each type of ICU/CCU entrance from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Opening Force: Not more than 5 lbf to fully open door.

B. Air Leakage: Entrance assemblies for shall be listed and labeled for smoke and draft control by qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and having maximum air leakage in accordance with NFPA 105 unless otherwise indicated.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 SLIDING ICU/CCU ENTRANCE ASSEMBLIES

A. General: Provide manufacturer's factory-glazed ICU/CCU entrances indicated including door leaves, sidelites, framing, headers, carrier assemblies, roller tracks, and accessories required for a complete installation.
1. Provide Jamb mounted touchless sensor which actuates electric strike releasing latch to allow door to open. Mount sensor interior and exterior for two-way traffic.

B. Breakaway Hardware: Release hardware that allows indicated panels to swing out in direction of egress to full 90 degrees from closed door position.
1. Maximum Force to Open Panel: 50 lbf.
2. Release Position: At any point in sliding-door travel.

C. Sliding ICU/CCU Entrance :
1. Performance: Standard assembly.
a. Alarm Interface: Equip entrance with electromagnet closer that closes door when alarm is triggered.
2. Finish framing, door(s), sidelite(s), and header with Class I, clear anodic finish.

2.4 COMPONENTS

A. Framing Members: Extruded aluminum, minimum 0.125 inch thick and reinforced as required to support imposed loads.
   1. Nominal Size: As indicated on Drawings.
   2. Extruded Glazing Stops and Applied Trim: Minimum 0.062-inch wall thickness.

B. Stile and Rail Doors: 1-3/4-inch- thick, glazed doors with minimum 0.125-inch- thick, extruded-aluminum tubular stile and rail members. Mechanically fasten corners with reinforcing brackets that are welded, or incorporate concealed tie rods that span full length of top and bottom rails.
   1. Glazing Stops and Gaskets: Snap-on, extruded-aluminum stops and preformed gaskets for glazing indicated.

C. Sidelites: 1-3/4-inch- deep sidelites with minimum 0.125-inch- thick, extruded-aluminum tubular stile and rail members matching door design and finish.
   1. Glazing Stops and Gaskets: Same materials and design as for stile and rail door.

D. Miniblind Glazing: ASTM E2190.
   1. Glass: ASTM C1036, Type 1, Class 1, q3.
      a. Tint: Clear.
      b. Kind: Fully tempered.
   2. Integral Miniblinds: Manufacturer's standard, horizontal louver blinds with aluminum slats and polyester-fiber cords; located in space between glass lites and operated by hardware located on inside face of glass panel.
      a. Operation: Tilt, raising, and lowering.
      b. Color: Match Architect's sample.

E. Headers: Fabricated from minimum 0.125-inch- thick, extruded aluminum, and extending full width of ICU/CCU entrance units to conceal carrier assemblies and roller tracks. Provide hinged or removable access panels for service and adjustment. Secure panels to prevent unauthorized access.
   1. Capacity: Capable of supporting doors up to 100 lb per leaf over spans up to 14 feet without intermediate supports.
   2. Provide sag rods for spans exceeding 14 feet.

F. Carrier Assemblies and Overhead Roller Tracks: Assembly that allows vertical adjustment; consisting of nylon- or polyoxymethylene (POM)-covered, ball-bearing-center steel wheels operating on a continuous roller track or of ball-bearing-center steel wheels operating on a nylon- or POM-covered, continuous roller track. Support doors from carrier assembly by cantilever and pivot assembly. Provide minimum of two ball-bearing roller wheels and two antirise rollers for each active leaf.

G. Brackets and Reinforcements: High-strength aluminum with nonstaining, nonferrous shims for aligning system components.

H. Fasteners and Accessories: Corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

2.5 HARDWARE

A. General: Provide units in sizes and types recommended by ICU/CCU entrance and hardware manufacturers for entrances and uses indicated. Finish exposed parts to match door finish unless otherwise indicated.

B. Closer: BHMA A156.4, Grade 1, fully concealed spring closer, sized in accordance with manufacturer's recommendations for door size, adjustable to comply with requirements for opening force.

C. Pulls: Recessed units on both sides of each operable door and surface-mounted, D-shaped pull for each swing-out panel. Pulls on sliding doors to be exposed and usable from both sides when sliding doors are in fully open position.

2.6 FABRICATION

A. General: Factory fabricate ICU/CCU entrance components to designs, sizes, and thicknesses indicated and to comply with indicated standards.
   1. Fabricate aluminum components before finishing.
   2. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
   3. Use concealed fasteners to greatest extent possible. Where exposed fasteners are required, use countersunk Phillips flat-head machine screws, finished to match framing.
      a. Where fasteners are subject to loosening or turning out from structural movements or vibration, use self-locking devices.
      b. Reinforce members as required to receive fastener threads.
   4. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

B. Framing: Provide ICU/CCU entrances as prefabricated assemblies. Complete fabrication, assembly, finishing, hardware application, and other work before shipment to Project site.
   1. Fabricate tubular and channel frame assemblies with welded or mechanical joints. Provide subframes and reinforcement as required for a complete system to support required loads.
   2. Perform fabrication operations in manner that prevents damage to exposed finish surfaces.
   3. Form profiles that are straight and free of defects or deformations.
   4. Provide components with concealed fasteners and anchor and connection devices.
   5. Fabricate components with accurately fitted joints, with ends coped or mitered to produce hairline joints free of burrs and distortion.
   6. Provide anchorage and alignment brackets for concealed support of assembly from the building structure.

C. Doors: Factory fabricated and assembled in profiles indicated. Reinforce as required to support imposed loads and for installing hardware.

D. Glazing: Fabricate framing with minimum glazing edge clearances for thickness and type of glazing indicated, in accordance with GANA's "Glazing Manual."

E. Factory Glazing: Install miniblind glazing at the factory.

F. Hardware: Factory install hardware to the greatest extent possible; remove only as required for final finishing operation and for delivery to and installation at Project site. Cut, drill, and tap for factory-installed hardware before applying finishes.
   1. Provide sliding weather stripping, mortised into door, at perimeter of sliding surfaces and breakaway sidelites.

G. Electrical Grounding: Fabricate ICU/CCU entrances to be internally grounded, complying with requirements of authorities having jurisdiction.

2.7 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
   1. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.
   2. Sheet and Plate: ASTM B209.

B. Sealants and Joint Fillers: As specified in Section 079200 "Joint Sealants."

C. Shrinkage-Resistant Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout complying with ASTM C1107/C1107M; of consistency suitable for application.

D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

E. Recycled Content of Aluminum Components: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

F. Regional Materials: Manufacture aluminum within 100 miles of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles of Project site

2.8 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.

B. Apply anodic finishes to formed metal after fabrication unless otherwise indicated.

C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.9 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, header support, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power and grounding systems to verify actual locations of electrical connections before automatic entrance installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install automatic entrances in accordance with manufacturer's written instructions, including wiring and connection to the building's power supply.
   1. Do not install damaged components. Fit frame joints to produce hairline joints free of burrs and distortion. Rigidly secure nonmovement joints. Seal joints watertight.
   2. Where aluminum contacts dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.
   3. Where aluminum contacts concrete or masonry, protect against corrosion by painting contact surfaces with bituminous coating.

B. Install ICU/CCU entrances plumb, true in alignment with established lines and grades, and without warp or rack of framing members and doors. Anchor securely in place.
   1. Install surface-mounted hardware using concealed fasteners to greatest extent possible.
   2. Set headers, carrier assemblies, tracks, operating brackets, and guides level and true to location with anchorage for permanent support.
   3. Level recesses for recessed floor tracks using shrinkage-resistant grout.
   4. Air Leakage: Install entrance assemblies for smoke-control and pressurized rooms in accordance with NFPA 105 and as indicated.

C. Field Glazing: Install glazing as specified in Section 088000 "Glazing."

D. Sealants: Comply with requirements in Section 079200 "Joint Sealants" for installing sealants, fillers, and gaskets.
   1. Set framing members, floor tracks, and flashings in full sealant bed.
   2. Seal perimeter of framing members with sealant.

E. Grounding: Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."

3.3 ADJUSTING

A. Adjust operating hardware and moving parts to function smoothly, and lubricate as recommended by manufacturer.

B. Adjust force to open door panels.

C. Test grounding system for compliance with requirements of authorities having jurisdiction.

D. Adjust smoke-control and pressurized-entrance doors for tight closure.

E. Test and adjust miniblinds to operate properly.

3.4 CLEANING AND PROTECTION

A. Clean glass and metal surfaces promptly after installation. Remove excess glazing and sealant compounds, dirt, and other substances. Repair damaged finish to match original finish.

B. Comply with requirements in Section 088000 "Glazing" for cleaning and protecting glass.

END OF SECTION

SECTION 084313 - ALUMINUM-FRAMED STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes two-sided structural sealant glazed aluminum-framed storefront systems.

B. Related Requirements:
   1. Section 013573 "Delegated Design Requirements and Procedures" for definitions, submittal procedures, responsibilities, and scheduling requirements associated with delegated design assignment indicated in this Section.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Sustainable Design Submittals:
   1. Product Data: For sealants, indicating VOC content.
   2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
   3. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
   4. Environmental Product Declaration (EPD): For each product.

C. Shop Drawings: For aluminum-framed storefronts. Include plans, elevations, sections, full-size details, and attachments to other work.
   1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
   2. Include full-size isometric details of each type of vertical-to-horizontal intersection of aluminum-framed storefronts, showing the following:
      a. Joinery, including concealed welds.
      b. Anchorage.
      c. Expansion provisions.
      d. Glazing.
      e. Flashing and drainage.
   3. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.

D. Samples for Initial Selection: For units with factory-applied color finishes.

E. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes.

F. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
   1. Joinery, including concealed welds.
   2. Anchorage.

3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.

G. Delegated-Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
1. Provide delegated-design submittals for aluminum-framed storefronts.

1.4 INFORMATIONAL SUBMITTALS

A. Mockup Testing Submittals:
1. Testing Program: Developed specifically for Project.
2. Test Reports: Prepared by a qualified preconstruction testing agency for each mockup test.
3. Record Drawings: As-built drawings of preconstruction laboratory mockups showing changes made during preconstruction laboratory mockup testing.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For aluminum-framed storefronts to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer and that employs a qualified glazing contractor for this Project who is certified under the North American Contractor Certification Program (NACC) for Architectural Glass & Metal (AGM) contractors and that employs glazing technicians certified under the Architectural Glass and Metal Technician (AGMT) certification program.

B. Laboratory Mockup Testing Agency Qualifications: Qualified in accordance with ASTM E699 for testing indicated and accredited by the International Accreditation Service or the International Laboratory Accreditation Cooperation Mutual Recognition Arrangement as complying with ISO/IEC 17025.

C. Testing Agency Qualifications: Qualified in accordance with ASTM E699 for testing indicated and accredited by IAS or ILAC Mutual Recognition Arrangement as complying with ISO/IEC 17025 and acceptable to Owner and Architect.

D. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
1. Do not change intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If changes are proposed, submit comprehensive explanatory data to Architect for review.

E. Provide the following upon request:
1. Qualification Data:
a. For Installer and laboratory mockup testing agency and field testing agency.

b. For professional engineer's experience with providing delegated-design engineering services of the type indicated, including documentation that engineer is licensed in the jurisdiction in which Project is located.

2. Energy Performance Certificates: For aluminum-framed storefronts, accessories, and components, from manufacturer.
   a. Basis for Certification: NFRC-certified energy performance values for each aluminum-framed storefront.
3. Product Test Reports: For aluminum-framed storefronts, for tests performed by a qualified testing agency.
4. Quality-Control Program: Developed specifically for Project, including fabrication and installation, in accordance with recommendations in ASTM C1401. Include periodic quality-control reports.
5. Source quality-control reports.

1.7 MOCKUPS

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Build mockup of typical wall area as shown on Drawings.
   2. Testing shall be performed on mockups in accordance with requirements in "Field Quality Control" Article.
   3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on laboratory mockups.
   1. Build preconstruction laboratory mockups at testing agency facility; use personnel, products, and methods of construction that will be used at Project site.
   2. Size and Configuration: As indicated on Drawings.
   3. Notify Architect seven days in advance of the dates and times when preconstruction laboratory mockups will be constructed and tested.

B. Preconstruction Laboratory Mockup Testing: Test preconstruction laboratory mockups in accordance with requirements in "Performance Requirements" Article. Perform the following tests in the following order:
   1. Structural, 50 percent: ASTM E330/E330M at 50 percent of positive test load.
   2. Air Leakage: ASTM E283.
   3. Water Penetration under Static Pressure: ASTM E331.
   4. Water Penetration under Dynamic Pressure: AAMA 501.1.
   5. Structural, 100 percent: ASTM E330/E330M at 100 percent of positive and negative test loads. Repeat the following:
      a. Air Leakage: ASTM E283.
      b. Water Penetration under Static Pressure: ASTM E331.
   6. Thermal Cycling: In accordance with AAMA 501.5. Repeat the following:
      a. Air Leakage: ASTM E283.
      b. Water Penetration under Static Pressure: ASTM E331.

7. Structural, 100 and 150 percent: ASTM E330/E330M at 100 and 150 percent of positive and negative test loads. Repeat the following:
   a. Air Leakage: ASTM E283.
   b. Water Penetration under Static Pressure: ASTM E331.

C. Preconstruction Adhesion and Compatibility Testing: Submit to structural glazing sealant manufacturer, for testing indicated below, Samples of each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member that is in close proximity to or is touching the structural or nonstructural sealants of a structural glazed system.
   1. Compatibility: Test materials or components using ASTM C1087.
   2. Adhesion: Test for adhesion or lack of adhesion of a structural sealant to the surface of another material or component using ASTM C1135.
   3. Submit no fewer than eight pieces of each type of material, including joint substrates, shims, joint-sealant backings, secondary seals, and miscellaneous materials.
   4. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
   5. For materials failing tests, obtain sealant manufacturer's written instructions for corrective measures, including the use of specially formulated primers.
   6. Testing will not be required if data based on previous testing of current sealant products match those submitted.

1.9 WARRANTY

A. Special Warranty: Manufacturer and Installer agrees to repair or replace components of aluminum-framed storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures, including, but not limited to, excessive deflection.
      b. Noise or vibration created by wind and thermal and structural movements.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      d. Water penetration through fixed glazing and framing areas.
      e. Failure of operating components.
   2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty, Anodized Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of anodized finishes within specified warranty period.
   1. Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Delta E units when tested in accordance with ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D 4214.
      c. Cracking, peeling, or chipping.
   2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Arcadia, Inc.
   2. Kawneer North America, an Arconic company.
   3. YKK AP America Inc.

B. Source Limitations: Obtain all components of aluminum-framed storefront system, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design aluminum-framed storefronts.
   1. Material properties indicated in this Section shall be considered as minimum properties.

B. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
   1. Aluminum-framed storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
   2. Failure also includes the following:
      a. Thermal stresses transferring to building structure.
      b. Glass breakage.
      c. Noise or vibration created by wind and thermal and structural movements.
      d. Loosening or weakening of fasteners, attachments, and other components.
      e. Failure of operating units.

C. Structural Loads:
   1. Wind Loads Design Criteria : As indicated on Drawings.
   2. Other Design Loads: As indicated on Drawings.

D. Deflection of Framing Members Supporting Glass: At design wind load, as follows:
   1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans of up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches.
   2. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.
      a. Operable Units: Provide a minimum 1/16-inch clearance between framing members and operable units.
   3. Cantilever Deflection: Limited to l/175 at unsupported cantilevers.

E. Structural: Test in accordance with ASTM E330/E330M as follows:

1. When tested at positive and negative wind-load design pressures, storefront assemblies do not evidence deflection exceeding specified limits.
2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity, but not less than 10 seconds.

F. Water Penetration under Static Pressure: Test in accordance with ASTM E331 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested in accordance with a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft. .

G. Water Penetration under Dynamic Pressure: Test in accordance with AAMA 501.1 as follows:
1. No evidence of water penetration through fixed glazing and framing areas when tested at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft..
2. Maximum Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters, or water that is drained to exterior.

H. Seismic Performance: Aluminum-framed storefronts shall withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.
1. Seismic Drift Causing Glass Fallout: Complying with criteria for passing based on building occupancy type when tested in accordance with AAMA 501.6 at design displacement and 1.5 times the design displacement.

I. Energy Performance: Certified and labelled by manufacturer for energy performance as follows:
1. Thermal Transmittance (U-factor):
   a. Fixed Glazing and Framing Areas: U-factor for the system of not more than 0.24 Btu/sq. ft. x h x deg F as determined in accordance with NFRC 100.
2. Solar Heat Gain Coefficient (SHGC):
   a. Fixed Glazing and Framing Areas: SHGC for the system of not more than 0.25 as determined in accordance with NFRC 200.
3. Air Leakage:
   a. Fixed Glazing and Framing Areas: Air leakage for the system of not more than 0.30 cfm/sq. ft. at a static-air-pressure differential of 6.24 lbf/sq. ft. when tested in accordance with ASTM E283.
4. Condensation Resistance: Design the wall and its components to not develop any visible interior condensation on framing members or glazing when the exterior air dry bulb temperature is 9 degrees F and the interior air dry bulb temperature is 70 degrees F with a 30 percent relative humidity.

J. Sound Transmission: Provide storefront and framing areas having the following sound-transmission characteristics:

1. Outdoor-Indoor Transmission Class: Minimum 29 when tested for laboratory sound transmission loss in accordance with ASTM E 90 and determined by ASTM E 1332.

K. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.
2. Thermal Cycling: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested in accordance with AAMA 501.5.
a. High Exterior Ambient-Air Temperature: That which produces an exterior metal-surface temperature of 180 deg F.
b. Low Exterior Ambient-Air Temperature: 9 deg F.
c. Interior Ambient-Air Temperature: 70 deg F.

L. Structural-Sealant Joints:
1. Designed to carry gravity loads of glazing.

M. Structural Sealant: ASTM C1184. Capable of withstanding tensile and shear stresses imposed by structural-sealant-glazed, aluminum-framed storefronts without failing adhesively or cohesively. When tested for preconstruction adhesion and compatibility, cohesive failure of sealant shall occur before adhesive failure.
1. Adhesive failure occurs when sealant pulls away from substrate cleanly, leaving no sealant material behind.
2. Cohesive failure occurs when sealant breaks or tears within itself but does not separate from each substrate, because sealant-to-substrate bond strength exceeds sealant's internal strength.

2.3 ALUMINUM-FRAMED STOREFRONT SYSTEMS

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
1. Construction: Thermally broken.
2. Glazing System: Retained mechanically with gaskets on four sides.
3. Glazing Plane: Front.
4. Finish: Color anodic finish.
5. Fabrication Method: Field-fabricated stick system.
6. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
7. Steel Reinforcement: As required by manufacturer.

B. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

2.4 GLAZING

A. Glazing: Comply with Section 088000 "Glazing."

B. Glazing Sealants: As recommended by manufacturer.
   1. Sealant shall have a VOC content of 250 g/L or less.
   2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Structural Glazing Sealants: ASTM C1184 chemically curing silicone formulation that is compatible with system components with which it comes in contact; specifically formulated and tested for use as structural sealant and approved by structural-sealant manufacturer for use in storefront system indicated.
   1. Color: As selected by Architect from manufacturer's full range of colors.

D. Weatherseal Sealants: ASTM C920 for Type S; Grade NS; Class 25; Uses NT, G, A, and O; chemically curing silicone formulation that is compatible with other system components with which it comes in contact; recommended by weatherseal-sealant, and storefront manufacturers for this use.

2.5 MATERIALS

A. Sheet and Plate: ASTM B209.

B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.

C. Structural Profiles: ASTM B308/B308M.

D. Steel Reinforcement:
   1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
   2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
   3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.

E. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM, and prepare surfaces in accordance with applicable SSPC standard.

F. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.6 ACCESSORIES

A. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
   1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
   2. Reinforce members as required to receive fastener threads.
   3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

B. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.

1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A123/A123M or ASTM A153/A153M requirements.

C. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

D. Bituminous Paint: Cold-applied asphalt-mastic paint containing no asbestos, formulated for 30-mil thickness per coat.

E. Rigid PVC Filler.

2.7 FABRICATION

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:
1. Profiles that are sharp, straight, and free of defects or deformations.
2. Accurately fitted joints with ends coped or mitered.
3. Physical and thermal isolation of glazing from framing members.
4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
5. Provisions for field replacement of glazing from interior.
6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.

E. Structural-Sealant-Glazed Framing Members: Include accommodations for using temporary support device to retain glazing in place while structural sealant cures.

F. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.8 ALUMINUM FINISHES

A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm; Black.

2.9 SOURCE QUALITY CONTROL

A. Structural Sealant: Perform quality-control procedures complying with ASTM C1401 recommendations, including, but not limited to, assembly material qualification procedures, sealant testing, and assembly fabrication reviews and checks.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Comply with manufacturer's written instructions.

B. Do not install damaged components.

C. Fit joints to produce hairline joints free of burrs and distortion.

D. Rigidly secure nonmovement joints.

E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.

F. Seal perimeter and other joints watertight unless otherwise indicated.

G. Metal Protection:
   1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
   2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

H. Set continuous sill members and flashing in full sealant bed, as specified in Section 079200 "Joint Sealants," to produce weathertight installation.

I. Install joint filler behind sealant as recommended by sealant manufacturer.

J. Install components plumb and true in alignment with established lines and grades.

3.3 INSTALLATION OF GLAZING

A. Install glazing as specified in Section 088000 "Glazing."

3.4 INSTALLATION OF STRUCTURAL GLAZING

A. Prepare surfaces that will contact structural sealant in accordance with sealant manufacturer's written instructions, to ensure compatibility and adhesion. Preparation includes, but is not limited to, cleaning and priming surfaces.

B. Set glazing into framing in accordance with sealant manufacturer and framing manufacturer's written instructions and standard practice. Use a spacer or backer as recommended by manufacturer.

C. Set glazing with proper orientation, so that coatings face exterior or interior as specified.

D. Hold glazing in place using temporary retainers of type and spacing recommended by manufacturer, until structural sealant joint has cured.

E. Apply structural sealant to completely fill cavity, in accordance with sealant manufacturer and framing manufacturers written instructions and in compliance with local codes.

F. Apply structural sealant at temperatures indicated by sealant manufacturer for type of sealant.

G. Allow structural sealant to cure in accordance with manufacturer?s recommendations.

H. Clean and protect glass as indicated in Section 088000 "Glazing."

3.5 INSTALLATION OF WEATHERSEAL SEALANT

A. After structural sealant has completely cured, remove temporary retainers and insert backer rod between lites of glass as recommended by sealant manufacturer.

B. Install weatherseal sealant to completely fill cavity, in accordance with sealant manufacturer's written instructions, to produce weatherproof joints.

3.6 ERECTION TOLERANCES

A. Install aluminum-framed storefronts to comply with the following maximum tolerances:
   1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
   2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
   3. Alignment:
      a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
      b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
      c. Where surfaces are separated by reveal or protruding element of 1 inch wide or more, limit offset from true alignment to 1/4 inch.
   4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Field Quality-Control Testing: Perform the following test on representative areas of aluminum-framed storefronts.
   1. Water-Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested in accordance with AAMA 501.2 and shall not evidence water penetration.
      a. Perform a minimum of three tests in areas as directed by Architect.
      b. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.
   2. Air Leakage: ASTM E783 at 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article but not more than 0.09 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft..
      a. Perform a minimum of three tests in areas as directed by Architect.
      b. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.
   3. Water Penetration: ASTM E1105 at a minimum uniform and cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and shall not evidence water penetration.

C. Structural-Sealant Adhesion: Test structural sealant in accordance with recommendations in ASTM C1401, Destructive Test Method A, "Hand Pull Tab (Destructive)," Appendix X2.
   1. Test a minimum of six areas on each building facade.
   2. Repair installation areas damaged by testing.

D. Aluminum-framed storefronts will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

END OF SECTION

SECTION 084413 - GLAZED ALUMINUM CURTAIN WALLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes two-sided structural sealant glazed aluminum curtain walls installed as unitized assemblies.

B. Related Requirements:
   1. Section 013573 "Delegated Design Requirements and Procedures" for definitions, submittal procedures, responsibilities, and scheduling requirements associated with delegated design assignment indicated in this Section.

1.2 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by preconstruction testing of glazed aluminum curtain walls representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
   1. Glazed aluminum curtain walls shall withstand movements of supporting structure including, but not limited to, story drift, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
   2. Failure also includes the following:
      a. Thermal stresses transferring to building structure.
      b. Glass breakage.
      c. Noise or vibration created by wind and thermal and structural movements.
      d. Loosening or weakening of fasteners, attachments, and other components.
      e. Failure of operating units.

B. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design glazed aluminum curtain walls.
   1. Material properties indicated in this Section shall be considered as minimum properties.

C. Structural Loads:
   1. Wind Loads Design Criteria: As indicated on Drawings.
   2. Periodic Maintenance-Equipment Loads: Minimum 250 pounds point load any place on mullions.
   3. Structural-Test Performance: Test in accordance with ASTM E 330 as follows:
      a. When tested at positive and negative wind-load design pressures, assemblies do not evidence deflection exceeding specified limits.
      b. When tested at 150 percent of positive and negative wind-load design pressures, assemblies, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
      c. Test Durations: As required by design wind velocity, but not less than 10 seconds.
   4. Deflection of Framing Members: At design wind pressure, as follows:

a. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding L/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
b. Deflection Parallel to Glazing Plane: Limited to amount not exceeding that which reduces glazing bite to less than 75 percent of design dimension and that which reduces edge clearance between framing members and glazing or other fixed components to less than 1/8 inch.
c. Cantilever Deflection: Where framing members overhang an anchor point, limit deflection to two times the length of cantilevered member, divided by 175.

5. Seismic Performance: Glazed aluminum curtain walls shall withstand the effects of earthquake motions determined in accordance with SEI/ASCE 7.
   a. Component Importance Factor is 1.5.
6. Story Drift: Accommodate design displacement of adjacent stories indicated.
   a. Design Displacement: As indicated on Drawings.
   b. Test Performance: Meeting criteria for passing based on building occupancy type when tested in accordance with AAMA 501.4 at design displacement and 1.5 times the design displacement.

D. Water Penetration under Static Pressure: No evidence of water penetration through fixed glazing and framing areas when tested in accordance with ASTM E 331 at a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft..

E. Water Penetration under Dynamic Pressure: No evidence of water penetration through fixed glazing and framing areas when tested in accordance with AAMA 501.1 at dynamic pressure equal to 20 percent of positive wind-load design pressure, but not less than 15 lbf/sq. ft..
   1. Controlled Water Leakage: No uncontrolled water penetrating assemblies or water appearing on assemblies' normally exposed interior surfaces from sources other than condensation. Water leakage does not include water controlled by flashing and gutters that does not wet insulation within the wall system and that is drained to exterior.

F. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures:
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
   2. Test Interior Ambient-Air Temperature: 70 deg F.
   3. Test Performance: No buckling; stress on glass; sealant failure; excess stress on framing, anchors, and fasteners; or reduction of performance when tested in accordance with AAMA 501.5.

G. Energy Performance: Glazed aluminum curtain walls shall have certified and labeled energy performance ratings in accordance with NFRC.
   1. Thermal Transmittance (U-factor): Fixed glazing and framing areas shall have U-factor of not more than 0.24 Btu/sq. ft. x h x deg F as determined in accordance with NFRC 100.
   2. Solar Heat Gain Coefficient: Fixed glazing and framing areas shall have a solar heat gain coefficient of no greater than 0.25 as determined in accordance with NFRC 200.

3. Air Infiltration: Maximum air leakage through fixed glazing and framing areas of 0.30 cfm/sq. ft. of fixed wall area as determined in accordance with ASTM E 283 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft..
4. Condensation Resistance: Design the wall and its components to not develop any visible interior condensation on framing members or glazing when the exterior air dry bulb temperature is 9 deg F and the interior air dry bulb temperature is 70 deg F and with a 30 percent relative humidity.
   a. Provide independent laboratory test reports based on AAMA 1503.1, confirming wall system performance to at least the above criteria.
   b. If independent laboratory test reports are unavailable to verify thermal performance, provide computer analysis using THERM 5 and Windows 5 software as developed by Lawrence Berkeley National Laboratory. Include in the analysis at least all principle mullions for sill, jamb, and head conditions for vision lights and spandrel areas.

H. Sound Transmission: Provide glazed aluminum curtain walls with fixed glazing and framing areas having the following sound-transmission characteristics:
   1. Outdoor-Indoor Transmission Class: Minimum 29 when tested for laboratory sound transmission loss in accordance with ASTM E 90 and determined by ASTM E 1332.

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Provide glazed aluminum curtain walls that comply with test-performance requirements indicated, as evidenced by reports based on Project-specific preconstruction testing by a qualified testing agency. Test and performance data shall be dated no later than 1 year earlier than the date for receipt of bids. Test reports older than 1 year may be acceptable if certified by the manufacturer that no changes, alterations or modifications have occurred that would materially affect the performance values or performance of the system.
   1. Engage a qualified testing agency to perform preconstruction testing on laboratory mockups.
   2. Build laboratory mockups at testing agency facility using personnel, materials, and methods of construction that will be used at Project site.
   3. Notify Architect seven days in advance of the dates and times when laboratory mockups will be constructed.
   4. Preconstruction Testing Program: Perform tests specified in "Performance Requirements" Article on laboratory mockups in the following order:
      a. Structural-performance preloading at 50 percent of the specified wind-load design pressure when tested in accordance with ASTM E 330.
      b. Air infiltration when tested in accordance with ASTM E 283.
      c. Water penetration under static pressure when tested in accordance with ASTM E 331.
      d. Water penetration under dynamic pressure when tested in accordance with AAMA 501.1.
      e. Structural performance at design load when tested in accordance with ASTM E 330.
      f. Repeat air filtration when tested in accordance with ASTM E 283.
      g. Repeat water penetration under static pressure when tested in accordance with ASTM E 331.

h. Structural performance at maximum 150 percent of positive and negative wind-load design pressures when tested in accordance with ASTM E 330.
i. Structure movement (vertical differential movement and lateral displacement) and thermal movement displacement, three cycles. Test procedure will be developed in conjunction with test laboratory.
j. Thermal cycling with thermal performance test conditions maintained for 2 hours after equilibrium is achieved. Perform 6 cycles with a cycle consisting of one cold and one hot condition.
k. Thermal performance with test conditions maintained for 2 hours after equilibrium is achieved.
l. Repeat air filtration when tested in accordance with ASTM E 283.
m. Repeat water penetration under static pressure when tested in accordance with ASTM E 331.
n. Repeat water penetration under dynamic pressure when tested in accordance with ASTM 501.1.
o. Structural performance at maximum 150 percent of positive and negative wind-load design pressures when tested in accordance with ASTM E 330.

5. In the event of failure to meet the performance requirements, retest mockup with previously agreed upon modifications or changes. The Architect in consultation with the resting service will determine at which step in the testing procedure retesting shall resume.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Sustainable Design Submittals:
1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
3. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
4. Environmental Product Declaration: For each product.

C. Shop Drawings: For glazed aluminum curtain walls. Include plans, elevations, sections, full-size details, and attachments to other work.
1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
2. Include full-size isometric details of each vertical-to-horizontal intersection of glazed aluminum curtain walls, showing the following:
a. Joinery, including concealed welds.
b. Anchorage.
c. Expansion provisions.
d. Glazing.
e. Flashing and drainage.
3. Include laboratory mockup Shop Drawings, prepared by a qualified preconstruction testing agency, showing details of laboratory mockup.
a. Submit mockup system Shop Drawings only after approval of wall system Shop Drawings.

b. Resubmit Shop Drawings with changes made to glazed aluminum curtain walls to successfully complete preconstruction testing.

D. Samples for Initial Selection: For each type of exposed finish.

E. Samples for Verification: For each type of exposed finish required, in manufacturer's standard sizes. Include 2 or more samples in each set, indicating limits of variation.

F. Fabrication Sample: Of each vertical-to-horizontal intersection of assemblies, made from 12-inch lengths of full-size components and showing details of the following:
1. Joinery, including concealed welds.
2. Anchorage.
3. Expansion provisions.
4. Glazing.
5. Flashing and drainage.
6. Cross-sectional sample of curtain wall showing thermal break construction.

G. Delegated-Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
1. Provide delegated-design submittals for glazed aluminum curtain walls.

1.5 INFORMATIONAL SUBMITTALS

A. Preconstruction Mockup Submittals:
1. Preconstruction Testing Program: Developed specifically for Project.
2. Preconstruction Test Reports: Prepared by a qualified preconstruction testing agency for each mockup test.
3. Photographs:
   a. Take and submit photographs at locations and intervals as required to accurately document mockup construction and testing.
   b. Submit digital color images on CD-R of mockup before, during, and after preconstruction testing.
4. Record Drawings: Submit record drawings of preconstruction mockups prepared by preconstruction testing agency.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For glazed aluminum curtain walls to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer capable of fabricating glazed aluminum curtain walls that meet or exceed energy performance requirements indicated and of documenting this performance by certification, labeling, and inclusion in lists.

B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

C. Testing Agency Qualifications: Qualified in accordance with ASTM E 699 for testing indicated.

D. Product Options: Information on Drawings and in Specifications establishes requirements for aesthetic effects and performance characteristics of assemblies. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction.
   1. Do not revise intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If revisions are proposed, submit comprehensive explanatory data to Architect for review.

E. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

F. Energy Performance Standards: Comply with NFRC for minimum standards of energy performance, materials, components, accessories, and fabrication. Comply with more stringent requirements if indicated.
   1. Provide NFRC-certified glazed aluminum curtain walls with an attached label.

G. Provide the following upon request:
   1. Qualification Data: For qualified Installer and preconstruction testing agency.
   2. Seismic Qualification Certificates: For glazed aluminum curtain walls, accessories, and components, from manufacturer.
      a. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
   3. Welding certificates.
   4. Energy Performance Certificates: For glazed aluminum curtain walls, accessories, and components, from manufacturer.
      a. Basis for Certification: NFRC-certified energy performance values for each glazed aluminum curtain wall.
   5. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified preconstruction testing agency, for glazed aluminum curtain walls, indicating compliance with performance requirements.

H. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
   1. Furnish all labor and materials to completely erect, at an independent testing laboratory, mockup units of sufficient size and configuration to demonstrate the performance capabilities of the vertical wall system. Schedule mockup erection and testing sufficiently in advance of wall system fabrication to cause no delay. Do not install mockup materials as part of the wall system.
   2. After completion of mockup construction and prior to start of testing sequence two vision glass lites and two spandrel panels are to be removed and replaced to successfully demonstrate project reglazing procedures.
   3. Exact configuration will be determined during wall system shop drawing review. For purposes of bidding, include costs for a vertical mockup 30 feet high by one bay wide with an inside and outside corner.
   4. Mockup shall have all details complete and identical to those approved on the wall system shop drawings. Mockup shall demonstrate quality of materials, finish, and workmanship, as well as compliance with performance requirements.

5. Provide schedule for mockup fabrication, erection, glazing, sealing and testing a minimum of 30 days in advance of fabrication to permit owner and Architect to coordinate monitoring and observation.
6. Field testing shall be performed on mockups in accordance with requirements in "Field Quality Control" Article.
7. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
8. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

I. Preinstallation Conference: Conduct conference at Project site.

1.8 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for glazed aluminum curtain walls by field measurements before fabrication and indicate measurements on Shop Drawings.

1.9 WARRANTY

A. Special Assembly Warranty: Standard form in which manufacturer agrees to repair or replace components of glazed aluminum curtain walls that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Noise or vibration created by wind and thermal and structural movements.
      c. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
      d. Water penetration through fixed glazing and framing areas.
   2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested in accordance with ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Arcadia, Inc.
   2. Kawneer North America; an Arconic company.
   3. YKK AP America Inc.

B. Source Limitations: Obtain all components of aluminum-framed storefront system, including framing and accessories, from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Environmental Product Declaration: Provide Type III Industry-Wide Environmental Product Declaration with external verification in the manufacture is recognized as a participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that has a cradle to gate scope.

2.3 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
   1. Sheet and Plate: ASTM B 209.
   2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
   3. Extruded Structural Pipe and Tubes: ASTM B 429.
   4. Structural Profiles: ASTM B 308/B 308M.
   5. Welding Rods and Bare Electrodes: AWS A5.10/A5.10M.

B. Steel Reinforcement: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM and prepare surfaces in accordance with applicable SSPC standard.
   1. Structural Shapes, Plates, and Bars: ASTM A 36/A 36M.
   2. Cold-Rolled Sheet and Strip: ASTM A 1008/A 1008M.
   3. Hot-Rolled Sheet and Strip: ASTM A 1011/A 1011M.

C. Recycled Content: Post-consumer recycled content and one-half pre-consumer recycled content shall not be less than 25 percent.

2.4 FRAMING

A. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
   1. Construction: Thermally broken.
   2. Glazing System: Retained mechanically with gaskets on two sides, structural sealant glazed on two sides.
   3. Glazing Plane: Front.

B. Thermally Broken Construction:
   1. Provide one of the following types of thermal break construction:
      a. Insulbar: A glass-reinforced polyamide 6/6 nylon, with glass fibers oriented in three directions, mechanically crimped into dual dovetail-shaped slots in the aluminum extrusions.
      b. Struct-Link or similar construction as approved: A poured and interrupted debridged polyurethane construction that periodically leaves a measured length of aluminum web to provide structural integrity, with the debridged sections continuously sealed using an elastomeric sealant.

c. Azon or similar construction as approved: A poured and debridged polyurethane construction with mechanically abraded surfaces that lock in the polyurethane minimizing dry shrinkage and fracturing of the polyurethane.
d. Pressure Bar: A continuous extruded aluminum member anchored to the window framing system with mechanical fasteners and separated from the framing by an insulating non-metallic spacer.

C. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

D. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.
1. Use self-locking devices where fasteners are subject to loosening or turning out from thermal and structural movements, wind loads, or vibration.
2. Reinforce members as required to receive fastener threads.
3. Use exposed fasteners with countersunk Phillips screw heads, finished to match framing system.

E. Anchors: Three-way adjustable anchors with minimum adjustment of 1 inch that accommodate fabrication and installation tolerances in material and finish compatible with adjoining materials and recommended by manufacturer.
1. Concrete and Masonry Inserts: Hot-dip galvanized cast-iron, malleable-iron, or steel inserts complying with ASTM A 123/A 123M or ASTM A 153/A 153M requirements.

F. Concealed Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials.

G. Framing Sealants: Manufacturer's standard sealants with VOC content of 250g/L or less when calculated in accordance with 40 CFR 59, Subpart D (EPA method 24).

2.5 GLAZING

A. Glazing: Comply with Section 088000 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.
1. Provide gaskets that are compatible with glazing sealants and will provide for silicone adhesion.

C. Glazing Sealants: As recommended by manufacturer.
1. Sealant shall have a VOC content of 250 g/L or less.
2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.6 ACCESSORY MATERIALS

A. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.7 FABRICATION

A. Form aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fitted joints with ends coped or mitered.
   3. Physical and thermal isolation of glazing from framing members.
   4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   5. Provisions for field replacement of glazing from interior.
   6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

D. Fabricate components that, when assembled, have the following characteristics:
   1. Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
   2. Pressure-equalized system or double barrier design with primary air and vapor barrier at interior side of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.

E. Factory-Assembled Frame Units:
   1. Rigidly secure nonmovement joints.
   2. Seal joints watertight unless otherwise indicated.
   3. Install glazing to comply with requirements in Section 088000 "Glazing."

F. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.8 ALUMINUM FINISHES

A. Color Anodic Finish: AAMA 611, AA-M12C22A42/A44, Class I, 0.018 mm; Black.

PART 3 - EXECUTION

3.1 MOCKUP APPROVAL

A. Do not proceed with erection of curtain wall work before completion and approval of mockups.

3.2 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. General:
   1. Comply with manufacturer's written instructions.
   2. Do not install damaged components.
   3. Fit joints to produce hairline joints free of burrs and distortion.
   4. Rigidly secure nonmovement joints.

5. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
6. Weld components in concealed locations to minimize distortion or discoloration of finish. Protect glazing surfaces from welding.
7. Seal joints watertight unless otherwise indicated.

B. Approved mockups establish acceptable workmanship and quality standards of the Project.

C. Metal Protection:
1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

D. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.

E. Install components plumb and true in alignment with established lines and grades.

3.4 ERECTION TOLERANCES

A. Erection Tolerances: Install glazed aluminum curtain walls to comply with the following maximum tolerances:
1. Plumb: 1/8 inch in 10 feet; 1/4 inch in 40 feet.
2. Level: 1/8 inch in 20 feet; 1/4 inch in 40 feet.
3. Alignment:
   a. Where surfaces abut in line or are separated by reveal or protruding element up to 1/2 inch wide, limit offset from true alignment to 1/16 inch.
   b. Where surfaces are separated by reveal or protruding element from 1/2 to 1 inch wide, limit offset from true alignment to 1/8 inch.
   c. Where surfaces are separated by reveal or protruding element of 1 inchwide or more, limit offset from true alignment to 1/4 inch.
4. Location: Limit variation from plane to 1/8 inch in 12 feet; 1/2 inch over total length.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Testing Services: Testing and inspecting of representative areas of glazed aluminum curtain walls shall take place as installation proceeds to determine compliance of installed assemblies with specified requirements.
1. Air Infiltration: Areas shall be tested for air leakage of 1.5 times the rate specified for laboratory testing in "Performance Requirements" Article, but not more than 0.09 cfm/sq. ft., of fixed wall area when tested in accordance with ASTM E 783 at a minimum static-air-pressure differential of 6.24 lbf/sq. ft..
   a. Test Area: One bay wide, but not less than 30 feet, by one story of glazed aluminum curtain wall.
   b. Perform a minimum of three tests in areas as directed by Architect.
   c. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.

2. Water Penetration: Areas shall be tested in accordance with ASTM E 1105 at a minimum uniform and cyclic static-air-pressure differential of 0.67 times the static-air-pressure differential specified for laboratory testing in "Performance Requirements" Article, but not less than 6.24 lbf/sq. ft., and shall not evidence water penetration.
   a. Test Area: One bay wide, but not less than 30 feet, by one story of glazed aluminum curtain wall.
   b. Perform a minimum of three tests in areas as directed by Architect.
   c. Perform tests in each test area as directed by Architect. Perform at least three tests, prior to 10, 35, and 70 percent completion.
3. Water Spray Test: Before installation of interior finishes has begun, areas designated by Architect shall be tested in accordance with AAMA 501.2 and shall not evidence water penetration.
   a. Test Area: A minimum area of 75 feet by one story of glazed aluminum curtain wall.

C. Glazed aluminum curtain walls will be considered defective if they do not pass tests and inspections.

D. Prepare test and inspection reports.

END OF SECTION

SECTION 085619 - PASS WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Sliding, pass security windows.

1.3 COORDINATION

A. Coordinate installation of anchorages for security windows. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in adjacent construction. Deliver such items to Project site in time for installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for window units.

B. LEED Submittals:
   1. Complete "LEED Credit Forms" for each product, material, or assembly used in the installation of the work of this section. Refer to Division 01 Section, "Sustainable Design Requirements".
   2. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
   3. Product Data for Credit IEQ 4.1: For glazing sealants, documentation including printed statement of VOC content.

C. Shop Drawings: For security windows.
   1. Include plans, elevations, sections, and attachments to other work.
   2. Full-size section details of framing members, including internal armoring, reinforcement, and stiffeners.
   3. Hardware for sliding window units.
   4. Glazing details.
   5. Details of deal tray.

D. Samples for Initial Selection: For frame members with factory-applied color finishes.

E. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
   1. Framing: 12-inch- long sections of frame members.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer for installation and maintenance of units required for this Project.

B. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."

C. Provide the following upon request:
   1. Qualification Data: For qualified Installer and testing agency.
   2. Product Test Reports: For each type of security window and accessory indicated as ballistics resistant, for tests performed by a qualified testing agency.
   3. Configuration Disclosure Drawing: For each type of forced-entry-resistant security window, complying with ASTM F 1233.
   4. Examination reports documenting inspections of substrates, areas, and conditions.
   5. Anchor inspection reports documenting inspections of built-in and cast-in anchors.
   6. Field quality-control reports documenting inspections of installed products.
      a. Field quality-control certification signed by Contractor and Detention Specialist.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Pack security windows in wood crates for shipment. Crate glazing separate from frames unless factory glazed.

B. Label security window packaging with drawing designation.

C. Store crated security windows on raised blocks to prevent moisture damage.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.9 SEQUENCING

A. Field Painting: Except where security windows have been preglazed before installation, complete field painting of security windows before glazing installation.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace security windows that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including deflections exceeding 1/4 inch.
      b. Failure of welds.
      c. Excessive air leakage.
      d. Faulty operation of sliding window hardware.
      e. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
   2. Warranty Period: Three years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

2.2 SLIDING, PASS SECURITY WINDOWS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Provide horizontal-sliding, pass security windows.
   1. Basis-of-Design Product: Subject to compliance with requirements, provide the following, or equal:
      a. Total Security Solutions "Baffle Transactions Window".

C. Configuration: As indicated on Drawings.

D. Framing: Fabricate perimeter framing, mullions, and glazing stops from aluminum as follows:
   1. Profile: Manufacturer's standard, with minimum face dimension indicated.
      a. Minimum Face Dimension: As indicated on Drawings.
   2. Depth: Manufacturer's standard .
   3. Provide thermally improved construction for aluminum framing.

E. Head and Jamb Framing: Designed for sealant gasket glazing.

F. Glazing Meeting Edges: Polished glazing.

G. Sill: Stainless-steel channel frame designed for sealant gasket glazing.

H. Sliding Window Hardware: Provide roller track designed for overhead support of two- or four-wheel carriage supporting horizontal-sliding glazed panel. Provide manufacturer's standard pull and lock with two keys for each horizontal-sliding glazed panel.
   1. Provide weather stripping for exterior horizontal-sliding, pass security windows.

I. Glazing and Glazing Materials: Manufacturer's UL Rated Level I bullet resistant acrylic, including wall sections, windows, and vertical supports.

J. Materials:
   1. Aluminum Extrusions: ASTM B 221. Provide alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 22,000-psi ultimate tensile strength.
   2. Aluminum Sheet and Plate: ASTM B 209.

2.3 FABRICATION

A. General: Fabricate security windows to provide a complete system for assembly of components and anchorage of window units.
   1. Provide units that are reglazable from the secure side without dismantling the nonsecure side of framing.
   2. Prepare security windows for glazing unless preglazing at the factory is indicated.

B. Provide weep holes and internal water passages for exterior security windows to conduct infiltrating water to the exterior.

C. Framing: Miter or cope corners the full depth of framing; weld and dress smooth.
   1. Fabricate framing with manufacturer's standard, internal opaque armoring in thicknesses required for security windows to comply with ballistics-resistance performance indicated.

D. Glazing Stops: Finish glazing stops to match security window framing.
   1. Secure-Side (Exterior) Glazing Stops: Welded or integral to framing.
   2. Nonsecure-Side (Interior) Glazing Stops: Removable, coordinated with glazing indicated.

E. Welding: Weld components to comply with referenced AWS standard. To greatest extent possible, weld before finishing and in concealed locations to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

F. Metal Protection: Separate dissimilar metals to protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended by manufacturer for this purpose.

G. Preglazed Fabrication: Preglaze window units at factory, where required for applications indicated. Comply with requirements in Section 088853 "Security Glazing."

H. Weather Stripping: Factory applied.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA 500 for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

2.6 ACCESSORIES

A. Counter Recessed Deal Tray: Formed from stainless steel with sliding stainless-steel cover; fabricated in curved shape with exposed flanges for recessed installation into horizontal surface.
   1. Clear Opening Size: 14 inches wide by 8 inches deep by 1-1/2 inches high.

B. Concealed Bolts: ASTM A 307, Grade A unless otherwise indicated.

C. Cast-in-Place Anchors in Concrete: Fabricated from corrosion-resistant materials capable of sustaining, without failure, a load equal to four times the load imposed, as determined by testing according to ASTM E 488, conducted by a qualified testing agency; of type indicated below.

1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 27/A 27M cast steel or ASTM A 47/A 47M malleable iron. Provide bolts, washers, and shims as required; hot-dip galvanized according to ASTM A 153/A 153M or ASTM F 2329.

D. Embedded Plate Anchors: Fabricated from mild steel shapes and plates, minimum 3/16 inch thick; with minimum 1/2-inch- diameter, headed studs welded to back of plate.

E. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

F. Compression-Type Glazing Strips and Weather Stripping: Unless otherwise indicated, provide compressible stripping for glazing and weather stripping, such as molded EPDM or neoprene gaskets complying with ASTM D 2000, Designations 2BC415 to 3BC620; molded PVC gaskets complying with ASTM D 2287; or molded, expanded EPDM or neoprene gaskets complying with ASTM C 509, Grade 4.

G. Miscellaneous Glazing Materials: Provide material, size, and shape complying with requirements of glass manufacturers and with a proven record of compatibility with surfaces contacted in installation.
   1. Cleaners, Primers, and Sealers: Type recommended by sealant or gasket manufacturer.
   2. Setting Blocks: Elastomeric material with a Type A Shore durometer hardness of 85, plus or minus 5.
   3. Spacers: Elastomeric blocks or continuous extrusions with a Type A Shore durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.
   4. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

H. Anchors, Clips, and Window Accessories: Stainless steel; hot-dip, zinc-coated steel or iron, complying with ASTM B 633; provide sufficient strength to withstand design pressures indicated.

I. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

J. Sealants: For sealants required within fabricated security windows, provide type recommended by manufacturer for joint size and movement. Sealant shall remain permanently elastic, nonshrinking, and nonmigrating.
   1. VOC Content: Sealants shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D, (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of security windows.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations of security window connections before security window installation.

C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of security windows.

D. Inspect built-in and cast-in anchor installations, before installing security windows, to verify that anchor installations comply with requirements. Prepare inspection reports.
   1. Remove and replace anchors where inspections indicate that they do not comply with specified requirements. Reinspect after repairs or replacements are made.
   2. Perform additional inspections to determine compliance of replaced or additional work. Prepare anchor inspection reports.

E. For glazing materials whose orientation is critical for performance, verify installation orientation.

F. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordination: Furnish layouts for cast-in-place anchors, clips, and other security window anchors whose installation is specified in other Sections.
   1. Furnish cast-in-place anchors and similar devices to other trades for installation well in advance of time needed for coordinating other work.

3.3 INSTALLATION

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing security windows to in-place construction. Include threaded fasteners for inserts, security fasteners, and other connectors.
   1. Install an attached or integral flange to secure side of security windows extending over rough-in opening gap so that gap has same performance as security window.

B. Glazed Framing: Provide sealant gasket-glazed framing. Comply with installation requirements in Section 088853 "Security Glazing."

C. Removable Glazing Stops and Trim: Fasten components with security fasteners.

D. Fasteners: Install security windows using fasteners recommended by manufacturer with head style appropriate for installation requirements, strength, and finish of adjacent materials. Provide stainless-steel fasteners in stainless-steel materials.

E. Sealants: Comply with requirements in Section 079200 "Joint Sealants" for installing sealants, fillers, and gaskets.
   1. Set continuous sill members and flashing in a full sealant bed to provide weathertight construction unless otherwise indicated.
   2. Seal frame perimeter with sealant to provide weathertight construction unless otherwise indicated.

F. Metal Protection: Where dissimilar metals will contact each other, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape recommended in writing by manufacturer for this purpose. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

3.4 FIELD QUALITY CONTROL

A. Inspect installed products to verify compliance with requirements. Prepare inspection reports and indicate compliance with and deviations from the Contract Documents.

B. Perform additional inspections to determine compliance of replaced or additional work. Prepare inspection reports.

C. Prepare field quality-control certification endorsed by Detention Specialist that states installed products and their installation comply with requirements in the Contract Documents.

3.5 ADJUSTING

A. Adjust horizontal-sliding, pass security windows to provide a tight fit at contact points for smooth operation and a secure enclosure.

B. Remove and replace defective work, including security windows that are warped, bowed, or otherwise unacceptable.

3.6 CLEANING AND PROTECTION

A. Clean surfaces promptly after installation of security windows. Take care to avoid damaging the finish. Remove excess glazing and sealant compounds, dirt, and other substances.
   1. Lubricate sliding security window hardware.

B. Clean glass of preglazed security windows promptly after installation..

C. Provide temporary protection to ensure that security windows are without damage at time of Substantial Completion.

3.7 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain operable security windows .

END OF SECTION

SECTION 086200 - UNIT SKYLIGHTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Unit skylights.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include product dimensions, construction details, material descriptions, dimensions and profiles of components, and finishes.
   2. Environmental Product Declaration (EPD): For each product.

B. Shop Drawings:
   1. Include plans, elevations, sections, mounting, and attachment details and methods of structural support.
   2. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: For each type of glazing and exposed factory-applied finish.
   1. Include Samples of accessories involving color and finish selection.

D. Samples for Verification: For each product, as follows:
   1. Glazing: In manufacturer's standard size and of same thickness indicated for the final Work.
   2. Finishes: For each type and color of factory-applied exposed finish required, in manufacturer's standard size.

E. Product Schedule: For each type of product specified. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For products and accessories to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Provide the following upon request:
   1. Product Test Reports: For each type and size of product, for tests performed by a qualified testing agency on specimens equal to or greater than sizes required for Project.
   2. Evaluation Reports: Indicating product compliance with code requirements of authorities having jurisdiction.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of products that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure to meet performance requirements.
      b. Water leakage not controlled by drainage features.

c. Deterioration of materials and finishes beyond normal weathering.
d. Yellowing of acrylic glazing.
e. Deterioration of insulating-glazing units including failure of hermetic seal under normal use that is not attributed to glazing breakage or to maintaining and cleaning insulating-glazing units contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glazing.

2. Warranty Period:
   a. Products and Accessories: Five years from date of Substantial Completion.
   b. Insulating-Glazing Units: 10 years from date of Substantial Completion.

B. Special Aluminum Finish Warranty: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of finish deterioration within specified warranty period.
   1. Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Delta E units when tested in accordance with ASTM D2244.
      b. Chalking in excess of a No. 8 rating when tested in accordance with ASTM D4214.
      c. Cracking, peeling, checking, or chipping.
   2. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Performance Standard: Comply with AAMA/WDMA/CSA 101/1.S.2/A440 for definitions and minimum standards of performance, materials, components, accessories, and fabrication unless more stringent requirements are indicated.
   1. Minimum Performance Grade: PG 30.
   2. Label Requirements: Label each product with names of manufacturer and labeling agency and AAMA/WDMA/CSA 101/1.S.2/A440 product designation, performance grade, and test specimen size equal to or greater than the size of the product.
   3. Certification Requirements: Provide AAMA or WDMA certified products, with label attached to each.

B. Thermal Transmittance: NFRC 100 maximum U-factor of 0.42 Btu/sq. ft. x h x deg F.

C. Solar Heat-Gain Coefficient (SHGC): NFRC 200 maximum SHGC of 0.28.

D. Plastic Glazing:
   1. Self-Ignition Temperature: 650 deg F or more for plastic sheets in thickness indicated when tested in accordance with ASTM D1929.
   2. Smoke-Production Characteristics: Smoke-developed index of 450 or less when tested in accordance with ASTM E84, and smoke density of 75 or less when tested in accordance with ASTM D2843.
   3. Combustibility Characteristics: Tested in accordance with ASTM D635 and classified for burning rate of nominal thickness of 0.060 inch or thickness of plastic glazing indicated for use as follows:
      a. Class CC2: Burning rate of 2-1/2 inches per minute or less.

E. Exterior Fire-Test Exposure: Provide products identical to those of assemblies tested for Class B fire resistance in accordance with ASTM E108 or UL 790 by Underwriters Laboratories or another testing and inspecting agency acceptable to authorities having jurisdiction.

F. Fall-Protection Performance: Installed assemblies are capable of safely supporting the greater of 400 lbs or twice the weight of employees, equipment, and materials that may be imposed on any 1 sq. foot of the assembly at any time.

2.2 UNIT SKYLIGHTS

A. Factory-Assembled Skylight: Unit that includes glazing, extruded-aluminum glazing retainers, gaskets, and inner frame.

B. Product Type: AAMA/WDMA/CSA 101/1.S.2/A440 SKP, unit skylight - plastic glazed.
   1. Provide fixed (nonoperable) units.

C. Unit Shape and Size: Circular, diameter as indicated, inside curb.

D. Acrylic Glazing: ASTM D4802, thermoformable, monolithic sheet, category as standard with manufacturer, Finish 1 (smooth or polished), Type UVF (formulated with UV absorber); and Class CC2 based on testing in accordance with ASTM D635.
   1. Double-Glazing Profile: Dome, 25 percent rise.
      a. Thicknesses of Each Glazing Layer: Not less than thicknesses required to meet specified requirements.
      b. Outer Glazing Color: White, translucent.
      c. Inner Glazing Color: White, translucent.

E. Glazing Gaskets: Manufacturer's standard.

F. Condensation Control: Fabricate unit skylights with integral internal gutters and nonclogging weeps to collect and drain condensation to the exterior.

G. Thermal Break: Fabricate unit skylights with thermal break separating exterior and interior metal framing.

H. Aluminum Finishes:
   1. High-Performance Organic Finish, Three-Coat: Fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
      a. Color and Gloss: Match Architect's sample.

2.3 ACCESSORY MATERIALS

A. Fasteners: Same metal as metal being fastened, nonmagnetic stainless steel, or other noncorrosive metal that is compatible with the materials being fastened and as recommended in writing by manufacturer. Finish exposed fasteners to match material being fastened.
   1. Where removal of exterior exposed fasteners might allow access to building, provide nonremovable fastener heads.

B. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Coordinate installation of products and accessories with installation of substrates, vapor retarders, roof insulation, roofing membrane, and flashing as required to ensure that each element of the Work performs properly and that combined elements are waterproof and weathertight.

B. Install products and accessories to comply with recommendations in AAMA 1607 and with manufacturer's written installation instructions.

C. Install products true to line and without distortion.

D. Anchor products securely to supporting substrates.

E. Where metal surfaces of products will contact other metal or corrosive substrates, such as preservative-treated wood, apply bituminous coating on concealed metal surfaces or provide other approved permanent separation recommended in writing by manufacturer.

3.3 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage through the Contractor a qualified testing agency to perform tests and inspections.

B. After completion of installation and nominal curing of sealant and glazing compounds, but before installation of interior finishes, test for water leaks in accordance with AAMA 501.2.

C. Perform test for total area of each installed product.

D. Work will be considered defective if it does not pass tests and inspections.

E. Additional testing and inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

F. Prepare test and inspection reports.

3.4 CLEANING AND ADJUSTING

A. Clean exposed product surfaces in accordance with manufacturer's written instructions. Touch up damaged metal coatings and finishes.

B. Remove excess sealants, glazing materials, dirt, and other substances.

C. Remove and replace glazing that has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect product surfaces from contact with contaminating substances resulting from construction operations.

END OF SECTION

SECTION 087100 - DOOR HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes commercial door hardware for the following:
   1. Swinging doors.
   2. Sliding doors.
   3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:
   1. Mechanical door hardware.
   2. Electromechanical door hardware.
   3. Automatic operators.

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
   1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
   2. ICC/IBC - International Building Code.
   3. NFPA 70 - National Electrical Code.
   4. NFPA 80 - Fire Doors and Windows.
   5. NFPA 101 - Life Safety Code.
   6. NFPA 105 - Installation of Smoke Door Assemblies.
   7. UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
   8. State Building Codes, Local Amendments.

D. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
   1. ANSI/BHMA Certified Product Standards - A156 Series.
   2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
   3. ANSI/UL 294 - Access Control System Units.
   4. UL 305 - Panic Hardware.
   5. ANSI/UL 437- Key Locks.

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
   1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
   2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening.

Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.

3. Content: Include the following information:
   a. Type, style, function, size, label, hand, and finish of each door hardware item.
   b. Manufacturer of each item.
   c. Fastenings and other pertinent information.
   d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
   e. Explanation of abbreviations, symbols, and codes contained in schedule.
   f. Mounting locations for door hardware.
   g. Door and frame sizes and materials.
   h. Warranty information for each product.
4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:
   1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
      a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
      b. Complete (risers, point-to-point) access control system block wiring diagrams.
      c. Wiring instructions for each electronic component scheduled herein.
   2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Proof of Certification: Provide copy of manufacturer(s) official certification or accreditation document indicating proof of status as a qualified and authorized provider of the primary Integrated Wiegand Access Control Products.

E. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

1.4 CLOSEOUT SUBMITTALS

A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

B. Project Record Documents: Provide record documentation of as-built door hardware sets in digital format (.pdf, .docx, .xlsx, .csv) and as required in Division 01, Project Record Documents.

1.5 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Integrated Wireless, and IP-Enabled Access Control Products Supplier Qualifications: Integrated access control products and accessories are required to be supplied and installed through current members of the ASSA ABLOY "Authorized Channel Partner" (ACP) and "Certified Integrator" (CI) programs. Suppliers are to be factory trained, certified prior to project bid, and a direct purchaser of the specified product. Installers are to be factory trained, certified prior to project bid, and are responsible for commissioning, servicing, and warranting the installed equipment specified for the project.

F. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
   1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
   2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

G. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

H. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
   1. Function of building, purpose of each area and degree of security required.
   2. Plans for existing and future key system expansion.
   3. Requirements for key control storage and software.

4. Installation of permanent keys, cylinder cores and software.
5. Address and requirements for delivery of keys.

I. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

J. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

1.6 DELIVERY, STORAGE AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.7 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified

electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.8 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
   1. Structural failures including excessive deflection, cracking, or breakage.
   2. Faulty operation of the hardware.
   3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   4. Electrical component defects and failures within the systems operation.

C. Warranty Period: Unless otherwise indicated below, warranty shall be two (2) years from date of Substantial Completion.
   1. Mechanical Locks – 7 years.
   2. Electric Locks – 2 years.
   3. Exit Devices – 10 years.
   4. Closers – 30 years.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hardware shall not have any visible manufacturer names on exposed materials, except cylinders, when the door is in a closed position.

2.2 BUTT HINGES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
   1. Quantity: Provide the following hinge quantity:
      a. Two Hinges: For doors with heights up to 60 inches.
      b. Three Hinges: For doors with heights 61 to 90 inches.
      c. Four Hinges: For doors with heights 91 to 120 inches.
      d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
   2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
      a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
      b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.
   3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
      a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.

b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.

4. Hinge Options: Comply with the following:
   a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.
5. Manufacturers:
   a. McKinney (MK) - TA/T4A Series, 5-knuckle.
   b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.3 CONTINUOUS HINGES

A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
   1. Where specified, provide modular continuous geared hinges that ship in two or three pieces and form a single continuous hinge upon installation.
   2. Manufacturers:.
      a. Pemko (PE).
      b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

B. Continuous Double-Acting Hinges (Behavioral Health). ANSI/BHMA A156.26 Grade 1-300 Certified continuous hinges.
   1. Manufacturers:
      a. Markar Products; ASSA ABLOY Architectural Door Accessories (MR) - DSH1000.
      b. Pemko (PE) - DSH1000 Series.
      c. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

C. Pin and Barrel Continuous Hinges: ANSI/BHMA A156.26 Grade 1-600 pin and barrel continuous hinges with minimum 14 gauge Type 304 stainless steel hinge leaves, concealed stainless pin, and twin self-lubricated nylon bearings at each knuckle separation. Factory trim hinges to suit door height and prepare for electrical cut-outs.
   1. Manufacturers:
      a. Markar Products; ASSA ABLOY Architectural Door Accessories (MR).
      b. Pemko (PE).
      c. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.4 SLIDING AND FOLDING HARDWARE

A. Sliding and Folding Door Hardware: Hardware is to be of type and design as specified and should conform with ANSI/BHMA A156.14.
   1. Provide sliding door hardware as follows:
      a. Sliding Bi-Passing Pocket Door Hardware: Provide complete sets consisting of track, hangers, stops, bumpers, floor channel, guides, and accessories indicated.

b. Cascading: Provide a bi-parting or single direction telescoping system as required with a minimum 200 lb. per door capacity.
c. Bi-folding Door Hardware: Rated for door panels weighing up to 125 lb.
d. Pocket Sliding Door Hardware: Rated for doors weighing up to 200 lb.

2. Manufacturers:
a. Pemko (PE).
b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.5 POWER TRANSFER DEVICES

A. Electrified Quick Connect Transfer Hinges: Provide electrified transfer hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets with a 1-year warranty. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
1. Manufacturers:
a. McKinney (MK) - QC (# wires) Option.
b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

B. Electrified Quick Connect Continuous Geared Transfer Hinges: Provide electrified transfer continuous geared hinges with a removable service panel cutout accessible without de-mounting door from the frame. Furnish with Molex™ standardized plug connectors with sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
1. Manufacturers:
a. Pemko (PE) - SER-QC (# wires) Option.
b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

C. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
1. Manufacturers:
a. Pemko (PE) - EL-CEPT Series.
b. Securitron (SU) - EL-CEPT Series.
c. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

D. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire

nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.

1. Provide one each of the following tools as part of the base bid contract:
   a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
   b. McKinney (MK) - Connector Hand Tool: QC-R003.
   c. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.
2. Manufacturers:
   a. McKinney (MK) - QC-C Series.
   b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.6 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.
   1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.
   2. Furnish dust proof strikes for bottom bolts.
   3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
   4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
   5. Manufacturers:
      a. Rockwood (RO).
      b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

B. Coordinators: ANSI/BHMA A156.3 door coordinators consisting of active-leaf, hold-open lever and inactive-leaf release trigger. Model as indicated in hardware sets.
   1. Manufacturers:
      a. Rockwood (RO).
      b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
   1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
   2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
   3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
   4. Pulls, where applicable, shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.
   5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push

plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

6. Manufacturers:
   a. Rockwood (RO).
   b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.7 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
   1. Manufacturers:
      a. Sargent Manufacturing (SA).
      b. Match Existing, Field Verify.
      c. No Substitution.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
   1. Threaded mortise cylinders with rings and cams to suit hardware application.
   2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
   3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
   4. Tubular deadlocks and other auxiliary locks.
   5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
   6. Keyway: Match Facility Standard.

C. Large Format Interchangeable Cores: Provide removable cores (LFIC) as specified, core insert, removable by use of a special key, and for use with only the core manufacturer's cylinder and door hardware.

D. Patented Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer’s United States patents.
   1. Patented key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.
   2. Manufacturers:
      a. Sargent (SA) - XC. To match existing.
      b. No Substitution.

E. Keying System: Each type of lock and cylinders to be factory keyed.
   1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
   2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
   3. Existing System: Field verify and key cylinders to match Owner's existing system.

F. Key Quantity: Provide the following minimum number of keys:
   1. Change Keys per Cylinder: Three (3).
   2. Master Keys (per Master Key Level/Group): Five (5).

3. Construction Keys (where required): Ten (10).
4. Construction Control Keys (where required): Two (2).

G. Construction Keying: Provide temporary keyed construction cores.

H. Key Registration List (Bitting List) Provide a master-keyed system with one (1) Grand Master Key (GMK), master keys for functional groups, and change keys for individual doors. Cylinders shall be factory-registered to the Owner to prevent unauthorized duplication.

I. Key Control Cabinet: Provide a key control system including envelopes, labels, and tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet. Key control cabinet shall have expansion capacity of 125% of the number of unique change keys required for the project.
   1. Manufacturers:
      a. Lund Equipment (LU).
      b. MMF Industries (MM).
      c. Telkee (TK).
      d. No Substitution.

P. Intelligent Key Cabinet: Provide an electronically controlled key management solution that can secure, distribute, and audit keys and other assets. Only authorized users shall be able to gain access to the cabinet via a biometric fingerprint reader or PIN code pad, or a combination of both; provide an optional access card reader. Cabinet shall be available in 32 or 64 port sizes.
   1. Web-based administration software shall track all user and asset activity with email and SMS/text reporting capability.
   2. Manufacturers:
      a. Medeco (MC) – IKC-64.
      b. No Substitution.

2.8 MORTISE LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational and Security Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.
   1. Provide locksets with functions and features as follows:
      a. Heavy duty 12-gauge wrought steel case.
      b. Stainless steel 3/4" one-piece anti-friction reversible latchbolt with a one-piece hardened stainless steel 1” projection deadbolt.
      c. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.
      d. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code.
      e. Meets Florida Building Code FL2998 and UL Certification Directory ZHEM.R21744 for latching hardware for hurricane requirements.
      f. Meets UL Certification Directory ZHLL.R21744 for products used in windstorm rated assemblies.
      g. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to 12.3 million cycles or greater.

h. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to 14.5 million cycles or greater.
i. Extended cycle test: Locks to have been cycle tested in ordinance with ANSI/BHMA 156.13 requirements to 16 million cycles or greater.
j. Status indicators inside, outside, or on both sides of doors as specified; available with wording for “locked/unlocked”, “vacant/occupied” or custom wording options. Indicator to be located above the cylinder with the inside thumb-turn not blocking the visibility of the indicator status.
k. Ten-year limited warranty for mechanical functions.

2. Electromechanical locksets shall have the following functions and features:
   a. Universal Molex plug-in connectors that have standardized color-coded wiring and are available in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
   b. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
   c. Motorized electric latch retraction where the latchbolt retracts in 0.5 seconds of power being applied; removing power allows the latch to project back to the extended position. Motorized latch retraction force exceeds ANSI/BHMA 50 lbs. warped door test.
   d. Options to be available for request-to-exit or enter signaling, latchbolt and deadbolt monitoring.
   e. Optional high security monitoring with internal end-of-line monitoring alongside deadbolt privacy and integrated door position monitoring.
   f. Two-year limited warranty on electrified functions.
3. Manufacturers:
   a. Sargent Manufacturing (SA) - 8200 Series.
   b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.9 CYLINDRICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed cylindrical locksets. Listed manufacturers shall meet all functions and features as specified herein.
   1. Provide locksets with functions and features as follows:
      a. Meets ANSI/BHMA A156.41 for single motion egress.
      b. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.
      c. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code.
      d. Exceeds ANSI/BHMA A156.2 requirements by 2.6 times for 3,100 in-lb. abusive locked lever torque with no entry while maintaining egress.
      e. Exceeds ANSI/BHMA A156.2 requirements by 8 times for 1,600 lbs. offset lever pull with no entry for protection against attacks.
      f. Exceeds ANSI/BHMA A156.3 requirements by 2 times for latch retraction with 100 lb. preload while maintaining operation in warped doors.
      g. Exceeds ANSI/BHMA A156.3 requirements by 20 times for no access with minimum 100 vertical impacts for protection against vandalism attempts.
      h. Independent return springs allow lock to exceed ANSI/BHMA A156.2 Grade 1 cycle requirements without lever sag.

i. Status indicators inside, outside, or on both sides of doors as specified with high visibility red/green or red/white icons to display locked or unlocked state in the rose.
j. Ten-year limited warranty for mechanical functions.

2. Electromechanical locksets shall have the following functions and features:
   a. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
   b. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
   c. Options to be available for request-to-exit or enter signaling, latchbolt and deadbolt monitoring.
   d. Two-year limited warranty on electrified functions.
3. Manufacturers:
   a. Sargent Manufacturing (SA) - 10X Line.
   b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.10 INTEGRATED WIRED OUTPUT LOCKING DEVICES, MULTI-CLASS READER

A. <u>Included with Section 087100 bid – Do Not Exclude.</u>

B. Integrated Wired Output Multi-Class Cylindrical Locks: Open Supervised Device Protocol (OSDP) output ANSI A156.2, Grade 1, Cylindrical Lockset with integrated card reader with or without keypad option, and request-to-exit signaling in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle trim with 1/2" deadlocking stainless steel latch. Lock is U.L listed and labeled for use on up to 3 hour fire rated openings.

1. Open architecture, hard wired platform supports centralized control of locking units with new OSDP and Keypad communication compatible access control systems. Inside lever handle (request-to-exit) signaling standard with door position (open/closed status) including monitoring (DPS).
2. Integrated reader supports the following credentials:
   a. pivClass embedded authertication FICAM approved and FIPS 201-3 compliant. Encryped communication for strong authentication.
   b. ISO14443A/B (PIV-compatible Transparent FASC-N read) available with pivCLASS variant PIV/PIV-1 with 75 bit.
   c. NFC-enabled mobile phones per Owner requirements.
   d. PIN code only or PIN + credential with keypad option.
3. 12VDC external power supply required for reader and lock, with optional 24VDC lock solenoid. Fail safe or fail secure options.
4. Installation requires only one cable run from the lock to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
5. Installation to include manufacturer's access control panel interface board or module where required for Wiegand or OSDP output protocol.
6. Manufacturers:
   a. Sargent Manufacturing (SA) – SN210-10X Line.
   b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.11 HOSPITAL AND BEHAVIORAL HEALTH PRODUCTS

A. Behavioral Health, Cylindrical: ANSI/BHMA A156.2, Series 4000, Operational and Security Grade 1 Certified Products Directory (CPD) listed cylindrical locks that exceed 3,100 in-lb with no entry; lock to maintain egress functionality in compliance with BHMA certification requirements. Locksets shall be listed for low, medium, and high-risk areas in the NYS-OMH Patient Safety Standard. Latch retraction with preload shall exceed 100 lb. while maintaining ANSI/BHMA requirements for operation in warped doors. Locksets shall be provided standard with Torx® fasteners and with optional lead-lining and antimicrobial coating as specified in Hardware Sets.
   1. Manufacturers:
      a. Sargent Manufacturing (SA) - 10X BHW Series.
      b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

B. Push-Pull Latches, Cylindrical: Hospital type, low profile push-pull latches with paddle trim capable of being mounted vertically, horizontally, or in mixed combinations. Non-handed units, standard 2 3/4" or 5" backsets, and UL listed for all labeled metal or wood doors. Provide optional lead-lining and engraved cases or handles as specified in Hardware Sets.
   1. Manufacturers:
      a. Sargent Manufacturing (SA) - 115 Series.
      b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.12 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
   1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
   2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
   3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
   4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:
   1. Strikes for Mortise Locks and Latches: BHMA A156.13.
   2. Strikes for Bored Locks and Latches: BHMA A156.2.
   3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
   4. Dustproof Strikes: BHMA A156.16.

2.13 ELECTROMAGNETIC LOCKING DEVICES

A. Surface Electromagnetic Locks (Heavy Duty): Electromagnetic locks to be surface mounted type conforming to ANSI A156.23, Grade 2 with minimum holding force strength of 1,200 pounds. Locks to be capable of accepting between 12 to 24 volts direct current and be UL listed for use on fire rated door assemblies. Electromagnetic coils are to consume no more than 1.5W during normal operation. Locks are to have an integrated door position switch, tamper switch, and lock bond sensor. Locks are to have integrated motion sensor and/or security camera as indicated in the hardware sets. Locks to be capable of detecting door prop conditions and entering low power

mode. Provide mounting accessories as needed to suit opening conditions. Power supply to be by the same manufacturer as the lock with combined products having a lifetime replacement warranty.

1. Manufacturers:
   a. Securitron (SU) - M680E Series.
   b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

B. Surface Electromagnetic Locks (Commercial Duty): Electromagnetic locks to be surface mounted type conforming to ANSI A156.23, Grade 1 with minimum holding force strength of 600 pounds. Locks to be capable of either 12 or 24 voltage and be UL listed for use on fire rated door assemblies. Electronics are to be fully sealed against tampering and allow exterior weatherproof applications. As indicated in Hardware Sets, provide specified mounting brackets and housings. Power supply to be by the same manufacturer as the lock with combined products having a lifetime replacement warranty.

1. Manufacturers:
   a. Securitron (SU) - M32/M38 Series.
   b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

C. Delayed Egress Electromagnetic Devices: Delayed egress locking systems shall be fully integrated units with a minimum 1200 pound holding force magnetic lock, autosensing dual voltage with microprocessor technology, magnetic bond sensor and integrated door position switch (DPS), and instant release circuit with no residual magnetism. System shall have easily visible LEDs that indicate status on secure side of door, adjustable door movement detection up to 1/4" and alarm strobe that indicates countdown and stays illuminated post alarm until reset.

1. Configurable settings shall include:
   a. Nuisance delay times: 0, 1, 2, or 3 seconds.
   b. Irrevocable alarm times: 15 or 30 seconds.
   c. Bypass delay times: 0, 15, 30, 45 seconds.
   d. No irrevocable alarm after bypass expiration.
   e. Post alarm reminder.
   f. Bypass expiration alarm.
   g. Manual/delayed relock.
   h. Unlocked at startup.
2. Manufacturers:
   a. Securitron (SU) - DEM680E Series.
   b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.14 ELECTRIC STRIKES

A. Standard Electric Strikes: Electric strikes conforming to ANSI/BHMA A156.31, Grade 1, for use on non-rated or fire rated openings. Strikes shall be of stainless steel construction tested to a minimum of 1500 pounds of static strength and 70 foot-pounds of dynamic strength with a minimum endurance of 1 million operating cycles. Provide strikes with 12 or 24 VDC capability, fail-secure unless otherwise specified. Where specified provide latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike.

1. Manufacturers:
   a. HES (HS) - 1500/1600 Series.
   b. Folger Adam (FA) - 310 Series.
   c. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications

B. Surface Mounted Rim Electric Strikes: Surface mounted rim exit device electric strikes conforming to ANSI/BHMA A156.31, Grade 1, and UL Listed for both Burglary Resistance and for use on fire rated door assemblies. Construction includes internally mounted solenoid with two heavy-duty, stainless steel locking mechanisms operating independently to provide tamper resistance. Strikes tested for a minimum of 500,000 operating cycles. Provide strikes with 12 or 24 VDC capability supplied standard as fail-secure unless otherwise specified. Option available for latchbolt and latchbolt strike monitoring indicating both the position of the latchbolt and locked condition of the strike. Strike requires no cutting to the jamb prior to installation.
   1. Manufacturers:
      a. HES (HS) - 9400/9500/9600/9700/9800 Series.
      b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

C. Provide electric strikes with in-line power controller and surge suppressor by the same manufacturer as the strike with the combined products having a five year warranty.

2.15 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
   1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
   2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.
   3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
   4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.
   5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
      a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
      b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
   6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.

7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.
8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.
   1. Provide exit devices with functions and features as follows:
      a. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.
      b. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code.
      c. No catch points: addition of applied deflectors or other added components are not allowed.
      d. No visible plastic.
      e. Heavy duty end caps with flush and overlapping options made of stainless steel, brass, or bronze with architectural finishes.
      f. Constructed of all stainless steel.
      g. Stainless steel pullman type latch with deadlock feature.
      h. Narrow or wide style exterior trim as specified in the hardware sets.
      i. Center case adjustability on concealed vertical rod exit devices; single operation with hex key individually adjusts top or bottom latches. No retainer screws or clips required to maintain adjustment.
      j. Ten-year limited warranty for mechanical features.
   2. Electromechanical exit devices shall have the following functions and features:
      a. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
      b. Wire routing for all non-access control electromechanical functions and EcoFlex trim to be contained within the carrier of the device eliminating the need for cavities in doors to be drilled. Include a protective film so that wires don't get damaged if the rail needs to be removed.
      c. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
      d. Options to be available for request-to-exit or enter signaling, latchbolt and touchbar monitoring.
      e. Field configurable electrified trim to fail-safe or fail-secure that operates from 12-24VDC.
   3. Manufacturers:
      a. Sargent Manufacturing (SA) - PE80 Series.
      b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.16 INTEGRATED WIRED OUTPUT EXIT DEVICES, MULTI-CLASS READER

A. <u>Included with Section 087100 bid – Do Not Exclude.</u>

B. Integrated Wired Output Multi-Class Exit Hardware: OSDP output ANSI 156.3 Grade 1 rim, mortise, and vertical rod exit device hardware with integrated card reader with or without keypad option, latchbolt and touchbar monitoring, and request-to-exit signaling, in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle exit trim with 3/4" throw latch bolt. U.L listed and labeled for either panic or "fire exit hardware" for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.
   1. Open architecture, hard wired platform supports centralized control of locking units with new OSDP compatible access control systems. Inside push bar (request-to-exit) signaling and door position (open/closed status) monitoring (via separately connected DPS).
   2. Integrated reader supports the following credentials:
      a. pivClass embedded authertication FICAM approved and FIPS 201-3 compliant. Encryped communication for strong authentication.
      b. ISO14443A/B (PIV-compatible Transparent FASC-N read) available with pivCLASS variant PIV/PIV-1 with 75 bit.
      c. NFC-enabled mobile phones per Owner requirements.
      d. PIN code only or PIN + credential with keypad option.
   3. 12VDC external power supply required for reader. 24VDC required for solenoid operated exit trim. Fail safe or fail secure options.
   4. Installation requires only one cable run from the exit hardware to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
   5. Competitor Alternates Allowed Option: Installation to include manufacturer's access control panel interface board or module where required for Wiegand or OSDP output protocol.
   6. Manufacturers:
      a. Sargent Manufacturing (SA) - SN210 PE80 Series.
      b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.17 SURFACE DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:
   1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
   2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
   3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
   4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
   5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.

6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard..
   1. Manufacturers:
      a. Sargent Manufacturing (SA) - 351 Series.
      b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

C. Door Closers, Surface Mounted (Utility Grade): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, utility grade door closers with complete spring power adjustment, sizes 1 thru 6. Closers to be rack and pinion type, cast aluminum case construction, with adjustable backcheck, closing sweep, and latch speed control valves. Provide closer standard packed for regular, top-jamb, and parallel arm type mounting applications.
   1. Manufacturers:
      a. Norton Rixson (NO) - 1601 Series.
      b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.18 OVERHEAD CONCEALED DOOR CLOSERS

A. Door Closers, Overhead Concealed Double Acting (Heavy Duty): Center pivot, double acting ANSI/BHMA 156.4 Grade 1 Certified Products Directory (CPD) listed overhead concealed door closers. Listed manufacturers shall meet all functions and features as specified herein.
   1. Provide overhead concealed doors closers with functions and features as follows:
      a. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies and A117.1 Accessibility Code.
      b. Cast iron body construction with 1-1/4" dual pistons.
      c. Fully concealed body in the frame head and track assembly in the door.
      d. Adjustable spring strength, hydraulic back check, and two closing speed adjustments for sweep and latch.
      e. Fifteen-year limited warranty.
   2. Manufacturers:
      a. Norton Rixson (RF) - 73 Series.
      b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

B. Door Closers, Overhead Concealed (Narrow Profile): ANSI/BHMA 156.4 Grade 1 Certified Products Directory (CPD) listed overhead concealed door closers designed for narrow profile frames and doors. Listed manufacturers shall meet all functions and features as specified herein.

1. Provide overhead concealed doors closers with functions and features as follows:
   a. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies and A117.1 Accessibility Code.
   b. Single acting, offset hung with a cast iron body.
   c. Fully concealed body in the frame head and track assembly in the door.
   d. Separate and independent valves for closing speed and backcheck adjustments.
   e. Five-year limited warranty.
2. Manufacturers:
   a. Norton Rixson (RF) - 91DCP Series.
   b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.19 ELECTROHYDRAULIC DOOR OPERATORS

A. <u>Included with Section 087100 bid – Do Not Exclude.</u>

B. Electrohydraulic Door Operators (High Traffic): Provide ANSI/BHMA A156.19 Certified Products Directory (CPD) listed low energy operators that meet ANSI/BHMA A156.4 requirements and are UL listed for use on fire rated doors and UL10C certified that comply with requirements for the Americans with Disabilities Act (ADA). Operators shall be verified by GreenCircle to offer energy savings of 19% when compared to similar products to accommodate openings up 250 pounds and 48” wide.

1. Provide operators with features as follows:
   a. Non-handed with push and pull side mounting.
   b. Operates as mechanical surface closer during close cycles, when door is opened manually or if power is off.
   c. Activation by push button, hands-free or radio frequency devices.
   d. On board electronics to collect usage and cycle count data to facilitate preventative maintenance/diagnostics.
   e. Two-year limited warranty.
   f. Wi-Fi interface where the operator is a secure, password protected WiFi hot spot with no connection to building’s IT required.
      1) Simple setup with no app required.
      2) View status and make adjustments without removing the cover.
      3) Built-in logic to support single use restroom applications with no external relay boards, logic modules, position switches required.
   g. Mounting backplate to simplify and speed up installation.
2. Operators shall have the following functionality:
   a. Adjustable Hold Open: Amount of time a door will stay in the full open position after an activation.
   b. Blow Open for Smoke Ventilation: Door opens when signal is received from alarm system allowing air or smoke to flow through opening. Door will stay open until signal from alarm system is stopped.
   c. Infinite Hold Open: Door will hold open at set position until power is turned off.
   d. Obstruction Detection: Door closes if it hits an obstruction while opening; door will reverse to open position if it hits an obstruction while closing. Door will stop once it hits an obstruction and will rest against the obstruction until removed.

e. Open Delay: Delays operator opening for locking hardware.
f. Overload Safety Shut-Off: After two minutes of receiving a door activation signal, inverter times out and door closes to prevent motor/inverter damage.
g. Presence Detector Input: Input for external sensor to detect presence at door open or close position only.
h. Push & Go: As the door is manually opened, the operator "senses" movement and opens door to the full-open position.
i. Selector Mode Switch: Off disables the signal inputs unless Blow Open is activated, on activates the signal inputs, hold open activates the unit (unless Blow Closed is activated) to the hold open position.
j. Vestibule Delay: When the wall switch is pressed, first door in vestibule will open. Second door will open once vestibule door delay has expired. Delay is adjustable.

3. Manufacturers:
   a. Norton Rixson (NO) - 6000 Series.
   b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.20 SURFACE MOUNTED CLOSER HOLDERS

A. Electromagnetic Door Holders: ANSI A156.15, Grade 1 electromagnetic door holder/releases with a minimum 25 to 40 pounds holding power and fail-safe operation; power failure releases door to close.
   1. Manufacturers:
      a. Norton Rixson (RF) - 900 Series.
      b. Sargent Manufacturing (SA) - 1560 Series.
      c. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.21 ARCHITECTURAL TRIM

A. Door Protective Trim
   1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
   2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1” LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
   3. Where plates are applied to fire rated doors with the top of the plate more than 16” above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.
   4. Protection Plates: ANSI/BHMA A156.6 protection plates (kick, armor, or mop), fabricated from the following:
      a. Stainless Steel: 300 grade, 050-inch thick.
   5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
   6. Manufacturers:

a. Rockwood (RO).
b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.22 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
1. Manufacturers:
a. Rockwood (RO).
b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
1. Manufacturers:
a. Norton Rixson (RF).
b. Rockwood (RO).
c. Sargent Manufacturing (SA).
d. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.23 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:
   1. Pemko (PE).
   2. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.24 ELECTRONIC ACCESSORIES

A. Key Switches: Key switches furnished standard with stainless steel single gang face plate with a 12/24VDC bi-color LED indicator. Integral backing bracket permits integration with any 1 1/4" or 1 1/2" mortise type cylinder. Key switches available as momentary or maintained action and in narrow face plate options.
   1. Manufacturers:
      a. Alarm Controls (AK) - MCK Series.
      b. Securitron (SU) - MK Series.
      c. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

B. Push-Button Switches: Industrial grade momentary or alternate contact, back-lighted push buttons with stainless-steel switch enclosures. 12/24 VDC bi-color illumination suitable for either flush or surface mounting.
   1. Manufacturers:
      a. Alarm Controls (AK) - TS Series.
      b. Securitron (SU) - PB Series.
      c. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

C. Request to Exit Motion Sensor: Passive infrared request to exit (REX) motion sensor designed for detecting exiting through a door from the secure area to a non-secure area.
   1. Provide devices with functions and features as follows:
      a. Adjustable infrared beam and relock time.
      b. UL listed.
      c. 12VDC or 24VDC power.
      d. Single pole, double throw (SPDT) switch.
   2. Manufacturers:
      a. Alarm Controls (AK) - SREX Series.
      b. Securitron (SU) - XMS2 Series.
      c. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

D. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
   1. Manufacturers:
      a. Securitron (SU) - DPS Series.
      b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

E. Intelligent Switching Power Supplies: Provide the least number of power supplies at the appropriate amperage level sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
   1. Power supplies shall meet all functions and features as specified herein.
      a. UL listed dual voltage 12 or 24 VDC field selectable continuous output.
      b. Dedicated fast charger to prolong battery life with low battery cutoff to protect batteries from deep discharge.
      c. Enhanced surge immunity for input/output protection
      d. Separate, dedicated battery charging circuit to keep locks cooler.
      e. Dual-color LED visual notification to prevent applying incorrect voltages to the power supply.
      f. Instant auto-switch to battery on AC loss.
      g. Expandable up to 16 outputs in the standard enclosure
      h. Integrated fire alarm interface to allow main output shutdown or disconnect on a per output basis when using an R8 output module.
      i. Network ready and remotely manage locks and connected devices when using an M8 managed output module on network models.
      j. Lifetime replacement, no-fault, no questions asked warranty.
   2. Manufacturers:
      a. Securitron (SU) - AQL Series.
      b. Alternate approved BHMA grade equal product and manufacturer must meet BAA/TAA compliance as reviewed and verified with certifications.

2.25 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.26 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
   1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
   1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
   2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
   3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
   4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

C. Integrated Wiegand access control products are required to be installed through current members of the ASSA ABLOY "Certified Integrator" (CI) program.

D. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

E. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

F. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

G. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
   1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
   1. Quantities listed are for each pair of doors, or for each single door.
   2. The supplier is responsible for handing and sizing all products.
   3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
   4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer’s Abbreviations:
   1. MK - McKinney
   2. MR - Markar
   3. PE - Pemko
   4. RF - Rixson
   5. OT - Other
   6. SU - Securitron
   7. RO - Rockwood
   8. SA - SARGENT
   9. AD - Adams Rite
   10. AL - Alarm Lock Systems
   11. HS - HES
   12. FO - Folger Adam
   13. RS - RITE Slide
   14. NO - Norton Rixson

15. AS - Altronix Corp
16. AK - Alarm Controls

Hardware Sets

- **This project is designed to meet the Buy American Act.**
- **Waiver may be required to comply with Buy American Act. Compliancy of these products to current Buy American-type regulations must be validated with the manufacturer.**

Set: 1.0
Doors: COR-1065, COR-2018, DTY-1139-1, VST-1002-1, VST-1002-2

2	Continuous Hinge	CFM__SLF-HD1 PT		PE
2	Electric Power Transfer	EL-CEPT	630	SU
2	Card Reader Device	SN210-ADPE8674 FIPS NEL	US32D	SA
1	Auxiliary Control	BAA 1164 P106	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
2	Surface Closer	TB 351 CPS	EN	SA
2	Closer Drop Plate	351B/D as required	EN	SA
2	Closer Spacer Kit	581-1/2 as required	EN	SA
1	Threshold & Seal	Door manufacturer		OT
2	Frame Wiring Harness	QC-C1500P		MK
2	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking levers for entry. | Free egress at all times. | Electrified exit devices are fail secure and stay locked from the secure side during alarm/power loss.| Integrated card reader exit device has an integral REX and DPS.| Minimum 5" stile width required for proper hardware installation.

Set: 2.0
Doors: COR-2371-2, COR-2371-3, COR-4019, COR-4021

2	Continuous Hinge	CFM__SLF-HD1 PT		PE
2	Electric Power Transfer	EL-CEPT	630	SU
1	Concealed Vert Rod Exit, Dummy	BAA 55 56 ADPE8410 862	US32D	SA
1	Concealed Vert Rod Exit, Nightlatch	BAA 55 56 1164 ADPE8410 P106 x 862	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
2	Conc Overhead Stop	1-_36	630	RF
2	Surface Closer	TB 351 O/P9	EN	SA
2	Closer Mounting Plate	351B as required	EN	SA
1	Threshold & Seal	Door manufacturer		OT
1	Card Reader (DIV 28)	By security contractor		OT
2	Frame Wiring Harness	QC-C1500P		MK
2	Door Wiring Harness	QC-C___P as required		MK
2	Door Position Switch (DIV 28)	By security contractor		OT
1	Wiring Diagram	Point to point system		AK
1	Power Supply	AQL_ R8 E1		SU

Notes: Doors are normally closed and locked. | Access by presenting a valid credential, momentarily retracting exit device latches for entry. | Free egress at all times. | Electrified exit devices are fail secure and stay locked from the secure side during alarm/power loss.

Set: 3.0
Doors: EMR-1314-2, EMS-1365-1

1	Continuous Hinge	CFM__SLF-HD1 PT		PE	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 CPS	EN	SA	
1	Closer Drop Plate	351B/D as required	EN	SA	
1	Closer Spacer Kit	581-1/2 as required	EN	SA	
1	Threshold & Seal	Door manufacturer		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Video Intercom	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	
1	Latch Protector	325	US26D	RO	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader or by remote release via video intercom, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.|Minimum 5" stile width required for proper hardware installation.

Set: 4.0
Doors: COR-1007, COR-1024, COR-3035-1, COR-3035-2, DTY-1139-2, VST-2078-1

1	Continuous Hinge	CFM__SLF-HD1 PT		PE	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Card Reader Device	1164 SN210-PE8876 FIPS NEL	US32D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 CPS	EN	SA	
1	Closer Drop Plate	351B/D as required	EN	SA	
1	Closer Spacer Kit	581-1/2 as required	EN	SA	
1	Threshold & Seal	Door manufacturer		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader exit device has an integral REX and DPS.| Minimum 5" stile width required for proper hardware installation.

Set: 5.0
Doors: STR-1001-1

1	Continuous Hinge	CFM__SLF-HD1 PT		PE	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Card Reader Device	1164 SN210-PE8876 FIPS NEL	US32D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 CPS	EN	SA	
1	Closer Drop Plate	351B/D as required	EN	SA	
1	Closer Spacer Kit	581-1/2 as required	EN	SA	
1	Threshold & Seal	Door manufacturer		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader exit device has an integral REX and DPS.| Minimum 5" stile width required for proper hardware installation. | The specified hardware is a basis of design. Provide tested and approved hardware for this fire rated aluminum assembly.

Set: 6.0
Doors: VST-2080-1

6	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK
2	Electric Power Transfer	EL-CEPT	630	SU
1	Concealed Vert Rod Exit, Exit Only		BAA 12 55 MDPE8610	
EO		US32D	SA	
1	Fail Secure Exit Device	BAA 12 55 MDPE8674 NEL	US32D	SA
1	Auxiliary Control	BAA 1164 P106	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
2	Surface Closer	TB 351 CPS	EN	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
2	Meeting Stile Seal	303AS		PE
1	Gasketing	305CR		PE
1	Rain Guard	346C		PE
2	Sweep	315CN		PE
1	Threshold	2716A		PE
1	Card Reader (DIV 28)	By security contractor		OT
2	Frame Wiring Harness	QC-C1500P		MK
2	Door Wiring Harness	QC-C___P as required		MK
1	Video Intercom	By security contractor		OT
2	Door Position Switch (DIV 28)	By security contractor		OT
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader or by remote release via video intercom, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader exit device has an integral REX and DPS.

Set: 7.0
Doors: COR-3053, CUP-2368-1, CUP-2368-2, CUP-2370-1

8	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK
2	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader Device	SN210-MDPE8674 FIPS NEL	US32D	SA
1	Concealed Vert Rod Exit, Exit Only		BAA 55 MDPE8610	
EO		US32D	SA	
1	Auxiliary Control	BAA 1164 P106	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
2	Surface Closer	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
2	Meeting Stile Seal	303AS		PE
1	Gasketing	305CR		PE
1	Rain Guard	346C		PE
2	Sweep	315CN		PE
1	Threshold	2716A		PE
2	Frame Wiring Harness	QC-C1500P		MK
2	Door Wiring Harness	QC-C___P as required		MK
1	Door Position Switch (DIV 28)	By security contractor		OT
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader exit device has an integral REX and DPS.

Set: 8.0
Doors: CUP-2371-1, CUP-2374-1

2	Continuous Hinge	CFM__SLF-HD1 PT		PE
2	Electric Power Transfer	EL-CEPT	630	SU
1	Concealed Vert Rod Exit, Exit Only		BAA 55 MDPE8610	
EO		US32D	SA	
1	Card Reader/KP Device	SN210-MDPE8674 FIKPS NEL	US32D	SA
1	Auxiliary Control	BAA 1164 P106	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
2	Surface Closer	TB 351 CPS	EN	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
2	Meeting Stile Seal	303AS		PE
1	Gasketing	305CR		PE
1	Rain Guard	346C		PE
2	Sweep	315CN		PE
1	Threshold	2716A		PE
2	Frame Wiring Harness	QC-C1500P		MK
2	Door Wiring Harness	QC-C___P as required		MK
1	Door Position Switch (DIV 28)	By security contractor		OT
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering a correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader/keypad exit device has an integral REX and DPS.

Set: 9.0

Set not used

Set: 10.0
Doors: YRD-0001-1, YRD-0001-6, YRD-0001-7

3	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK	
1	Rim Exit Device, Storeroom	BAA CPC 1164 PE8804 NEL	US32D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	SMART Pac Bridge Rectifier	2005M3		HS	⚡
1	Electric Strike	9600-LBM	630	HS	⚡
1	ElectroLynx Adaptor	2004M		HS	⚡
1	Surface Closer	TB 351 CPS	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	305CR		PE	
1	Rain Guard	346C		PE	
1	Sweep	315CN		PE	
1	Threshold	2716A		PE	
1	Card Reader (DIV 28)	By security contractor		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Video Intercom	By security contractor		OT	
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily releasing electric strike for entry. | Free egress at all times. | Electric strike is fail secure and stays locked during alarm/power loss.

Set: 10.1
Doors: YRD-0001-4

3	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK	
1	Rim Exit Device, Storeroom	BAA CPC 1164 PE8804 NEL	US32D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 CPS	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	305CR		PE	
1	Sweep	315CN		PE	
1	Threshold	2716A		PE	

Set: 11.0
Doors: ELV-5002-2, EMS-1372C-3, FAC-2397-5, FAC-2397-8, FAC-2397A, FAC-2398A, FAC-2399A, STR-5045-1

3	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK
1	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	305CR		PE
1	Rain Guard	346C		PE
1	Sweep	315CN		PE
1	Threshold	2716A		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT
1	Latch Protector	325	US26D	RO

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 12.0
Doors: EMS-1380-1

3	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK
1	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	305CR		PE
1	Rain Guard	346C		PE
1	Sweep	315CN		PE
1	Threshold	2716A		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Video Intercom	By security contractor		OT
1	Low Voltage Power (DIV 28)	By security contractor		OT
1	Latch Protector	325	US26D	RO

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader or by remote release via video intercom, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 13.0
Doors: STR-1064-1, STR-2020

3	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Card Reader Device	1164 12 SN210-PE8876 FIPS NEL	US32D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 CPS	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	305CR		PE	
1	Rain Guard	346C		PE	
1	Sweep	315CN		PE	
1	Threshold	2716A		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Video Intercom	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader or by remote release via video intercom, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader exit device has an integral REX and DPS.

Set: 14.0
Doors: CUP-2374-2

1	Continuous Hinge	CFM__SLF-HD1 PT		PE	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Card Reader/KP Device	1164 SN210-PE8876 FIKPS NEL	US32D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 CPS	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	305CR		PE	
1	Rain Guard	346C		PE	
1	Sweep	315CN		PE	
1	Threshold	2716A		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering a correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader/keypad exit device has an integral REX and DPS.

Set: 15.0
Doors: DTY-1147

6	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Dust Proof Strike	570	US26D	RO
1	Automatic Flush Bolt Set	2842	US32D	RO
1	Storeroom Lock 3/4" latch	BAA 41 1164 10XG04 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Coordinator	2600 x FB	US28	RO
2	Closer Mounting Bracket	2601D as required	US28	RO
2	Surface Closer	TB 351 O/P9	EN	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
2	Wall Stop	400	US26D	RO
1	Overlapping Astragal	355CS		PE
1	Gasketing	S44BL		PE

Notes: Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 15.1
Doors: YRD-0001-2

6	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK
1	Concealed Vert Rod Exit, Exit Only		BAA MDPE8610 EO	
	US32D	SA		
1	Concealed Vert Rod Exit	BAA 1164 MDPE8606 NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
2	Surface Closer	TB 351 CPS	EN	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
2	Meeting Stile Seal	303AS		PE
1	Gasketing	305CR		PE
2	Sweep	315CN		PE
1	Threshold	2716A		PE
1	Video Intercom	By security contractor		OT

Set: 16.0
Doors: EMR-1313-1

1	Continuous Hinge	CFM__SLF-HD1 PT		PE	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Card Reader/KP Lock	1164 SN210-10XG271 FIKPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 CPS	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	305CR		PE	
1	Rain Guard	346C		PE	
1	Sweep	315CN		PE	
1	Threshold	2716A		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Video Intercom	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	
1	Latch Protector	325	US26D	RO	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering a correct PIN at keypad or by remote release via video intercom, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader exit device has an integral REX and DPS.

Set: 17.0
Doors: COR-1002-3

1	Continuous Hinge	CFM__SLF-HD1 PT		PE	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 CPS	EN	SA	
1	Closer Drop Plate	351B/D as required	EN	SA	
1	Closer Spacer Kit	581-1/2 as required	EN	SA	
1	Seal/Silencers	Door/frame manufacturer		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.| Minimum 5" stile width required for proper hardware installation.

Set: 18.0
Doors: PCC-3276, PCC-3292, PVM-2118, SCC-4231, TCC-1324, TCC-1325, TCC-1326, TCC-2193, TCC-2194, TCC-2195, TCC-2196, TCC-3226, TCC-3229, WEL-1116

1	Continuous Hinge	CFM__SLF-HD1 PT		PE	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Closer Drop Plate	351B/D as required	EN	SA	
1	Closer Spacer Kit	581-1/2 as required	EN	SA	
1	Surface Closer (HO)	TB 351 H	EN	SA	
1	Wall Stop	400	US26D	RO	
1	Gasketing	S44BL		PE	
1	Gasketing	S773BL		PE	
1	Acoustic Corner Pad	ACP112BL/2		PE	
1	Door Bottom	3692APK773BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.| Minimum 5" stile width required for proper hardware installation.

Set: 19.0
Doors: ADM-4316, IMG-1209-1, TCC-3225, WEL-1106-1, WEL-1111, WIC-1123

1	Continuous Hinge	CFM__SLF-HD1 PT		PE	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Closer Drop Plate	351B/D as required	EN	SA	
1	Closer Spacer Kit	581-1/2 as required	EN	SA	
1	Surface Closer (HO)	TB 351 H	EN	SA	
1	Wall Stop	400	US26D	RO	
1	Seal/Silencers	Door/frame manufacturer		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.| Minimum 5" stile width required for proper hardware installation.

Set: 20.0
Doors: ADM-4365

1	Continuous Hinge	CFM__HD1-M		PE	
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15		SA
1	Wall Stop	400	US26D	RO	
1	Seal/Silencers	Door/frame manufacturer		OT	

Notes: Minimum 5" stile width required for proper hardware installation.

Set: 21.0
Doors: PFS-1039

1	Continuous Hinge	CFM__HD1-M		PE	
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15		SA
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Closer Drop Plate	351B/D as required	EN	SA	
1	Closer Spacer Kit	581-1/2 as required	EN	SA	
1	Wall Stop	400	US26D	RO	
1	Seal/Silencers	Door/frame manufacturer		OT	

Notes: Minimum 5" stile width required for proper hardware installation.

Set: 22.0
Doors: STR-1001-2

1	Continuous Hinge	CFM__HD1-M		PE	
1	Rim Exit Device, Classroom	BAA 1164 12 PE8513 NEL	US32D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15		SA
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Closer Mounting Plate	351B as required	EN	SA	
1	Wall Stop	400	US26D	RO	
1	Threshold & Seal	Door manufacturer		OT	

Notes: The specified hardware is for basis of design. Provide tested and approved hardware for this fire rated aluminum storefront assembly.

Set: 23.0
Doors: DTY-1143-1

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Surface Vert Rod Exit, Exit Only	BAA 55 56 NBPE8710 EO	US32D	SA	⚡
1	Surface Vert Rod Exit	BAA 1164 55 56 NBPE8706 NEL	US32D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Automatic Opener (PAIR)	D6011/D6061	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
1	Card Reader (DIV 28)	By security contractor		OT	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Video Intercom	By security contractor		OT	
2	Door Position Switch (DIV 28)	By security contractor		OT	
1	Wiring Diagram	Point to point system		AK	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL_ R8 E1		SU	⚡

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader or by remote release via video intercom, momentarily retracting exit device latches for entry. | Free egress at all times. | Electrified exit devices are fail secure and stay locked from the secure side during alarm/power loss. | Outside low energy operator actuator is enabled only when door is unlocked; inside actuator is always enabled.

Set: 24.0
Doors: VST-2078-2

1	Continuous Hinge	CFM__HD1-M		PE
1	Rim Exit Device, Passage	BAA 12 PE8515 NEL	US32D	SA
1	Surface Closer	TB 351 CPS	EN	SA
1	Closer Drop Plate	351B/D as required	EN	SA
1	Closer Spacer Kit	581-1/2 as required	EN	SA
1	Threshold & Seal	Door manufacturer		OT

Notes: The specified hardware is for basis of design. Provide tested and approved hardware for this fire rated aluminum storefront assembly.

Set: 25.0
Doors: COR-2053-1, COR-2067-2, FAC-2154

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Surface Vert Rod Exit, Exit Only	BAA 55 56 NBPE8710 EO	US32D	SA	⚡
1	Surface Vert Rod Exit	BAA 1164 55 56 NBPE8706 NEL	US32D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Automatic Opener (PAIR)	D6011/D6061	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
1	Card Reader (DIV 28)	By security contractor		OT	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
1	Wiring Diagram	Point to point system		AK	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL_ R8 E1		SU	⚡

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential, momentarily retracting exit device latches for entry. | Free egress at all times. | Electrified exit devices are fail secure and stay locked from the secure side during alarm/power loss. | Outside low energy door operator actuator is enabled only when doors are unlocked; inside actuator is always enabled.

Set: 25.1
Doors: COR-2063

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Surface Vert Rod Exit, Exit Only	BAA 55 56 NBPE8710 EO	US32D	SA	⚡
1	Surface Vert Rod Exit	BAA 1164 55 56 NBPE8706 NEL	US32D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Automatic Opener (PAIR)	D6011/D6061	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Wiring Diagram	Point to point system		AK	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL_ R8 E1		SU	⚡

Set: 26.0
Doors: COR-2054-1

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
2	Delayed Egress Magnetic Lock	DEM680E	630	SU	⚡
1	Surface Vert Rod Exit, Exit Only	BAA 55 56 NBPE8710 EO	US32D	SA	⚡
1	Surface Vert Rod Exit	BAA 1164 55 56 NBPE8706 NEL	US32D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Automatic Opener (PAIR)	D6011/D6061	689	NO	⚡
2	Sequencer	BEA BR3-X		OT	
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
2	Card Reader (DIV 28)	By security contractor		OT	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
1	Wiring Diagram	Point to point system		AK	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL_ R8 E1		SU	⚡

Notes: Delayed egress locking system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.13.1. | Doors are normally closed and locked. | Access by presenting a valid credential to reader either side, momentarily releasing delayed egress mag lock and retracting exit device latches for entry. | Delayed egress by pushing on exit device rail which initiates a local alarm and irreversible 15 second delay, after which the door leaf is free for egress. | Delayed egress mag locks are integrated into the building's fire alarm system and release during alarm/power loss allowing immediate free egress. | Electrified exit devices are fail secure and stay locked from the secure side during alarm/power loss. | Low energy operator actuators are enabled only when doors are unlocked. | Wall magnets are integrated into the building's fire alarm system and release during alarm/power loss allowing doors to close and latch. | Present a valid credential twice in both directions to travel across main corridor.

Set: 27.0
Doors: ADM-4340, COR-1062, COR-1065-2, COR-2052

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
2	Delayed Egress Magnetic Lock	DEM680E	630	SU	⚡
2	Surface Vert Rod Exit, Exit Only	BAA 12 55 56 NBPE8710 EO	US32D	SA	⚡
1	Automatic Opener (DE PAIR)	D6001DE	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
2	Card Reader (DIV 28)	By security contractor		OT	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
1	Wiring Diagram	Point to point system		AK	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL_ R8 E1		SU	⚡

Notes: Delayed egress locking system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.13.1. | Doors are normally closed and locked. | Both door leaves receive a delayed egress mag lock. | Presenting a valid credential to reader momentarily deactivates delayed egress mag lock, retracts exit device latches, and enables wave to open low energy operator actuators. | Delayed egress by pushing on exit device rail which initiates a local alarm and irreversible 15 second delay, after which the door leaf is free for egress. | Delayed egress mag locks are integrated into the building's fire alarm system and release during alarm/power loss allowing immediate free egress.

Set: 28.0

Set not used

Set: 29.0
Doors: COR-2038

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
2	Delayed Egress Magnetic Lock	DEM680E	630	SU	⚡
2	Surface Vert Rod Exit, Exit Only	BAA 55 56 NBPE8710 EO	US32D	SA	⚡
1	Automatic Opener (DE PAIR)	D6001DE	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
2	Card Reader (DIV 28)	By security contractor		OT	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Video Intercom	By security contractor		OT	
2	Door Position Switch (DIV 28)	By security contractor		OT	
1	Wiring Diagram	Point to point system		AK	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL_ R8 E1		SU	⚡

Notes: Delayed egress locking system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.13.1. | Doors are normally closed and locked. | Both door leaves receive a delayed egress mag lock. | Presenting a valid credential to reader or by remote release via video intercom, momentarily deactivates delayed egress mag lock, retracts exit device latches, and enables wave to open low energy operator actuators. | Delayed egress by pushing on exit device rail which initiates a local alarm and irreversible 15 second delay, after which the door leaf is free for egress. | Delayed egress mag locks are integrated into the building's fire alarm system and release during alarm/power loss allowing immediate free egress. | Low energy door operator provides hold open.

Set: 30.0
Doors: COR-1017, COR-1026-2, COR-2032, COR-3036, COR-3046, COR-4053

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Delayed Egress Magnetic Lock	DEM680E	630	SU	⚡
2	Surface Vert Rod Exit, Exit Only	BAA 55 56 NBPE8710 EO	US32D	SA	⚡
1	Automatic Opener (DE PAIR)	D6001DE	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
1	Card Reader (DIV 28)	By security contractor		OT	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
1	Wiring Diagram	Point to point system		AK	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL_ R8 E1		SU	⚡

Notes: Delayed egress locking system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.13.1. | Doors are normally closed and latched. | The secure door leaf receives a delayed egress mag lock. | Presenting a valid credential to reader momentarily deactivates delayed egress mag lock, retracts exit device latches, and enables wave to open low energy operator actuator for secure leaf. | Non-secure leaf wave to open low energy operator actuator is always enabled. | Delayed egress by pushing on exit device rail which initiates a local alarm and irreversible 15 second delay, after which the door leaf is free for egress. | Delayed egress mag lock is integrated into the building's fire alarm system and releases during alarm/power loss allowing immediate free egress.

Set: 31.0
Doors: COR-1046, COR-1049-2

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Delayed Egress Magnetic Lock	DEM680E	630	SU	⚡
2	Surface Vert Rod Exit, Exit Only	BAA 12 55 56 NBPE8710 EO	US32D	SA	⚡
1	Automatic Opener (DE PAIR)	D6001DE	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
1	Card Reader (DIV 28)	By security contractor		OT	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
1	Wiring Diagram	Point to point system		AK	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL_ R8 E1		SU	⚡

Notes: Delayed egress locking system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.13.1. | Doors are normally closed and latched. | The secure door leaf receives a delayed egress mag lock. | Presenting a valid credential to reader momentarily deactivates delayed egress mag lock, retracts exit device latches, and enables wave to open low energy operator actuator for secure leaf. | Non-secure leaf wave to open low energy operator actuator is always enabled. | Delayed egress by pushing on exit device rail which initiates a local alarm and irreversible 15 second delay, after which the door leaf is free for egress. | Delayed egress mag lock is integrated into the building's fire alarm system and releases during alarm/power loss allowing immediate free egress.| Low energy door operator provides hold open.

Set: 32.0
Doors: COR-1049-1, COR-1065-1, COR-2054-2, COR-2084C

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Delayed Egress Magnetic Lock	DEM680E	630	SU	⚡
2	Surface Vert Rod Exit, Exit Only	BAA 12 55 56 NBPE8710 EO	US32D	SA	⚡
1	Automatic Opener (DE PAIR)	D6001DE	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
1	Card Reader (DIV 28)	By security contractor		OT	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
1	Wiring Diagram	Point to point system		AK	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL_ R8 E1		SU	⚡

Notes: Delayed egress locking system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.13.1. | Doors are normally closed and latched. | The secure door leaf receives a delayed egress mag lock. | Presenting a valid credential to reader momentarily deactivates delayed egress mag lock, retracts exit device latches, and enables wave to open low energy operator actuator for secure leaf. | Non-secure leaf wave to open low energy operator actuator is always enabled. | Delayed egress by pushing on exit device rail which initiates a local alarm and irreversible 15 second delay, after which the door leaf is free for egress. | Delayed egress mag lock is integrated into the building's fire alarm system and releases during alarm/power loss allowing immediate free egress.

Set: 33.0
Doors: COR-2003B-1

6	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
2	Electric Power Transfer	EL-CEPT	630	SU
2	Delayed Egress Magnetic Lock	DEM680E	630	SU
1	Surface Vert Rod Exit	BAA 1164 55 56 NBPE8706 NEL	US32D	SA
1	Surface Vert Rod Exit, Exit Only	BAA 55 NBPE8710 EO	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)		US15 SA
2	Surface Closer	TB 351 O/P9	EN	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
2	Wall Stop	400	US26D	RO
2	Meeting Stile Seal	29310CS		PE
1	Gasketing	S44BL		PE
2	Card Reader (DIV 28)	By security contractor		OT
2	Frame Wiring Harness	QC-C1500P		MK
2	Door Wiring Harness	QC-C___P as required		MK
2	Door Position Switch (DIV 28)	By security contractor		OT
1	Wiring Diagram	Point to point system		AK
1	Power Supply	AQL4-R8E1		SU

Notes: Delayed egress locking system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.13.1. | Doors are normally closed and locked. | Access by presenting a valid credential to reader either side, momentarily releasing delayed egress mag locks and retracting exit device latch on active leaf for entry. | Delayed egress by pushing on exit device rail which initiates a local alarm and irreversible 15 second delay, after which the door leaf is free for egress. | Delayed egress mag locks are integrated into the building's fire alarm system and release during alarm/power loss allowing immediate free egress. | Electrified exit devices are fail secure and stay locked from the secure side during alarm/power loss.

Set: 33.1
Doors: COR-2048, ELC-1015, ELC-2079

6	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Surface Vert Rod Exit, Exit Only	BAA 12 55 NBPE8710 EO	US32D	SA	
1	Surface Vert Rod Exit	12 NB SN210-PE8774 FIPS NEL	US32D	SA	⚡
1	Auxiliary Control	BAA 1164 P306	US32D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
2	Surface Closer	TB 351 O/P9	EN	SA	
2	Kick Plate	K1050 10" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29310CS		PE	
1	Gasketing	S44BL		PE	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader exit device has an integral REX and DPS.

Set: 34.0
Doors: COR-2068

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
2	Magnetic Lock	M680EBD	630	SU	⚡
2	Surface Vert Rod Exit, Exit Only	BAA 12 55 56 NBPE8710 EO	US32D	SA	⚡
1	Automatic Opener (DE PAIR)	D6001DE	689	NO	⚡
2	Sequencer	BEA BR3-X		OT	
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
2	Card Reader (DIV 28)	By security contractor		OT	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
1	Wiring Diagram	Point to point system		AK	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL_ R8 E1		SU	⚡

Notes: IBC controlled door for infant security system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.14. | Doors are normally closed and locked from both sides at all times. | Entry and exiting by presenting a valid credential to card reader either side, momentarily retracting exit device latches, de-activating mag locks, and activating low energy operator actuators. | The power supply is integrated into the building's smoke detection system only and will drop power to magnetic locks when activated. | Present a valid credential twice in both directions to travel across main corridor.

Set: 35.0
Doors: COR-2073C, IPC-3300

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
2	Magnetic Lock	M680EBD	630	SU	⚡
2	Surface Vert Rod Exit, Exit Only	BAA 12 55 56 NBPE8710 EO	US32D	SA	⚡
1	Automatic Opener (DE PAIR)	D6001DE	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
2	Card Reader (DIV 28)	By security contractor		OT	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
1	Wiring Diagram	Point to point system		AK	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL_ R8 E1		SU	⚡

Notes: IBC controlled door for infant security system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.14.| Doors are normally closed and locked from both sides at all times. | Entry and exiting by presenting a valid credential to card reader either side, momentarily retracting exit device latches, de-activating mag locks, and activating low energy operator actuators. | The power supply is integrated into the building's smoke detection system only and will drop power to magnetic locks when activated.

Set: 36.0
Doors: COR-3054

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
2	Magnetic Lock	M680EBD	630	SU	⚡
2	Surface Vert Rod Exit, Exit Only	BAA 12 55 56 NBPE8710 EO	US32D	SA	⚡
1	Automatic Opener (DE PAIR)	D6001DE	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
2	Card Reader (DIV 28)	By security contractor		OT	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Video Intercom	By security contractor		OT	
2	Door Position Switch (DIV 28)	By security contractor		OT	
1	Wiring Diagram	Point to point system		AK	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL_ R8 E1		SU	⚡

Notes: IBC controlled door for infant security system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.14.| Doors are normally closed and locked from both sides at all times. | Entry and exiting by presenting a valid credential to card reader either side, momentarily retracting exit device latches, de-activating mag locks, and activating low energy operator actuators. | The power supply is integrated into the building's smoke detection system only and will drop power to magnetic locks when activated.

Set: 37.0
Doors: ELC-1012, ELC-1018, ELC-1036, ELC-1051, ELC-1068, ELC-2007, ELC-2034, ELC-2046, ELC-2056, ELC-2081, ELC-2083, ELC-3009, ELC-3023, ELC-3035, ELC-3037, ELC-3066, ELC-4028, ELC-4037, ELC-4052, ELC-4063

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Card Reader/KP Device ⚡	1164 12 SN210-PE8876 FIKPS NEL		US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Gasketing	S44BL		PE	
1	Gasketing	S773BL		PE	
1	Acoustic Corner Pad	ACP112BL/2		PE	
1	Door Bottom	3692APK773BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Template door closer to allow 180 degrees maximum opening as indicated. | Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad exit device has an integral REX and DPS.

Set: 37.1
Doors: CUP-2371-2, CUP-2373, ELC-1063

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader/KP Device	1164 12 SN210-PE8876 FIKPS NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Template door closer to allow 180 degrees maximum opening as indicated. | Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad exit device has an integral REX and DPS.

Set: 38.0
Doors: PHM-1166-2

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader/KP Device	1164 SN210-PE8876 FIKPS NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Template door closer to allow 180 degrees maximum opening as indicated. | Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad exit device has an integral REX and DPS.

Set: 39.0
Doors: ELC-4013

1	Continuous Hinge	FM300 CTP	630	MR
1	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader/KP Device	1164 12 SN210-PE8876 FIKPS NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Template door closer to allow 180 degrees maximum opening as indicated. | Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad exit device has an integral REX and DPS.

Set: 40.0
Doors: COR-1003, COR-1005, COR-2005, COR-2007, COR-2014, COR-3003, COR-3039, DTL-4136-1, MHS-3297, MHS-3312, PCC-3122-2, PCC-3153-1, PCC-3153-2, PCC-3187-1, PCC-3187-2, PCC-3222-1, PCC-3222-2, PCC-3251, PCC-3267, RHB-4274, SCC-4207

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader/KP Device	1164 SN210-PE8876 FIKPS NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader exit device has an integral REX and DPS.

Set: 40.1
Doors: PCC-3104-2

3	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Rim Exit Device, Classroom	BAA 1164 PE8813 NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 41.0
Doors: PVM-2106

1	Continuous Hinge	FM300 CTP	630	MR
1	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader Device	1164 SN210-PE8876 FIPS NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	S15	SA
1	Surface Closer	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader exit device has an integral REX and DPS.

Set: 42.0
Doors: CUP-2370-2, UPS-1014

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Device	1164 12 SN210-PE8876 FIPS NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader exit device has an integral REX and DPS.

Set: 42.1
Doors: CUP-2374-3, UPS-2076

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader/KP Device	1164 12 SN210-PE8876 FIKPS NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering a correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader exit device has an integral REX and DPS.

Set: 42.2
Doors: EMS-1380-2

3	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Rim Exit Device, Classroom	BAA 1164 12 PE8813 NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Sweep	315CN		PE
1	Threshold	271A		PE

Set: 42.3
Doors: UPS-2029

1	Continuous Hinge	FM300 CTP	630	MR
1	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader/KP Device	1164 12 SN210-PE8876 FIKPS NEL		US32D SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering a correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader exit device has an integral REX and DPS.

Set: 43.0
Doors: PCC-3104-1

1	Continuous Hinge	FM300 CTP	630	MR
1	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader Device	1164 SN210-PE8876 FIPS NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Template door closer to allow 180 degrees maximum opening as indicated. | Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader exit device has an integral REX and DPS.

Set: 44.0
Doors: STR-2001, STR-3001, STR-3020, STR-3045, STR-4001-1, STR-4001-2, STR-4020, STR-4045, STR-4064

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Device	1164 12 SN210-PE8875 FIPS NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail safe and is unlocked during alarm/power loss allowing re-entry per code. | Integrated card reader exit device has an integral REX and DPS.

Set: 45.0
Doors: WIS-2284

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Magnetic Lock	M680EBD	630	SU	⚡
1	Fail Secure Exit Device	BAA 1164 12 55 PE8876 NEL	US32D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 O/P9	EN	SA	
2	Kick Plate	K1050 10" CSK	US32D	RO	
1	Electromagnetic Holder	998M x voltage	689	RF	⚡
1	Gasketing	S44BL		PE	
2	Card Reader (DIV 28)	By security contractor		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Video Intercom	By security contractor		OT	
1	Power Supply	AQL4-R8E1		SU	⚡

Notes: IBC controlled door for infant security system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.14. | Doors are normally closed and locked from both sides at all times. | Entry and exiting by presenting a valid credential to card reader either side, momentarily retracting exit device latches, de-activating mag locks, and activating low energy operator actuators. | The power supply is integrated into the building's smoke detection system only and will drop power to magnetic locks when activated. | Wall magnets are integrated into the building's fire alarm system and release during alarm/power loss allowing doors to close and latch.

Set: 46.0
Doors: COR-1053, DTL-4161, EMR-1299

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Card Reader Device	1164 12 SN210-PE8876 FIPS NEL	US32D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader exit device has an integral REX and DPS.

Set: 47.0
Doors: DTL-4105

1	Continuous Hinge	FM300 CTP	630	MR
1	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader Device	1164 12 SN210-PE8876 FIPS NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified exit device is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader exit device has an integral REX and DPS.

Set: 48.0

Set not used

Set: 49.0
Doors: STR-1064-2

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Magnetic Lock	M680EBD	630	SU
1	Fail Secure Exit Device	BAA 1164 12 55 PE8876 NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Sweep	315CN		PE
1	Threshold	271A		PE
2	Card Reader (DIV 28)	By security contractor		OT
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Door Position Switch (DIV 28)	By security contractor		OT
1	Wiring Diagram	Point to point system		AK
1	Power Supply	AQL_ R8 E1		SU

Notes: IBC controlled door for infant security system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.14.| Door is normally closed and locked from both sides at all times. | Entry and exiting by presenting a valid credential to card reader either side, momentarily unlocking lever for entry and de-activating mag locks. | The power supply is integrated into the building's smoke detection system only and will drop power to magnetic locks when activated.

Set: 50.0
Doors: STR-2064, STR-3064

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Magnetic Lock	M680EBD	630	SU	⚡
1	Fail Safe Exit Device	BAA 1164 12 55 PE8875 NEL	US32D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Gasketing	S44BL		PE	
2	Card Reader (DIV 28)	By security contractor		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Wiring Diagram	Point to point system		AK	
1	Power Supply	AQL_ R8 E1		SU	⚡

Notes: IBC controlled door for infant security system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.14.| Door is normally closed and locked from both sides at all times. | Entry and exiting by presenting a valid credential to card reader either side, momentarily unlocking lever for entry and de-activating mag locks. | The power supply is integrated into the building's smoke detection system only and will drop power to magnetic locks when activated. | Exit device is fail safe and unlocked during alarm/power loss allowing re-entry per code.

Set: 51.0
Doors: COR-3041, COR-4040

6	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
2	Surface Vert Rod Exit, Exit Only	BAA NBPE8710 EO	US32D	SA	
2	Surface Closer	TB 351 O/P9	EN	SA	
2	Kick Plate	K1050 10" CSK	US32D	RO	
2	Electromagnetic Holder	998M x voltage	689	RF	⚡
2	Meeting Stile Seal	29310CS		PE	
1	Gasketing	S44BL		PE	

Set: 52.0
Doors: COR-1026-1, COR-3063, IPC-3280

6	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
2	Surface Vert Rod Exit, Exit Only	BAA 12 NBPE8710 EO	US32D	SA	
2	Surface Closer	TB 351 O/P9	EN	SA	
2	Kick Plate	K1050 10" CSK	US32D	RO	
2	Electromagnetic Holder	998M x voltage	689	RF	⚡
2	Meeting Stile Seal	29310CS		PE	
1	Gasketing	S44BL		PE	

Notes: Wall magnets are integrated into the building's fire alarm system and release during alarm/power loss allowing fire doors to close and latch.

Set: 53.0
Doors: COR-2067-1

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
2	Surface Vert Rod Exit, Exit Only	BAA 12 55 56 NBPE8710 EO	US32D	SA	⚡
1	Automatic Opener (DE PAIR)	D6001DE	689	NO	⚡
2	Kick Plate	K1050 10" CSK	US32D	RO	
2	Electromagnetic Holder	998M x voltage	689	RF	⚡
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Wiring Diagram	Point to point system		AK	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL_ R8 E1		SU	⚡

Notes: Wall magnets are integrated into the building's fire alarm system and release during alarm/power loss allowing doors to close and latch.

Set: 54.0
Doors: TCC-2105A, TCC-2105B-1

3	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Rim Exit Device, Classroom	BAA 1164 PE8813 NEL	US32D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer (HO)	TB 351 CPSH	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Gasketing	S44BL		PE	
1	Gasketing	S773BL		PE	
1	Acoustic Corner Pad	ACP112BL/2		PE	
1	Door Bottom	3692APK773BL		PE	

Set: 55.0
Doors: CUP-2371-3, SCC-4193

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Rim Exit Device, Passage	BAA 12 PE8815 NEL	US32D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 56.0
Doors: DTL-4144

1	Continuous Hinge	FM300	630	MR
1	Rim Exit Device, Passage	BAA PE8815 NEL	US32D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 57.0
Doors: SCC-4200, SCC-4207E, SCC-4221, SCC-4225, SCC-4234

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Rim Exit Device, Passage	BAA PE8815 NEL	US32D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 58.0
Doors: ELV-1061

1	Continuous Hinge	HG305 AS	630	MR	
1	Continuous Hinge	HG305 CTP AS	630	MR	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Card Reader Lock	1164 41 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
1	Surf Overhead Stop	9-_36	630	RF	
2	Surface Closer	TB 351 O/P9	EN	SA	
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS. |Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 59.0
Doors: PRS-2338-2

1	Continuous Hinge	HG305 AS	630	MR	
1	Continuous Hinge	HG305 CTP AS	630	MR	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Storeroom Lock 3/4" latch	BAA 41 1164 10XG04 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Electric Strike	310-2-3/4	630	FO	⚡
1	Coordinator	2600 x FB	US28	RO	
2	Conc Overhead Stop	1-_36	630	RF	
1	Automatic Opener (PAIR)	D6011/D6061	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	305CR		PE	
2	Sweep	315CN		PE	
1	Threshold	271A		PE	
1	Card Reader (DIV 28)	By security contractor		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
2	Wave to Open Wall Switch	700		NO	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily releasing electric strike for entry. | Free egress at all times. | Electrified strike is fail secure and stays locked during alarm/power loss. | Outside low energy operator actuator is enabled only when doors are unlocked; inside actuator is always enabled.

Set: 60.0
Doors: ADM-4339A

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Dust Proof Strike	570	US26D	RO	
1	Combination Flush Bolt Set	2845/2945	US32D	RO	
1	Card Reader Lock	1164 41 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
2	Surface Closer (HO)	TB 351 H	EN	SA	
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
2	Silencer	608-RKW		RO	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 61.0
Doors: LAB-2191A

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Card Reader/KP Lock ⚡	1164 41 SN210-10XG271 FIKPS LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
2	Surface Closer	TB 351 O/P9	EN	SA	
2	Kick Plate	K1050 10" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 62.0
Doors: DTY-1148

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Card Reader Lock	1164 41 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
2	Surface Closer	TB 351 O/P9	EN	SA	
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 63.0
Doors: ELV-4041, EMR-1307, IMG-1226-1, VST-2080-2

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Card Reader Lock	1164 41 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
2	Surface Closer	TB 351 O/P9	EN	SA	
2	Kick Plate	K1050 10" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 63.1
Doors: EMS-1370

6	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Surface Vert Rod Exit, Exit Only	BAA 12 NBPE8710 EO	US32D	SA	
1	Surface Vert Rod Exit	BAA 12 NBPE8706 NEL	US32D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
2	Surface Closer	TB 351 O/P9	EN	SA	
2	Kick Plate	K1050 10" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29310CS		PE	
1	Gasketing	S44BL		PE	

Set: 63.2
Doors: MCH-2077

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Card Reader Lock	1164 41 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
2	Surface Closer	TB 351 O/P9	EN	SA	
2	Kick Plate	K1050 10" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
1	Gasketing	S44BL		PE	
1	Gasketing	S773BL		PE	
1	Acoustic Corner Pad	ACP112BL/2		PE	
2	Door Bottom	3692APK773BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 64.0
Doors: IDF-1381

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Dust Proof Strike	570	US26D	RO	
1	Combination Flush Bolt Set	2845/2945	US32D	RO	
1	Card Reader/KP Lock ⚡	1164 41 SN210-10XG271 FIKPS LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Surface Closer	TB 1601 P (inactive leaf)	689	NO	
2	Kick Plate	K1050 10" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
1	Gasketing	S44BL		PE	
1	Gasketing	S773BL		PE	
1	Acoustic Corner Pad	ACP112BL/2		PE	
2	Door Bottom	3692APK773BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad lock has an integral REX and DPS.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 64.1
Doors: PHM-1188-1

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Dust Proof Strike	570	US26D	RO	
1	Combination Flush Bolt Set	2845/2945	US32D	RO	
1	Card Reader/KP Lock ⚡	1164 41 SN210-10XG271 FIKPS LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
1	Surf Overhead Stop	9-_36	630	RF	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Surface Closer	TB 1601 P (inactive leaf)	689	NO	
2	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
2	Silencer	608-RKW		RO	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad lock has an integral REX and DPS.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 65.0
Doors: EVS-2332, EVS-2333

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Card Reader Lock	1164 41 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
1	Surf Overhead Stop	9-_36	630	RF	
2	Surface Closer	TB 351 O/P9	EN	SA	
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 65.1
Doors: SUR-2265

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Card Reader Lock	1164 41 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
1	Surf Overhead Stop	9-_36	630	RF	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Surface Closer	TB 1601 P (inactive leaf)	689	NO	
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 65.2
Doors: LAB-1340, LAB-1344, LAB-1346

5	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Self-latching Top Bolt	2905	US26D	RO	
1	Card Reader Lock	1164 41 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surf Overhead Stop	9-_36	630	RF	
1	Surface Closer	TB 351 O/P9	EN	SA	
2	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
2	Silencer	608-RKW		RO	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS. |Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 66.0
Doors: PRS-2350

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Card Reader/KP Lock ⚡	1164 41 SN210-10XG271 FIKPS LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Surface Closer	TB 1601 P (inactive leaf)	689	NO	
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering a correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad lock has an integral REX and DPS.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 67.0
Doors: LAB-1339

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Card Reader Lock	1164 41 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
2	Surf Overhead Stop	9-_36	630	RF	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Surface Closer	TB 1601 P (inactive leaf)	689	NO	
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 68.0
Doors: LAB-2191

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Card Reader Lock	1164 41 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
1	Surf Overhead Stop	9-_36	630	RF	
2	Surface Closer	TB 351 O/P9	EN	SA	
2	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 69.0
Doors: LAB-1345, LAB-1347

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Card Reader Lock	1164 41 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Coordinator	2600 x FB	US28	RO	
2	Closer Mounting Bracket	2601D as required	US28	RO	
2	Surf Overhead Stop	9-_36	630	RF	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Surface Closer	TB 1601 P (inactive leaf)	689	NO	
2	Kick Plate	K1050 10" CSK	US32D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 70.0
Doors: EMR-1314-3

1	Continuous Hinge	HG305 AS	630	MR	
1	Continuous Hinge	HG305 CTP AS	630	MR	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Storeroom Lock 3/4" latch	BAA 41 1164 10XG04 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Electric Strike	310-2-3/4	630	FO	⚡
1	Coordinator	2600 x FB	US28	RO	
1	Automatic Opener (PAIR)	D6011/D6061	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
1	Card Reader (DIV 28)	By security contractor		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Video Intercom	By security contractor		OT	
2	Door Position Switch (DIV 28)	By security contractor		OT	
2	Wave to Open Wall Switch	700		NO	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader or by remote release via video intercom, momentarily releasing electric strike for entry. | Free egress at all times. | Electric strike is fail secure and stays locked during alarm/power loss. | Outside low energy operator actuator is enabled only when door is unlocked; inside actuator is always enabled.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 71.0
Doors: COR-1040, SUR-2281

1	Continuous Hinge	HG305 AS	630	MR	
1	Continuous Hinge	HG305 CTP AS	630	MR	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Storeroom Lock 3/4" latch	BAA 41 1164 10XG04 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Electric Strike	310-2-3/4	630	FO	⚡
1	Coordinator	2600 x FB	US28	RO	
1	Automatic Opener (PAIR)	D6011/D6061	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
1	Card Reader (DIV 28)	By security contractor		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
2	Wave to Open Wall Switch	700		NO	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily releasing electric strike for entry. | Free egress at all times. | Electric strike is fail secure and stays locked during alarm/power loss. | Outside low energy operator actuator is enabled only when door is unlocked; inside actuator is always enabled.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 71.1
Doors: CLE-2232-1, CLE-2232-2

2	Continuous Hinge	HG305 AS	630	MR	
2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Storeroom Lock 3/4" latch	BAA 41 1164 10XG04 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Electric Strike	310-2-3/4	630	FO	⚡
1	Coordinator	2600 x FB	US28	RO	
1	Surf Overhead Stop	9-_36	630	RF	
1	Automatic Opener (PAIR)	D6011/D6061	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
1	Card Reader (DIV 28)	By security contractor		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
2	Wave to Open Wall Switch	700		NO	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily releasing electric strike for entry. | Free egress at all times. | Electric strike is fail secure and stays locked during alarm/power loss. | Outside low energy operator actuator is enabled only when door is unlocked; inside actuator is always enabled.|Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 72.0
Doors: SUR-2267-1, SUR-2268-1, SUR-2272-1

1	Continuous Hinge	HG305 AS	630	MR	
1	Continuous Hinge	HG305 CTP AS	630	MR	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Hospital Latch	24 115	US26D	SA	
1	Electric Strike	310-2-3/4	630	FO	⚡
1	Coordinator	2600 x FB	US28	RO	
1	Automatic Opener (PAIR)	D6011/D6061	689	NO	⚡
2	Armor Plate	K1050 (-F) 40" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 40" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
2	Wave to Open Wall Switch	700		NO	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Set: 73.0
Doors: MSP-2353-1

1	Continuous Hinge	HG305 AS	630	MR	
1	Continuous Hinge	HG305 CTP AS	630	MR	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Automatic Flush Bolt Set	2962	US32D	RO	
1	Dust Proof Strike	570	US26D	RO	
1	Storeroom Lock 3/4" latch	BAA 41 1164 10XG04 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Electric Strike	310-2-3/4	630	FO	⚡
1	Coordinator	2600 x FB	US28	RO	
1	Conc Overhead Stop	1-_36	630	RF	
1	Automatic Opener (PAIR)	D6011/D6061	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
1	Card Reader (DIV 28)	By security contractor		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
2	Wave to Open Wall Switch	700		NO	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily releasing electric strike for entry. | Free egress at all times. | Electric strike is fail secure and stays locked during alarm/power loss. | Outside low energy operator actuator is enabled only when door is unlocked; inside actuator is always enabled.

Set: 74.0
Doors: PRS-2347

1	Continuous Hinge	HG305 AS	630	MR	
1	Continuous Hinge	HG305 CTP AS	630	MR	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Dust Proof Strike	570	US26D	RO	
1	Automatic Flush Bolt Set	2842	US32D	RO	
1	Storeroom Lock 3/4" latch	BAA 41 1164 10XG04 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Electric Strike	310-2-3/4	630	FO	⚡
1	Coordinator	2600 x FB	US28	RO	
1	Automatic Opener (PAIR)	D6011/D6061	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
1	Overlapping Astragal	355CS		PE	
1	Meeting Edge Seal	S772BL		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
1	Card Reader (DIV 28)	By security contractor		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
2	Wave to Open Wall Switch	700		NO	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily releasing electric strike for entry. | Free egress at all times. | Electric strike is fail secure and stays locked during alarm/power loss. | Outside low energy operator actuator is enabled only when door is unlocked; inside actuator is always enabled.

Set: 75.0
Doors: COR-1058-1, COR-1058-2

2	Continuous Hinge	HG305 CTP AS	630	MR	
2	Electric Power Transfer	EL-CEPT	630	SU	⚡
2	Delayed Egress Magnetic Lock	DEM680E	630	SU	⚡
1	Surface Vert Rod Exit ⚡	BAA 1164 12 55 56 NBPE8706 NEL		US32D	SA
1	Surface Vert Rod Exit, Dummy	BAA 12 55 56 NB-PE8710 NEL	US32D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Automatic Opener (PAIR)	D6011/D6061	689	NO	⚡
2	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
2	Wall Stop	400	US26D	RO	
2	Meeting Stile Seal	29326CNB		PE	
2	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
2	Card Reader (DIV 28)	By security contractor		OT	
2	Frame Wiring Harness	QC-C1500P		MK	⚡
2	Door Wiring Harness	QC-C___P as required		MK	⚡
2	Door Position Switch (DIV 28)	By security contractor		OT	
2	Wave to Open Wall Switch	700		NO	⚡
1	Power Supply	AQL4-R8E1		SU	⚡

Notes: : Delayed egress locking system complying with International Building Code 2021 Chapter 10 Means of Egress 1010.2.13.1. | Doors are normally closed and locked. | Access by presenting a valid credential to reader either side, momentarily releasing delayed egress mag locks and retracting exit device latch on active leaf for entry. | Delayed egress by pushing on exit device rail which initiates a local alarm and irreversible 15 second delay, after which the door leaf is free for egress. | Delayed egress mag locks are integrated into the building's fire alarm system and release during alarm/power loss allowing immediate free egress. | Electrified exit devices are fail secure and stay locked from the secure side during alarm/power loss.

Set: 76.0
Doors: ADM-4369, ADM-4390, DTL-4109, DTL-4110, DTL-4111-2, DTL-4114, DTL-4151, DTY-1142, DTY-1151, EFS-1348, EMR-1281, EMS-1377, EMS-1378, ITS-2200, ITS-2201, OEH-2226, PCC-3114, PCC-3250, PCC-3279, PHM-1158, PVM-2139, RHB-4271-1, RHB-4284, WIS-2293, WIS-2294, WIS-2295

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS. | Provide video intercom at ADM-4369. | Provide panic button at IPC-3294, WIS-2293, and WIS-2294.

Set: 76.1
Doors: DTL-4115, PCC-3283, RES-4250, TCC-2282, TCC-2283

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 76.2
Doors: EFS-2148, EMR-1316, EMR-1317, EMR-1319, EMR-1320, EMR-1321

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer (HO)	TB 351 H	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Acoustic Seal Set	PEMKOSTCSET-1C	BL	PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 76.3
Doors: EMR-1293, EMR-1318, IMG-1244, IPC-3246A, IPC-3251, IPC-3252, IPC-3257, IPC-3262, IPC-3266, IPC-3270, IPC-3294

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer (HO)	TB 351 H	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS. | Provide panic button at IPC-3294.

Set: 76.4
Doors: IMG-1245, IPC-3292

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer (HO)	TB 351 H	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 77.0
Doors: DTY-1152, EMR-1276, EMR-1282, EMR-1283

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader/KP Lock	1164 SN210-10XG271 FIKPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad lock has an integral REX and DPS.

Set: 78.0
Doors: OEH-2400, SUR-2245

1	Continuous Hinge	FM300 CTP	630	MR
1	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 79.0
Doors: DTL-4138-2, EMR-1277, EMS-1374, IMG-1241, PCC-3155, PCC-3253, PHM-1160, PVM-2116, RHB-4282, SCC-4233A, SUR-2244, SUR-2275, WIS-2292-1, WIS-2292-2, WIS-2299

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS. INSTALL CARD READER INSIDE ROOM AT DTL-4138-2.

Set: 80.0
Doors: EVS-2330, IPC-3293, MSP-2366-1, MSP-2366-2

1	Continuous Hinge	FM300 CTP	630	MR	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 81.0

Doors: ADM-4315, ADM-4322, ADM-4327, ADM-4385, ADM-4389-1, CLE-2233-1, COR-1029, COR-2047, COR-2062, CUP-2369, DTL-4104A, DTL-4104C, DTL-4137, DTL-4142, DTL-4145, DTL-4152, DTY-1143-2, EFS-1351, EFS-1361, EFS-1363, EFS-1366, EFS-2170, EFS-2188-1, EFS-2189, EFS-3230, ELV-1037, EMR-1253, EMR-1322, EMS-1371, EVS-1040, EVS-1210, EVS-1222, EVS-1331, EVS-2169, EVS-2320, EVS-2328, EVS-3021, EVS-3227, EVS-3306, EVS-4146, FAC-2152, FAC-2159, FAC-2397-2, FAC-2397-6, FAC-2397-7, IMG-1209-2, IMG-1211, IMG-1223, IMG-1229, IMG-1235B-1, IMG-1235B-2, IPC-3284A, IPC-3290, ITS-2199-1, ITS-2199-2, LAB-1205, LAB-1329, LAB-1337-2, MHS-3304, MHS-3305, MSP-2357, MSP-2358, PCC-3117, PCC-3180, PCC-3203, PCC-3204, PCC-3239, PCC-3288, PRC-3233, PRS-2336-1, PRS-2336-2, PRS-2336-3, PRS-2341, RES-4251, RES-4259, RHB-4267, RHB-4272-1, RHB-4272-2, RHB-4296, RHB-4297A, SCC-4173-1, SCC-4179, SCC-4207C, SCC-4214A, SCC-4214B, STR-1030-1, STR-2030, SUR-2238C, SUR-2277, SUR-2278, SUR-2280, WEL-1106-2, WEL-1107-1, WEL-1107-2, WEL-1109-1, WEL-1109-2, WEL-1110-1, WEL-1110-2, WEL-1119, WIS-2297, WIS-2307, WIS-2311, WIS-2319

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 81.1
Doors: ADM-4311-1, ADM-4311-2, ADM-4312-1, ELV-2058, ELV-4055, MCH-1038, PCC-3169, PVM-2114, SCC-4246-1

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Gasketing	S44BL		PE	
1	Gasketing	S773BL		PE	
1	Acoustic Corner Pad	ACP112BL/2		PE	
1	Door Bottom	3692APK773BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 81.2
Doors: COR-1052-1, COR-1052-2

1	Continuous Hinge	HG305 AS	630	MR	
1	Storeroom Lock	BAA 1164 10XG04 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	SMART Pac Bridge Rectifier	2005M3		HS	⚡
1	ElectroLynx Adaptor	2004M		HS	⚡
1	Electric Strike	1600-CS	630	HS	⚡
1	Automatic Opener (SINGLE)	6011/6061	689	NO	⚡
1	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
1	Card Reader (DIV 28)	By security contractor		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
2	Wave to Open Wall Switch	700		NO	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily releasing electric strike for entry. | Free egress at all times. | Electric strike is fail secure and stays locked during alarm/power loss. | Outside low energy operator actuator is enabled only when door is unlocked; inside actuator is always enabled.

Set: 82.0
Doors: ADM-4380, EFS-1364, EFS-1365, EFS-2126, EFS-2149, EFS-2168, EFS-3224, EFS-3242, EFS-4314, EMR-1322B, PCC-3263, WEL-1115, WIS-2317

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Electrified Mortise Lock	BAA 1164 V21 PHR NAC-82281 LNL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Acoustic Seal Set	PEMKOSTCSET-1C	BL	PE
1	Card Reader (DIV 28)	By security contractor		OT
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Extending deadbolt from inside disables remote access control unlocking.

Set: 83.0
Doors: DTL-4139-1, DTL-4139-2, DTL-4140-1, DTL-4140-2, DTL-4153, DTY-1140B, EMR-1279-1, EMR-1279-2, EMR-1384, IMG-1230, IPC-3302A, ITS-2204, MHS-3313, OEH-2224, OEH-2225, PCC-3118, PCC-3120, PCC-3121, PCC-3223, PCC-3224, PCC-3225, PCC-3226, PCC-3228, PCC-3249, PCC-3277, PCC-3287, PHM-1185-1, PHM-1185-2, PHM-1187-1, PUB-2056, PVM-2113, PVM-2127, PVM-2128, RES-4257, RHB-4277, RHB-4305, SCC-4199, SCC-4212-1, SCC-4212-2, SUR-2251, WEL-1108-1, WEL-1108-2, WIC-1125, WIC-1127, WIS-2298, WIS-2309

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Armor Plate	K1050 (-F) 34" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 83.1
Doors: PHM-1187-2

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Card Reader/KP Lock	1164 SN210-10XG271 FIKPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Armor Plate	K1050 (-F) 40" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Edge Guard	305 (-UL) 40" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering a correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 83.2
Doors: MSP-2353-2

1	Electrified Top Pivot	EH340 QC-6	626	RF	⚡
1	Center Hung Bottom Pivot	128-3/4	626	RF	
1	Electrified Deadlatch	4300-M	628	AD	⚡
1	Double Lipped Strike	4901-2 center hung, verify length and extended lip sizes	630	AD	
1	Paddle Operator	4591	US26D	AD	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Mortise Cylinder	1164 42	US32D	SA	
1	Push Plate	70F CFC	US32D	RO	
1	Concealed Closer	73N	689	RF	
1	Card Reader (DIV 28)	By security contractor		OT	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	By security contractor		OT	
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Special wire channel required in door from top pivot to electric deadlatch. | Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking deadlatch for entry. | Free egress from non-secure side via paddle operator at all times. | Electric deadlatch is fail secure and stays locked from the secure side during alarm/power loss.

Set: 84.0
Doors: PRS-2338-1

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Armor Plate	K1050 (-F) 34" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	305CR		PE
1	Sweep	315CN		PE
1	Threshold	271A		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 85.0
Doors: ADM-4312-2, CLE-2231

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer (HO)	TB 351 CPSH	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 86.0
Doors: DTL-4111-1

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surf Overhead Hold Open	9-_26	630	RF
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 87.0
Doors: CLE-2227, DTY-1140-2, EFS-2150, EMR-1251A, EMR-1315, EMS-1375, EVS-1112, EVS-1114, EVS-1122, EVS-1144A, EVS-1156, EVS-1193, EVS-1246, EVS-1289, EVS-1366, EVS-2115, EVS-2122A, EVS-2197, EVS-2222, EVS-2243, EVS-2274, EVS-2300, EVS-2349, EVS-2365, EVS-2403, EVS-3243, EVS-3264, EVS-3294, EVS-4215, EVS-4268, EVS-4273, EVS-4307, EVS-4308, EVS-4332, FAC-2153, ITS-2208, MCH-1029, MCH-1114A, MHS-3298, OEH-2405, PCC-3185, PCC-3252, PHM-1189, PHM-1190, PHM-1191, PUB-2055, RHB-4283, SCC-4229-1, SCC-4229-2, SCC-4230-1, SCC-4230-2, TCC-2106, WIS-2303

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 87.1
Doors: MCH-2085, MDF-1329, SCC-4255

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 88.0
Doors: EMS-1365-2

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	305CR		PE
1	Sweep	315CN		PE
1	Threshold	2716A		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 89.0

Doors: IDF-1019, IDF-1054, IDF-1330, IDF-2013, IDF-2045, IDF-2057, IDF-3016, IDF-3038, IDF-4008, IDF-4038, IDF-4058, MDF-1013, MDF-2075, PHM-1167-2, PHM-1168-2, PHM-1169-2, PHM-1170-2, PHM-1171-2, PHM-1172-2, PHM-1173-2, PHM-1194-2, PHM-1195-2

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Card Reader/KP Lock	1164 SN210-10XG271 FIKPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Gasketing	S44BL		PE	
1	Gasketing	S773BL		PE	
1	Acoustic Corner Pad	ACP112BL/2		PE	
1	Door Bottom	3692APK773BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad lock has an integral REX and DPS.

Set: 89.1

Doors: IDF-3058, IPC-3254, PHM-1177-1, PHM-1177-2, PHM-1188-2, SEC-2146-1, SEC-2146-2, SEC-2147A, WIS-2301-1, WIS-2301-2, WIS-2305-1, WIS-2305-2

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Card Reader/KP Lock	1164 SN210-10XG271 FIKPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad lock has an integral REX and DPS.

Set: 90.0
Doors: TCC-2105C

2	Continuous Hinge	FM300	630	MR
2	Roller Latch	592	US26D	RO
2	Pull	856-RKW	US26D	RO
2	Surf Overhead Stop	9-_36	630	RF
2	Silencer	608-RKW		RO

Set: 91.0
Doors: IPC-3274, WIS-2290

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader/KP Lock	1164 SN210-10XG271 FIKPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad lock has an integral REX and DPS.

Set: 92.0
Doors: ADM-4317, ADM-4389-2, DTL-4141-2, DTL-4143-1, EMR-1280-1, EMR-1280-2, INF-1327, PVM-2111, WEL-1133-1, WEL-1134-1

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surf Overhead Stop	9-_36	630	RF	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 93.0
Doors: EFS-2188-2, IPC-3247

1	Continuous Hinge	FM300 CTP	630	MR	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surf Overhead Stop	9-_36	630	RF	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 94.0
Doors: LAB-3241

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Acoustic Seal Set	PEMKOSTCSET-1C	BL	PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 94.1
Doors: DTL-4173

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 95.0
Doors: EMR-1304-1

1	Continuous Wire Hinge	FM300 HT EL WEP TORX	630	MR
1	Fail Secure Lock (LIG RESISTANT)	BAA 1164 10XG71		
BHW		US32D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Kick Plate	K1050 10" CSK TORX	US32D	RO
1	Ligature Resistant Wall Stop	Kingsway KG182	US32D	OT
1	Gasketing (LIGATURE RESISTANT)	P88BL		PE
1	Card Reader (DIV 28)	By security contractor		OT
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Door Position Switch (DIV 28)	By security contractor		OT
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | All behavioral health areas that are exposed to patients shall have tamper resistant torx fasteners.

Set: 96.0
Doors: PHM-1166-1

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader/KP Lock	1164 SN210-10XG271 FIKPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Video Intercom	By security contractor		OT
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad or by remote release via video intercom, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad lock has an integral REX and DPS.

Set: 97.0
Doors: SEC-2147

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader/KP Lock	1164 SN210-10XG271 FIKPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Intercom	By security contractor		OT
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad lock has an integral REX and DPS.

Set: 98.0
Doors: COR-4054, OEH-2210, PFS-2236B

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Video Intercom	By security contractor		OT
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader or by remote release via video intercom, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 99.0
Doors: RES-4247

1	Continuous Hinge	FM300 CTP	630	MR
1	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Video Intercom	By security contractor		OT
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader or by remote release via video intercom, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 100.0
Doors: FAC-2164, FAC-2165, FAC-2166

1	Continuous Hinge	FM300 CTP	630	MR
1	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 101.0
Doors: EVS-1227B

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
3	Silencer	608-RKW		RO
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 101.1
Doors: TCC-2105B-2

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 102.0
Doors: ELV-2016, EMR-1313-2, EMR-2334, LAB-1202, OEH-2402, PCC-3170, SCC-4176

1	Continuous Hinge	FM300 CTP	630	MR
1	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 103.0
Doors: DTL-4150, EMR-1385, EMS-1379, EVS-2329, EVS-2331, IPC-3265A, IPC-3265B, ITS-2202, OEH-2398, OEH-2401, SCC-4232, SUR-2256

1	Continuous Hinge	HG305 CTP AS	630	MR
1	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Armor Plate	K1050 (-F) 34" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO
1	Gasketing	S44BL		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 104.0
Doors: IPC-3260A, IPC-3260B

1	Continuous Hinge	HG305 CTP AS	630	MR	
1	Electric Power Transfer	EL-CEPT	630	SU	⚡
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surf Overhead Stop	9-_36	630	RF	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Armor Plate	K1050 (-F) 34" CSK	US32D	RO	
1	Edge Guard	305 (-UL) 34" CUTOUT(S)	US32D	RO	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 105.0
Doors: WIS-2316-1

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Fail Safe Lock	BAA RX 1164 10XG70 LL NC-B14	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Wiring Diagram	Point to point system		AK	
1	Door Position Switch (DIV 28)	DPS-W		SU	⚡
1	Pushbutton	TS-2 SPL Legend "PUSH TO LOCK"		AK	⚡
1	LED Status Indicator	RP-09L GRN "VACANT"/RED "OCCUPIED"		AK	

Notes: Operation description provided with wiring and riser diagrams. Interlock with door WIS-2316-2 set 108.0. Power supply and relay included in hardware set 108.0.

Set: 106.0
Doors: WIS-2313-1

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Fail Safe Lock	BAA RX 1164 10XG70 LL NC-B14	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 CPS	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Relay	RLP-24		SU	⚡
1	Wiring Diagram	Point to point system		AK	
1	Door Position Switch (DIV 28)	DPS-W		SU	⚡
1	Pushbutton	TS-2 SPL Legend "PUSH TO LOCK"		AK	⚡
1	LED Status Indicator	RP-09L GRN "VACANT"/RED "OCCUPIED"		AK	
1	Power Supply	AQL4-R8E1		SU	⚡

Notes: Operation description provided with wiring and riser diagrams. Interlock with doors WIS-2313-2 Set 107.0.

Set: 107.0
Doors: WIS-2313-2

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Surface Bolt	630-8	US26D	RO	
1	Fail Safe Lock	BAA RX 1164 10XG70 LL NC-B14	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 CPS	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	DPS-W		SU	⚡
1	Pushbutton	TS-2 SPL Legend "PUSH TO LOCK"		AK	⚡
1	LED Status Indicator	RP-09L GRN "VACANT"/RED "OCCUPIED"		AK	

Notes: Interlock with door WIS-2313-1. | Surface bolt shall be installed on non-corridor door for staff to lock and unlock bolt as needed. Power supply and relay included in hardware set 106.0.

Set: 108.0
Doors: IMG-1233-2, WIS-2316-2

2	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Fail Safe Lock	BAA RX 1164 10XG70 LL NC-B14	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 O/P9	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Relay	RLP-24		SU	⚡
1	Door Position Switch (DIV 28)	DPS-W		SU	⚡
1	Pushbutton	TS-2 SPL Legend "PUSH TO LOCK"		AK	⚡
1	LED Status Indicator	RP-09L GRN "VACANT"/RED "OCCUPIED"	AK		
1	Power Supply	AQL4-R8E1		SU	⚡

Notes: Interlock with doors IMG-1233-1 Set 131.0 and WIS-2316-1 Set 105.0.

Set: 109.0

Set not used

Set: 110.0
Doors: ELV-2011

2	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK	
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK	⚡
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 CPS	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	S44BL		PE	
1	Gasketing	S773BL		PE	
1	Acoustic Corner Pad	ACP112BL/2		PE	
1	Door Bottom	3692APK773BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 111.0
Doors: DTY-1157, FAC-2156, RHB-4050-1, SCC-4192

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Storeroom Lock	BAA 1164 10XG04 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 111.1
Doors: EVS-2361

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
3	Silencer	608-RKW		RO
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Door Position Switch (DIV 28)	By security contractor		OT
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader and/or entering correct PIN at keypad, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader/keypad lock has an integral REX and DPS.

Set: 112.0
Doors: EMS-2390A, EVS-2395, MCH-2078, MCH-2079, MCH-3067

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Storeroom Lock	BAA 1164 10XG04 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 113.0
Doors: OEH-2399

1	Continuous Hinge	FM300	630	MR
1	Storeroom Lock	BAA 1164 10XG04 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 114.0
Doors: PCC-3122-1, PCC-3278-1, PCC-3278-2

3	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Rim Exit Device, Classroom	BAA 1164 PE8813 NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 115.0
Doors: PCC-3161, PCC-3281, PCC-3282, WIC-1126, WIC-1128, WIC-1129, WIC-1130

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Acoustic Seal Set	PEMKOSTCSET-1C	BL	PE

Set: 115.1
Doors: MHS-3300, MHS-3303, MHS-3320

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE

Set: 116.0
Doors: DTY-1150

3	Hinge, Full Mortise	TA2714 x USA	US26D	MK
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE
1	Video Intercom	By security contractor		OT

Set: 117.0
Doors: ADM-4318, ADM-4319, ADM-4320, ADM-4321, ADM-4333, ADM-4334, ADM-4335, ADM-4336, ADM-4344, ADM-4345, ADM-4346, ADM-4347, ADM-4351, ADM-4352, ADM-4353, ADM-4356, ADM-4357, ADM-4358, ADM-4359, ADM-4360, ADM-4361, ADM-4362, ADM-4364, ADM-4367, ADM-4371, ADM-4372, ADM-4373, ADM-4374, ADM-4375, ADM-4377, ADM-4378, ADM-4381, ADM-4382, ADM-4383, ADM-4384, ADM-4386, CLE-2230, CUP-2369A, DTL-4147, DTL-4148, DTY-1153, EMR-1258, EMS-1376, EVS-2321, EVS-2322, EVS-2323, EVS-2324, EVS-2325, EVS-2326, FAC-2161, FAC-2162, FAC-2163, INF-1328, ITS-2203, ITS-2205, ITS-2206, ITS-2207, ITS-2209, LAB-1334, LAB-1335, LAB-1336, MHS-3314, MHS-3316, MHS-3317, MHS-3318, MSP-2355-2, OEH-2218, OEH-2219, PCC-3115, PCC-3116, PCC-3123, PCC-3133, PCC-3134, PCC-3154, PCC-3156, PCC-3157, PCC-3158, PCC-3159, PCC-3192, PCC-3215-1, PHM-1174, PHM-1175, PHM-1176, PRS-2345, PRS-2346, PVM-2120, PVM-2123, PVM-2129, PVM-2130, PVM-2131, PVM-2135, PVM-2136, PVM-2137, PVM-2138, PVM-2140, PVM-2141, RES-2124, RES-2125, RES-4261, RES-4262, RES-4263, RES-4264, RHB-4269, RHB-4270, RHB-4276, SCC-4195, SCC-4197, SCC-4213, SEC-2143, SEC-2145, SUR-2250, SUR-2254, SUR-2255, SUR-2279, WEL-1113, WEL-1117, WEL-1118, WIS-2296

3	Hinge, Full Mortise	TA2714 x USA	US26D	MK
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 117.1
Doors: EMR-1295, PHM-1168-1, RES-4249, RHB-4304

3	Hinge, Full Mortise	TA2714 x USA	US26D	MK
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE

Set: 117.2
Doors: WIS-2311A, WIS-2311C

3	Hinge, Full Mortise	TA2714 x USA	US26D	MK	
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15		SA
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Acoustic Seal Set	PEMKOSTCSET-1C	BL	PE	

Set: 118.0
Doors: ADM-4366, ADM-4368

3	Hinge, Full Mortise	TA2714 x USA	US26D	MK	
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15		SA
1	Surf Overhead Stop	9-_36	630	RF	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	S44BL		PE	

Set: 119.0
Doors: CLE-2226, CLE-2233-2, COM-1134, COM-1135, COM-1136, COM-1137, COM-1138, DTL-4162, EMR-1259, PCC-3186, PCC-3214, PCC-3221, PCC-3248, PCC-3256, PCC-3284, PCC-3289, PCC-3290, PCC-3291, PCC-3293, PCC-3295, PCC-3296, PRC-3240, RHB-4285

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15		SA
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Gasketing	S44BL		PE	

Set: 119.1
Doors: PCC-3132-1

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15		SA
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Wall Stop	400	US26D	RO	
1	Acoustic Seal Set	PEMKOSTCSET-1C	BL	PE	

Set: 119.2
Doors: MHS-3307, MHS-3308, MHS-3309, MHS-3310, MHS-3311, MHS-3319, MHS-3321, MHS-3322, MHS-3323, PCC-3236, PCC-3237, PHM-1169-1, PHM-1170-1, PHM-1171-1, PHM-1172-1, PHM-1173-1, SCC-4201-1, SCC-4202-1, SCC-4227-1

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE

Set: 120.0
Doors: PCC-3280, PRC-3239

1	Continuous Hinge	FM300	630	MR
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE

Set: 121.0
Doors: MSP-2354-1, MSP-2354-2

1	Continuous Hinge	FM300	630	MR
1	Storeroom Lock	BAA 1164 10XG04 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 122.0
Doors: ADM-4313, COR-4025, IMG-1219, IMG-1225, IPC-3289, IPC-3302, LAB-1337-1, MSP-2355-1, OEH-2214, OEH-2214A, PCC-3179-1, PCC-3179-2, PCC-3193-1, PCC-3193-2, PFS-1039A, PRS-2343, PVM-2107A, SCC-4173-2

3	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Entry/Office Lock	BAA 1164 10XG05 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 123.0
Doors: COR-1049B, IMG-1047A, IPC-3248, RHB-4275A, WIS-2310

6	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Automatic Flush Bolt Set	2962	US32D	RO
1	Dust Proof Strike	570	US26D	RO
1	Classroom Lock 3/4" latch	BAA 41 1164 10XG37 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Coordinator	2600 x FB	US28	RO
2	Closer Mounting Bracket	2601D as required	US28	RO
2	Surface Closer	TB 351 O/P9	EN	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
2	Wall Stop	400	US26D	RO
1	Overlapping Astragal	355CS		PE
1	Meeting Edge Seal	S772BL		PE
1	Gasketing	S44BL		PE

Notes: Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 123.1
Doors: WIS-2291

6	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Automatic Flush Bolt Set	2962	US32D	RO
1	Dust Proof Strike	570	US26D	RO
1	Classroom Lock 3/4" latch	BAA 41 1164 10XG37 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Coordinator	2600 x FB	US28	RO
2	Closer Mounting Bracket	2601D as required	US28	RO
1	Surface Closer	TB 351 O/P9	EN	SA
1	Surface Closer	TB 1601 P (inactive leaf)	689	NO
2	Kick Plate	K1050 10" CSK	US32D	RO
2	Wall Stop	400	US26D	RO
1	Overlapping Astragal	355CS		PE
1	Meeting Edge Seal	S772BL		PE
1	Gasketing	S44BL		PE

Notes: Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 124.0
Doors: EMR-1296, EMR-1297

1	Continuous Hinge	FM300 HT WEP TORX	630	MR
1	Classroom Lock (LIG RESISTANT)	BAA 1164 10XG37 BHW	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Concealed Closer	91BHN	689	NO
1	Kick Plate	K1050 10" CSK TORX	US32D	RO
1	Ligature Resistant Wall Stop	Kingsway KG182	US32D	OT
1	Gasketing (LIGATURE RESISTANT)	P88BL		PE

Notes: All behavioral health areas that are exposed to patients shall have tamper resistant torx fasteners.

Set: 125.0
Doors: LAB-1345A

3	Hinge, Full Mortise	TA2714 NRP x USA	US26D	MK
1	Classroom Lock	BAA 1164 10XG37 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surf Overhead Stop	9-_36	630	RF
3	Silencer	608-RKW		RO

Set: 126.0
Doors: MSP-2359-2

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Classroom Lock	BAA 1164 10XG37 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
3	Silencer	608-RKW		RO

Set: 127.0
Doors: MSP-2359-1, WIS-2308

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Classroom Lock	BAA 1164 10XG37 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 128.0
Doors: EMR-1288

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Classroom Lock	BAA 1164 10XG37 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Armor Plate	K1050 (-F) 34" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 129.0

Set not used

Set: 130.0
Doors: DTL-4141B, DTL-4143B, SUR-2277B, SUR-2278B

3	Hinge, Full Mortise	TA2714 x USA	US26D	MK
1	Indicator Privacy Lock	BAA 10XU65 VSLL V33	US26D	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Mop Plate	K1050 6" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Coat Hook	RM802	US32D	RO

Set: 131.0
Doors: IMG-1233-1

1	Pivot Set	L147	626	RF	
1	Electrified Inter Pivot	EML19 QC-6	626	RF	⚡
1	Surface Bolt	630-8	US26D	RO	
1	Fail Safe Lock	BAA RX 1164 10XG70 LL NC-B14	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer	TB 351 CPS	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	S44BL		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Door Position Switch (DIV 28)	DPS-W		SU	⚡
1	Pushbutton	TS-2 SPL Legend "PUSH TO LOCK"		AK	⚡
1	LED Status Indicator	RP-09L GRN "VACANT"/RED "OCCUPIED"		AK	

Notes: Interlock with door IMG-1233-2 Set 108.0. Surface bolt shall be installed on non-corridor door for staff to lock and unlock bolt as needed. Power supply and relay included in hardware set 108.0.

Set: 132.0
Doors: EMS-2391, EMS-2394

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Indicator Privacy Lock	BAA 10XU65 VSLL V33	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE

Set: 133.0

Doors: DTL-4106, DTL-4107, DTL-4135, DTL-4171, EMR-1254, EMR-1255, EMR-1256, EMR-1305, EMR-1306, EMR-1312, IMG-1212, IMG-1215, IMG-1250, LAB-1203, LAB-1204, MHS-3301, MHS-3302, PCC-3125, PCC-3151, PCC-3191, PCC-3218, PCC-3259, PCC-3285, PFS-1103, PFS-1104, PFS-4101, PFS-4102, PFS-4245, PFS-4246, PVM-2110, PVM-2112, RHB-4301, SCC-4238, SCC-4243, SCC-4244, SUR-2259, WIC-1124

1	Cont Hinge, Double Swing	DSH1000-__C		PE
1	Indicator Privacy Lock	BAA 10XU65 VSLL V33	US26D	SA
1	Concealed Closer	73ERN	689	RF
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Mop Plate	K1050 6" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Emergency Stop	ERSBH__C-NBPxHT		PE

Notes: Frame requires continuous hinge reinforcement.

Set: 134.0

Doors: ADM-4310, ADM-4330, DTL-4108, DTL-4112, DTL-4159, EFS-2335A, EFS-2335B, EFS-2335C, EFS-3227, EFS-3228, EMR-1284, EMR-1285, EMR-1286, IMG-1224, IPC-3252A, IPC-3288, IPC-3301, MCH-2335, MHS-3315, OEH-2210A, PCC-3181, PCC-3182, PCC-3190, PCC-3217, PCC-3254, PHM-1161, PHM-1196, PHM-1197, RES-4256, RHB-4039, SCC-4194, SCC-4203, SCC-4249, SCC-4250, WEL-1120, WEL-1121

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Keypad Lock	DL4100 IC R Indicator Privacy	US26D	AL
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Mop Plate	K1050 6" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 135.0

Doors: ADM-4328, ADM-4329, ADM-4331, ADM-4341, ADM-4342, ADM-4343, CUP-2368A, DTL-4141A, DTL-4143A, EFS-2327, EMR-1308, EMR-1322A, EMS-1367, EMS-2392, EMS-2393, FAC-2152A, IMG-1218, IMG-1226D, IMG-1231, IPC-3245A, IPC-3247A, LAB-1327, LAB-1328, MSP-2367A, OEH-2404, PCC-3129, PFS-3144, PFS-3145, PHM-1177A, PHM-1178, PRC-3236, PVM-2119, PVM-2121, SUR-2252, SUR-2257, SUR-2277C, SUR-2278C, WIS-2302, WIS-2311B

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Indicator Privacy Lock	BAA 10XU65 VSLL V33	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Mop Plate	K1050 6" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 135.1
Doors: WIC-1132

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Indicator Privacy Lock	BAA 10XU65 VSLL V33	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Mop Plate	K1050 6" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Acoustic Seal Set	PEMKOSTCSET-1C	BL	PE

Set: 136.0
Doors: SCC-4180

1	Continuous Hinge	FM300	630	MR
1	Indicator Privacy Lock	BAA 10XU65 VSLL V33	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Mop Plate	K1050 6" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 137.0
Doors: RHB-4302, WIS-2303A, WIS-2307A

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Indicator Privacy Lock	BAA 10XU65 VSLL V33	US26D	SA
1	Surface Closer	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Mop Plate	K1050 6" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 138.0
Doors: SUR-2258A

1	Continuous Hinge	FM300	630	MR
1	Indicator Privacy Lock	BAA 10XU65 VSLL V33	US26D	SA
1	Surface Closer	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Mop Plate	K1050 6" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 139.0
Doors: EMR-1260-1, EMR-1261-1, EMR-1262-1, EMR-1263-1, EMR-1264-1, EMR-1265-1, EMR-1266-1, EMR-1267-1, EMR-1268-1, EMR-1270-1, EMR-1271-1, EMR-1290-1, EMR-1291-1, EMR-1292-1

6	Hinge, Swing Clear, Hvy Wt	T4A3795 x USA	US26D	MK
1	Self-latching Top Bolt	2905	US26D	RO
1	Hospital Latch	24 115	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Surface Closer	TB 1601 P (inactive leaf)	689	NO
2	Kick Plate	K1050 10" CSK	US32D	RO
2	Wall Stop	400	US26D	RO
1	Overlapping Astragal	355CS		PE
1	Meeting Edge Seal	S772BL		PE
1	Gasketing	S44BL		PE

Notes: Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 140.0
Doors: IPC-3249A

6	Hinge, Swing Clear, Hvy Wt	H T4A3795 x USA	US26D	MK
1	Self-latching Top Bolt	2905	US26D	RO
1	Hospital Latch	24 115	US26D	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
2	Wall Stop	400	US26D	RO
1	Overlapping Astragal	355CS		PE
1	Meeting Edge Seal	S772BL		PE
1	Gasketing	S44BL		PE

Notes: Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 141.0
Doors: IPC-3299A

6	Hinge, Swing Clear, Hvy Wt	H T4A3795 x USA	US26D	MK
1	Self-latching Top Bolt	2905	US26D	RO
1	Hospital Latch	24 115	US26D	SA
2	Surf Overhead Stop	9-_36	630	RF
2	Kick Plate	K1050 10" CSK	US32D	RO
1	Overlapping Astragal	355CS		PE
1	Meeting Edge Seal	S772BL		PE
1	Gasketing	S44BL		PE

Notes: Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 142.0
Doors: WIS-2286, WIS-2287, WIS-2288, WIS-2289

6	Hinge, Swing Clear, Hvy Wt	H T4A3795 x USA	US26D	MK
1	Self-latching Top Bolt	2905	US26D	RO
1	Hospital Latch	24 115	US26D	SA
1	Surf Overhead Stop	9-_36	630	RF
2	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Overlapping Astragal	355CS		PE
1	Meeting Edge Seal	S772BL		PE
1	Gasketing	S44BL		PE

Notes: Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 143.0
Doors: DTY-1146

6	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Dust Proof Strike	570	US26D	RO
1	Combination Flush Bolt Set	2845/2945	US32D	RO
1	Passage Latch	BAA 10XU15 LL	US26D	SA
1	Coordinator	2600 x FB	US28	RO
2	Closer Mounting Bracket	2601D as required	US28	RO
2	Surface Closer	TB 351 O/P9	EN	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
1	Overlapping Astragal	355CS		PE
1	Gasketing	S44BL		PE

Notes: Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 144.0
Doors: IMG-1220, IMG-1221A

2	Pivot Set	L147	626	RF
2	Intermediate Pivot	ML19	626	RF
1	Automatic Flush Bolt Set	2962	US32D	RO
1	Dust Proof Strike	570	US26D	RO
1	Hospital Latch	24 74-Pull 115	US26D	SA
1	Coordinator	2600 x FB	US28	RO
2	Closer Mounting Bracket	2601D as required	US28	RO
2	Surface Closer	TB 351 O/P9 Lead Line Cover	EN	SA
2	Armor Plate	K1050 (-F) 40" CSK	US32D	RO
2	Wall Stop	400	US26D	RO
2	Edge Guard	305 (-UL) 40" CUTOUT(S)	US32D	RO
1	Lead-lined Astragal	Door manufacturer		OT
1	Meeting Edge Seal	S772BL		PE
1	Gasketing	S44BL		PE

Set: 145.0
Doors: IMG-1237-1, IMG-1247-2

2	Pivot Set	L147	626	RF
2	Intermediate Pivot	ML19	626	RF
1	Automatic Flush Bolt Set	2962	US32D	RO
1	Dust Proof Strike	570	US26D	RO
1	Hospital Latch	24 74-Pull 115	US26D	SA
1	Coordinator	2600 x FB	US28	RO
2	Closer Mounting Bracket	2601D as required	US28	RO
2	Surf Overhead Stop	9-_36	630	RF
1	Surface Closer	TB 351 O/P9 Lead Line Cover	EN	SA
1	Surface Closer	TB 1601 P (inactive leaf)	689	NO
2	Armor Plate	K1050 (-F) 40" CSK	US32D	RO
2	Edge Guard	305 (-UL) 40" CUTOUT(S)	US32D	RO
1	Lead-lined Astragal	Door manufacturer		OT
1	Meeting Edge Seal	S772BL		PE
1	Gasketing	S44BL		PE

Set: 146.0
Doors: ELV-2015A, ELV-2033, ELV-2059, ELV-3049, ELV-4049

6	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Dust Proof Strike	570	US26D	RO
1	Automatic Flush Bolt Set	2842	US32D	RO
1	Storeroom Lock 3/4" latch	BAA 41 1164 10XG04 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Coordinator	2600 x FB	US28	RO
2	Closer Mounting Bracket	2601D as required	US28	RO
2	Surface Closer	TB 351 O/P9	EN	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
2	Electromagnetic Holder	998M x voltage	689	RF
1	Overlapping Astragal	355CS		PE
1	Meeting Edge Seal	S772BL		PE
1	Gasketing	S44BL		PE

Notes: Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 146.1
Doors: ELV-5002-1

6	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK	
1	Dust Proof Strike	570	US26D	RO	
1	Automatic Flush Bolt Set	2842	US32D	RO	
1	Storeroom Lock 3/4" latch	BAA 41 1164 10XG04 LL	US26D	SA	
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Electric Strike	310-2-3/4	630	FO	⚡
1	Coordinator	2600 x FB	US28	RO	
2	Surf Overhead Stop	9-_36	630	RF	
1	Automatic Opener (PAIR)	D6011/D6061	689	NO	⚡
2	Kick Plate	K1050 10" CSK	US32D	RO	
1	Overlapping Astragal	355CS		PE	
1	Gasketing	305CR		PE	
2	Sweep	368CN		PE	
1	Aluminum Plate	18/1A x 5" wide		PE	
2	Wave to Open Wall Switch	700		NO	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Coordinate description of operation with security. Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 147.0
Doors: ELV-5001-3, ELV-5001-4

6	Hinge, Full Mortise, Hvy Wt	T4A3386 x USA	US32D	MK
1	Dust Proof Strike	570	US26D	RO
1	Automatic Flush Bolt Set	2842	US32D	RO
1	Storeroom Lock 3/4" latch	BAA 41 1164 10XG04 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Coordinator	2600 x FB	US28	RO
2	Closer Mounting Bracket	2601D as required	US28	RO
2	Surface Closer	TB 351 CPS	EN	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
1	Overlapping Astragal	355CS		PE
1	Gasketing	305CR		PE
2	Sweep	315CN		PE
1	Threshold	2716A		PE

Notes: Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 147.1
Doors: ELV-5001-2

6	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK
1	Electric Power Transfer	EL-CEPT	630	SU
1	Dust Proof Strike	570	US26D	RO
1	Automatic Flush Bolt Set	2842	US32D	RO
1	Card Reader Lock	1164 41 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Coordinator	2600 x FB	US28	RO
2	Closer Mounting Bracket	2601D as required	US28	RO
2	Surface Closer	TB 351 CPS	EN	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
1	Overlapping Astragal	355CS		PE
1	Gasketing	305CR		PE
2	Sweep	315CN		PE
1	Threshold	2716A		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Door Position Switch (DIV 28)	By security contractor		OT
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.| Provide lock strike plate with special length lip so not to cut the astragal for outswing doors. Astragal to be installed on keyed side to protect the latch for both active or inactive door leaves as required.

Set: 148.0
Doors: EMS-2388

6	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
2	Surface Vert Rod Exit, Passage	BAA 12 NBPE8715 NEL	US32D	SA
2	Surface Closer	TB 351 O/P9	EN	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
2	Wall Stop	400	US26D	RO
2	Meeting Stile Seal	29310CS		PE
1	Gasketing	S44BL		PE

Set: 149.0
Doors: PCC-3269-1, PCC-3270-1, PCC-3271-1, PCC-3273-1, PCC-3274-1, PCC-3275-1

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Acoustic Seal Set	PEMKOSTCSET-1C	BL	PE

Set: 149.1
Doors: PCC-3268-1, PCC-3272-1, RHB-4289, RHB-4303A, RHB-4303B, SCC-4191B-1

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE

Set: 150.0
Doors: EMR-1298, EMR-1300-1, EMR-1301-1, EMR-1302-1, EMR-1303-1

1	Continuous Hinge	FM300 HT WEP TORX	630	MR
1	Passage Latch (LIG RESISTANT)	BAA 10XU15 BHW	US32D	SA
1	Kick Plate	K1050 10" CSK TORX	US32D	RO
1	Ligature Resistant Wall Stop	Kingsway KG182	US32D	OT
1	Gasketing (LIGATURE RESISTANT)	P88BL		PE

Notes: All behavioral health areas that are exposed to patients shall have tamper resistant torx fasteners.

Set: 151.0
Doors: EMR-1294, PCC-3212-1, PHM-1194-1, SCC-4190

1	Continuous Hinge	FM300	630	MR
1	Hospital Latch	115	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE

Set: 151.1
Doors: IMG-1213, IMG-1214

1	Continuous Hinge	FM300	630	MR
1	Hospital Latch	115	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 152.0
Doors: IMG-1216

1	Continuous Hinge	FM300	630	MR
1	Hospital Latch	115	US26D	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 152.1
Doors: PVM-2109

1	Continuous Hinge	FM300	630	MR
1	Hospital Latch	115	US26D	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE

Set: 153.0
Doors: DTL-4163, DTL-4166, EMR-1260-2, PCC-3106-1, PCC-3107-1, PCC-3108-1, PCC-3109-1, PCC-3110-1, PCC-3111-1, PCC-3112-1, PCC-3113-1, PCC-3127-1, PCC-3128-1, PCC-3130-1, PCC-3131-1, PCC-3136-1, PCC-3137-1, PCC-3138-1, PCC-3139-1, PCC-3140-1, PCC-3141-1, PCC-3142-1, PCC-3143-1, PCC-3162-1, PCC-3163-1, PCC-3164-1, PCC-3165-1, PCC-3166-1, PCC-3167-1, PCC-3168-1, PCC-3172-1, PCC-3173-1, PCC-3174-1, PCC-3175-1, PCC-3176-1, PCC-3177-1, PCC-3178-1, PCC-3195-1, PCC-3196-1, PCC-3197-1, PCC-3198-1, PCC-3199-1, PCC-3200-1, PCC-3201-1, PCC-3202-1, PCC-3205-1, PCC-3206-1, PCC-3207-1, PCC-3208-1, PCC-3209-1, PCC-3210-1, PCC-3211-1, PCC-3230-1, PCC-3231-1, PCC-3232-1, PCC-3233-1, PCC-3234-1, PCC-3235-1, PCC-3240-1, PCC-3241-1, PCC-3242-1, PCC-3243-1, PCC-3244-1, PCC-3245-1, PCC-3246-1, PCC-3247-1, PCC-3260, PCC-3261, PCC-3262, PHM-1167-1, PHM-1195-1, RES-4253-1, RES-4254-1, SCC-4177, SCC-4181, SCC-4182, SCC-4183, SCC-4184, SCC-4185, SCC-4186, SCC-4187, SCC-4188, SCC-4189, SCC-4191, SCC-4203-1, SCC-4204-1, SCC-4205-1, SCC-4206-1, SCC-4235-1, SCC-4236-1, SCC-4237-1, SCC-4239-1, SCC-4245, SCC-4247-1, SCC-4248-1, SUR-2253, WEL-1105

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE

Set: 153.1
Doors: RES-4266, WIS-2290B, WIS-2312, WIS-2314, WIS-2315

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 154.0
Doors: EMR-1268-2, IMG-1236, IMG-1249

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 154.1
Doors: IPC-3269

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	3692APK773BL		PE

Set: 155.0
Doors: IPC-3297-2, IPC-3299-2

3	Hinge, Full Mortise	H TA2714 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 156.0
Doors: PVM-2117

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 157.0
Doors: IPC-3284, WIS-2305A

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 158.0
Doors: IPC-3249-2, IPC-3255-2

3	Hinge, Full Mortise	H TA2714 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 159.0
Doors: IPC-3255A

3	Hinge, Full Mortise, Hvy Wt	H T4A3786 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 160.0
Doors: EMS-2390

3	Hinge, Full Mortise	TA2714 x USA	US26D	MK
1	Passage Latch	BAA 10XU15 LL	US26D	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 161.0
Doors: IMG-1237-2, IMG-1247-1

1	Pivot Set	L147	626	RF
1	Intermediate Pivot	ML19	626	RF
1	Hospital Latch	74-Pull 115	US26D	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Surface Closer	TB 351 O/P9 Lead Line Cover	EN	SA
1	Armor Plate	K1050 (-F) 40" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 162.0
Doors: DTL-4138-1, DTL-4141-1, DTL-4143-2, EMS-2385, EMS-2389, EMS-2396, MSP-2367, PCC-3135, PCC-3150, PCC-3171, RES-4248

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Passage Latch	BAA 10XU15 LL	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 163.0
Doors: ELV-5001-1

3	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK
1	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	305CR		PE
1	Sweep	315CN		PE
1	Threshold	2716A		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 164.0
Doors: EMS-2387

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Passage Latch	BAA 10XU15 LL	US26D	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 165.0
Doors: IPC-3249B

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 166.0
Doors: LAB-1207

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE
1	Gasketing	S773BL		PE
1	Acoustic Corner Pad	ACP112BL/2		PE
1	Door Bottom	411APKL		PE

Set: 167.0
Doors: IPC-3298, LAB-2190, SUR-2247

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Hospital Latch	115	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 168.0
Doors: COR-2085-1, COR-2085-2

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Passage Latch	BAA 10XU15 LL	US26D	SA
1	Surface Closer (HO)	TB 351 CPSH	EN	SA
1	Armor Plate	K1050 (-F) 34" CSK	US32D	RO
3	Silencer	608-RKW		RO

Set: 169.0
Doors: SUR-2267-2, SUR-2268-2, SUR-2272-2

1	Continuous Hinge	HG305 AS	630	MR
1	Hospital Latch	115	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Armor Plate	K1050 (-F) 40" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Edge Guard	305 (-UL) 40" CUTOUT(S)	US32D	RO
1	Gasketing	S44BL		PE

Set: 170.0
Doors: SUR-2276

1	Continuous Hinge	HG305 AS	630	MR
1	Hospital Latch	115	US26D	SA
1	Surf Overhead Stop	9-_36	630	RF
1	Surface Closer	TB 351 O/P9	EN	SA
1	Armor Plate	K1050 (-F) 40" CSK	US32D	RO
1	Edge Guard	305 (-UL) 40" CUTOUT(S)	US32D	RO
1	Gasketing	S44BL		PE

Set: 171.0
Doors: COR-2053-2

2	Continuous Hinge	HG305 AS	630	MR
2	Push Plate	70C-RKW	US32D	RO
1	Automatic Opener (DE PAIR)	D6001DE	689	NO
2	Armor Plate	K1050 (-F) 40" CSK	US32D	RO
2	Wall Stop	400	US26D	RO
2	Meeting Stile Seal	29326CNB		PE
2	Edge Guard	305 (-UL) 40" CUTOUT(S)	US32D	RO
1	Gasketing	S44BL		PE
2	Wave to Open Wall Switch	700		NO

Set: 172.0
Doors: DTY-1141-1, DTY-1141-2

2	Push Plate	70F	US32D	RO
1	Concealed Closer	73N	689	RF
2	Armor Plate	K1050 (-F) 40" CSK	US32D	RO
2	Wall Stop	400	US26D	RO

Set: 173.0
Doors: EMR-1247, EMR-1248, PFS-1154, PFS-1155, PFS-1198, PFS-1199, PFS-2233, PFS-2234, PFS-3231, PFS-3232, PFS-3265, PFS-3266, PFS-4298, PFS-4299, PVM-2143, PVM-2144

1	Continuous Hinge	FM300	630	MR
1	Push Pull	111x73C/73CL	US32D	RO
1	Automatic Opener (SINGLE)	6011/6061	689	NO
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
3	Silencer	608-RKW		RO
2	Wave to Open Wall Switch	700		NO

Set: 173.1
Doors: EFS-2171, EFS-2177

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Passage Latch	BAA 10XU15 LL	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 174.0
Doors: ADM-4317-1, EMR-1298-2, EMR-1300-2, EMR-1301-2, EMR-1302-2, EMR-1303-2, EMR-1304-2, EMS-1372A-1, EMS-1372A-2, EMS-1372B-1, EMS-1372B-2, EMS-1372C-1, EMS-1372C-2, FAC-2397-1, FAC-2397-3, FAC-2397-4, PRS-2338-3

1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Mortise Cylinder	1164 42	US32D	SA
1	Keyswitch	MK		SU

Balance of hardware by coiling door manufacturer

Notes: Provide keyswitch and cylinder/core or padlock. Verify with manufacturer.

Set: 174.1
Doors: EMR-1314-1

1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Mortise Cylinder	1164 42	US32D	SA
1	Keyswitch	MK		SU

Balance of hardware by automatic sliding door manufacturer

Set: 174.2
Doors: ELV-5001-2A, MSP-2362-1, MSP-2362-2, MSP-2362-3

1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Mortise Cylinder	1164 42	US32D	SA

Balance of hardware by access panel manufacturer

Notes: Verify if cylinder is required with manufacturer.

Set: 174.3
Doors: IMG-1228, IMG-1228A

1	Cylinder	As required		SA

Balance of hardware by MRI manufacturer

Notes: Verify if cylinder is required with manufacturer.

Set: 175.0
Doors: EVS-2382, PRS-2351, PRS-2352, PRS-2375, PRS-2377, PRS-2378, PRS-2379, PRS-2380, PRS-2381, PRS-2383, PRS-2384, YRD-0001-3, YRD-0001-5

1	Armored Door Cord	TSB-C/CXL		SU
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Low Voltage Power (DIV 28)	By security contractor		OT

Balance of hardware by gate supplier

Notes: Gate is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss. | Integrated card reader lock has an integral REX and DPS.

Set: 176.0
Doors: EMS-1373A

All hardware by gate supplier

Set: 177.0
Doors: EMR-1309, EMR-1310, EMR-1311, EMR-1382, EMR-1383, IPC-3249-1, IPC-3255-1, IPC-3256, IPC-3258, IPC-3259, IPC-3263, IPC-3264, IPC-3267, IPC-3268, IPC-3271, IPC-3272, IPC-3275, IPC-3276, IPC-3278, IPC-3279, IPC-3281, IPC-3282, IPC-3285, IPC-3286, IPC-3287, IPC-3295, IPC-3296, IPC-3297-1, IPC-3299, SUR-2258, WEL-1133-2, WEL-1134-2

All hardware by manual sliding door manufacturer

Set: 177.1
Doors: PHM-1180, PHM-1181, PHM-1182

2	Wave to Open Wall Switch	700	NO

Balance of hardware by automatic sliding door manufacturer

Notes: Interlock and automatic operator by door supplier.

Set: 177.2
Doors: IMG-1226-2

1	Gasketing	By manual sliding door manufacturer	OT

Balance of hardware by manual sliding door manufacturer

Set: 177.3
Doors: VST-1000-2, VST-1025-2, VST-1041-2, VST-1045-2, VST-2040-2

All hardware by automatic sliding door manufacturer

Set: 177.4
Doors: VST-1000-1, VST-1025-1, VST-1041-1, VST-1045-1, VST-2040-1

1	Card Reader/Keypad (DIV 28)	By security contractor	OT
1	Video Intercom	By security contractor	OT

Balance of hardware by automatic sliding door manufacturer

Set: 177.5
Doors: PHM-1183

1	Card Reader (DIV 28)	By security contractor		OT
2	Wave to Open Wall Switch	700		NO

Balance of hardware by automatic sliding door manufacturer

Notes: Interlock and automatic operator by door supplier.

Set: 178.0
Doors: DTL-4161A, DTL-4164, DTL-4165, DTL-4167, DTL-4169, DTL-4170, PCC-3106-2, PCC-3107-2, PCC-3108-2, PCC-3109-2, PCC-3110-2, PCC-3111-2, PCC-3112-2, PCC-3113-2, PCC-3127-2, PCC-3128-2, PCC-3130-2, PCC-3131-2, PCC-3136-2, PCC-3137-2, PCC-3138-2, PCC-3139-2, PCC-3140-2, PCC-3141-2, PCC-3142-2, PCC-3143A, PCC-3162-2, PCC-3163-2, PCC-3164-2, PCC-3165-2, PCC-3166-2, PCC-3167-2, PCC-3168-2, PCC-3172-2, PCC-3173-2, PCC-3174-2, PCC-3175-2, PCC-3176-2, PCC-3177-2, PCC-3178-2, PCC-3184, PCC-3195-2, PCC-3196-2, PCC-3197-2, PCC-3198-2, PCC-3199-2, PCC-3200-2, PCC-3201-2, PCC-3202-2, PCC-3205-2, PCC-3206-2, PCC-3207-2, PCC-3208-2, PCC-3209-2, PCC-3210-2, PCC-3211-2, PCC-3212-2, PCC-3230-2, PCC-3231-2, PCC-3232-2, PCC-3233-2, PCC-3234-2, PCC-3235-2, PCC-3240-2, PCC-3241-2, PCC-3242-2, PCC-3243-2, PCC-3244-2, PCC-3245-2, PCC-3246-2, PCC-3247-2, PCC-3268-2, PCC-3269-2, PCC-3270-2, PCC-3271-2, PCC-3272-2, PCC-3273-2, PCC-3274-2, PCC-3275-2, RES-4253-2, SCC-4178, SCC-4191B-2, SCC-4203-2, SCC-4204-2, SCC-4205-2, SCC-4206-2, SCC-4209-1, SCC-4209-2, SCC-4216-1, SCC-4216-2, SCC-4217-1, SCC-4217--2, SCC-4218-1, SCC-4218-2, SCC-4219-1, SCC-4219-2, SCC-4220-1, SCC-4220-2, SCC-4226-1, SCC-4226-2, SCC-4235-2, SCC-4236-2, SCC-4237-2, SCC-4239-2, SCC-4240-1, SCC-4240-2, SCC-4241-1, SCC-4241-2, SCC-4246-2, SCC-4247-2, SCC-4248-2, WIC-1131, WIS-2286C, WIS-2287B, WIS-2288C, WIS-2289C

1	Side Wall Track Kit	280C-SWTKIT x soft close		PE
2	Door Pull	111 Mtg-Type 5 BTB	US32D	RO
2	Gasketing	S773BL face of door to wall		PE
1	Door Bottom	2170_V		PE

Set: 179.0
Doors: PCC-3102, PCC-3103, PCC-3146, PCC-3147, PCC-3148, PCC-3213, PCC-3215-2, PFS-4103, RES-4260, RES-4265, SCC-4175, SCC-4198, SCC-4222, SCC-4223, SCC-4224

1	Side Wall Track Kit	280C-SWTKIT x soft close		PE
1	Dust Proof Strike	570	US26D	RO
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Rim Cylinder	1164 34	US32D	SA
1	Locking Pull	LP3301DBD 05	US32D	RO

Set: 179.1
Doors: PCC-3132-2, RES-4252, RES-4254-2, SCC-4201-2, SCC-4202-2, SCC-4227-2

1	Side Wall Track Kit	280C-SWTKIT x soft close		PE
1	Dust Proof Strike	570	US26D	RO
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Rim Cylinder	1164 34	US32D	SA
1	Locking Pull	LP3301DBD 05	US32D	RO
2	Gasketing	S773BL face of door to wall		PE
1	Door Bottom	2170_V		PE

Set: 180.0
Doors: IPC-3256A, IPC-3258A, IPC-3259A, IPC-3263A, IPC-3264A, IPC-3267A, IPC-3268A, IPC-3271A, IPC-3272A, IPC-3275A, IPC-3276A, IPC-3278A, IPC-3279A, IPC-3281A, IPC-3282A, IPC-3285A, IPC-3286A, IPC-3287A, IPC-3295A, IPC-3296A, IPC-3297A, LAB-3241A, PRC-3237, RHB-4286, RHB-4287, RHB-4288, RHB-4292, RHB-4293, RHB-4294, RHB-4295, WIS-2286A, WIS-2287A, WIS-2288A, WIS-2289A

1	Side Wall Track Kit	280C-SWTKIT x soft close		PE
2	Door Pull	111 Mtg-Type 5 BTB	US32D	RO

Set: 181.0
Doors: SCC-4242

1	Side Wall Track Kit	280C-SWTKIT x soft close		PE
1	Magnetic Lock	M32BD		SU
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Mortise Cylinder	1164 42	US32D	SA
2	Door Pull	111 Mtg-Type 5 BTB	US32D	RO
2	Gasketing	S773BL face of door to wall		PE
1	Door Bottom	2170_V		PE
1	Relay	RB30		AS
1	Wiring Diagram	Point to point system		AK
1	Dress Cover	DC-32CL		SU
1	Motion Sensor	XMS2		SU
1	Pushbutton	EEB3N		SU
1	Keyswitch	MK		SU
1	Power Supply	AQL4-E1 w/fire alarm relay		SU

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily de-energizing mag lock for entry. | Free egress at all times via motion sensor. | Redundant push to exit button. | Mag lock is integrated into the building's fire alarm system and is unlocked during alarm/power loss.

Set: 182.0
Doors: EMR-1261-2, EMR-1262-2, EMR-1263-2, EMR-1264-2, EMR-1265-2, EMR-1266-2, EMR-1267-2, EMR-1270-2, EMR-1271-2, EMR-1272-1, EMR-1272-2, EMR-1273-1, EMR-1273-2, EMR-1290-2, EMR-1291-2, EMR-1292-2

1	Track and Hardware	By STC frame/door sliding door assembly manufacturer Section 083473.20		RS
2	Pull	S3110-B-12.75-0.75	630	RS

Note, at doors EMR-1272-1, EMR-1272-2, EMR-1273-1, EMR-1273-2
Doors to have self-closing and latching hardware for smoke rated doors.

Set: 183.0
Doors: IMG-1235A-2

All hardware by sliding lead-lined door manufacturer

Set: 184.0
Doors: Maintenance Stock

5	Side Wall Track Kit	280C-SWTKIT x soft close		PE
5	Keypad Lock	DL4100 IC R Indicator Privacy	US26D	AL

Set: 185.0
Doors: STR-1030-2, STR-1064-3, STR-1380-3, STR-2020-2, STR-5045-2

All hardware by self-closing stair gate supplier

SEE ADDITIONAL HARDWARE SETS CONTINUED IN THE NEXT PAGES FOR THE FOLLOWING BUILDINGS

BP2 – IHS HOSPITAL UTILITY CAMPUS

BP3 – UTILITY

BP4 – IHS HOSPITAL PUMP HOUSE

CONTINUED NEXT PAGES

BP2 – IHS HOSPITAL UTILITY CAMPUS

1.1 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
   1. Quantities listed are for each pair of doors, or for each single door.
   2. The supplier is responsible for handing and sizing all products.
   3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

B. Manufacturer's Abbreviations:
   1. MK - McKinney
   2. RO - Rockwood
   3. SA - SARGENT
   4. RF - Rixson
   5. PE - Pemko
   6. OT - Other

Hardware Sets

- **This project is designed to meet the Buy American Act.**
- **Waiver may be required to comply with Buy American Act. Compliancy of these products to current Buy American-type regulations must be validated with the manufacturer.**

Set: 1.0
Doors: 1004

5	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK	
1	Electric Hinge, Hvy Wt	T4A3386-QC x USA	US32D	MK	⚡
1	Surface Bolt (bottom)	585-12 Sex Bolts	US26D	RO	
1	Surface Bolt (top)	585-24 Sex Bolts	US26D	RO	
1	Card Reader Lock 3/4" latch	1164 41 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
2	Surface Closer (STOP)	TB 351 CPS	EN	SA	
2	Armor Plate	K1050 (-F) 36" CSK	US32D	RO	
1	Security Astragal	353 x P941		PE	
1	Gasketing	305CR		PE	
1	Rain Guard	346C		PE	
2	Sweep	315CN		PE	
1	Threshold	1716A		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 1.1
Doors: 1003-2

6	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK
2	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader CVR Exit Device	1164 SN210-MDPE8674 FIPS P106 x NEL	US32D	SA
1	CVR Exit Device, Exit Only	BAA 55 MDPE8610 EO	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
2	Surface Closer (STOP)	TB 351 CPS	EN	SA
2	Armor Plate	K1050 (-F) 36" CSK	US32D	RO
2	Meeting Stile Seal	303AS		PE
1	Gasketing	305CR		PE
1	Rain Guard	346C		PE
2	Sweep	315CN		PE
1	Threshold	1716A		PE
2	Frame Wiring Harness	QC-C1500P		MK
2	Door Wiring Harness	QC-C___P as required		MK
1	Door Position Switch (DIV 28)	By security contractor		OT
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever on active leaf for entry. | Free egress at all times. | Electrified device is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader device has an integral REX and DPS.

Set: 2.0
Doors: 1001-1, 1002-1, 1002-3

2	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK
1	Electric Hinge, Hvy Wt	T4A3386-QC x USA	US32D	MK
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Surface Closer (STOP)	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	305CR		PE
1	Rain Guard	346C		PE
1	Sweep	315CN		PE
1	Threshold	2716A		PE
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT
1	Latch Protector	325	US26D	RO

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 3.0
Doors: 1008-2

8	Hinge, Swing Clear, Hvy Wt	T4A3795 x USA	US26D	MK
2	Surface Vert Rod Exit, Passage	BAA NBPE8715 NEL	US32D	SA
2	Surface Closer	TB 351 O/P9	EN	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
2	Wall Stop	400	US26D	RO
2	Silencer	608-RKW		RO

Notes: Template door closers to allow maximum 180 degrees of opening.

Set: 4.0
Doors: 1007

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Flush Bolt Set	2845/2945	US26D	RO
1	Dust Proof Strike	570	US26D	RO
1	Card Reader Lock 3/4" latch	1164 41 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Coordinator	2600 x FB	US28	RO
2	Mounting Bracket	2601D as required	US28	RO
2	Surface Closer (STOP, HO)	TB 351 CPSH	EN	SA
1	Security Astragal	353 x P941		PE
2	Silencer	608-RKW		RO
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 5.0
Doors: 1006

3	Hinge, Full Mortise	TA2714 x USA	US26D	MK
1	Indicator Privacy Lock	BAA 10XU65 VSLL V33	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
1	Gasketing	S44BL		PE

Set: 6.0
Doors: 1010

8	Hinge, Swing Clear, Hvy Wt	T4A3795 x USA	US26D	MK
1	Surface Bolt (bottom)	585-12 Sex Bolts	US26D	RO
1	Surface Bolt (top)	585-24 Sex Bolts	US26D	RO
1	Passage Latch	BAA 10XU15 LL	US26D	SA
2	Surface Closer	TB 351 O/P9	EN	SA
2	Armor Plate	K1050 (-F) 36" CSK	US32D	RO
2	Wall Stop	400	US26D	RO
1	Security Astragal	353 x P941		PE
1	Gasketing	305CR		PE
2	Sweep	315CN		PE
1	Threshold	1716A		PE

Notes: Template door closers to allow maximum 180 degrees of opening.

Set: 7.0
Doors: 1002-4, 1005, 1008-1

3	Hinge, Full Mortise	TA2714 x USA	US26D	MK
1	Passage Latch	BAA 10XU15 LL	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
3	Silencer	608-RKW		RO

Set: 7.1
Doors: 1003-3

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Rim Exit Device, Passage	BAA 12 PE8815 NEL	US32D	SA
1	Surface Closer (STOP)	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 8.0
Doors: 1001-2, 1002-2, 1003-1

1	Hardware	Door manufacturer		OT

CONTINUED NEXT PAGE

BP3 - UTILITY

1.1 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
   1. Quantities listed are for each pair of doors, or for each single door.
   2. The supplier is responsible for handing and sizing all products.
   3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

B. Manufacturer's Abbreviations:
   1. MK - McKinney
   2. RO - Rockwood
   3. SA - SARGENT
   4. RF - Rixson
   5. PE - Pemko
   6. OT - Other

Hardware Sets

- **This project is designed to meet the Buy American Act.**
- **Waiver may be required to comply with Buy American Act. Compliancy of these products to current Buy American-type regulations must be validated with the manufacturer.**

Set: 1.0
Doors: 1003-2

6	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK
2	Electric Power Transfer	EL-CEPT	630	SU
1	Card Reader CVR Exit Device	1164 SN210-MDPE8674 FIPS P106 x NEL	US32D	SA
1	CVR Exit Device, Exit Only	BAA 55 MDPE8610 EO	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
2	Surface Closer (STOP)	TB 351 CPS	EN	SA
2	Armor Plate	K1050 (-F) 36" CSK	US32D	RO
2	Meeting Stile Seal	303AS		PE
1	Gasketing	305CR		PE
1	Rain Guard	346C		PE
2	Sweep	315CN		PE
1	Threshold	1716A		PE
2	Frame Wiring Harness	QC-C1500P		MK
2	Door Wiring Harness	QC-C___P as required		MK
1	Door Position Switch (DIV 28)	By security contractor		OT
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever on active leaf for entry. | Free egress at all times. | Electrified device is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader device has an integral REX and DPS.

Set: 2.0
Doors: 1008

2	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK	
1	Electric Hinge, Hvy Wt	T4A3386-QC x USA	US32D	MK	⚡
1	Rim Exit Device	1164 SN210-PE8876 FIPS NEL	US32D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer (STOP)	TB 351 CPS	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	305CR		PE	
1	Rain Guard	346C		PE	
1	Sweep	315CN		PE	
1	Threshold	2716A		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified device is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 3.0
Doors: 1001-1, 1001-3, 1002-1

2	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x USA	US32D	MK	
1	Electric Hinge, Hvy Wt	T4A3386-QC x USA	US32D	MK	⚡
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer (STOP)	TB 351 CPS	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	305CR		PE	
1	Rain Guard	346C		PE	
1	Sweep	315CN		PE	
1	Threshold	2716A		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	
1	Latch Protector	325	US26D	RO	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail

secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 4.0
Doors: 1007-2

8	Hinge, Swing Clear, Hvy Wt	T4A3795 x USA	US26D	MK
2	Surface Vert Rod Exit, Passage	BAA NBPE8715 NEL	US32D	SA
2	Surface Closer (STOP)	TB 351 CPS	EN	SA
2	Kick Plate	K1050 10" CSK	US32D	RO
2	Silencer	608-RKW		RO

Set: 5.0
Doors: 1005

5	Hinge, Full Mortise, Hvy Wt	T4A3786 NRP x USA	US26D	MK
1	Electric Hinge, Hvy Wt	T4A3786-QC x USA	US26D	MK
1	Flush Bolt Set	2845/2945	US26D	RO
1	Dust Proof Strike	570	US26D	RO
1	Card Reader Lock 3/4" latch	1164 41 SN210-10XG271 FIPS LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Coordinator	2600 x FB	US28	RO
2	Closer Mounting Bracket	2601D as required	US28	RO
2	Surface Closer (STOP, HO)	TB 351 CPSH	EN	SA
1	Security Astragal	353 x P941		PE
2	Silencer	608-RKW		RO
1	Frame Wiring Harness	QC-C1500P		MK
1	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 6.0
Doors: 1006

3	Hinge, Full Mortise	TA2714 x USA	US26D	MK
1	Indicator Privacy Lock	BAA 10XU65 VSLL V33	US26D	SA
1	Surface Closer (STOP)	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 7.0
Doors: 1007-1

8	Hinge, Swing Clear, Hvy Wt	T4A3795 x USA	US26D	MK
1	Surface Bolt (bottom)	585-12 Sex Bolts	US26D	RO
1	Surface Bolt (top)	585-24 Sex Bolts	US26D	RO
1	Passage Latch	BAA 10XU15 LL	US26D	SA
2	Surface Closer (STOP)	TB 351 CPS	EN	SA
2	Armor Plate	K1050 (-F) 36" CSK	US32D	RO
1	Security Astragal	353 x P941		PE
1	Gasketing	305CR		PE
2	Sweep	315CN		PE
1	Threshold	1716A		PE

Set: 8.0
Doors: 1001-4, 1004

3	Hinge, Full Mortise	TA2714 x USA	US26D	MK
1	Passage Latch	BAA 10XU15 LL	US26D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
3	Silencer	608-RKW		RO

Set: 9.0
Doors: 1003-1

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x USA	US26D	MK
1	Rim Exit Device, Passage	BAA 12 PE8815 NEL	US32D	SA
1	Surface Closer (STOP)	TB 351 CPS	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Gasketing	S44BL		PE

Set: 10.0
Doors: 1001-2, 1001-5, 1002-2, 1003-3

1	Hardware	Door manufacturer		OT

CONTINUED NEXT PAGE

BP4 – IHS HOSPITAL PUMP HOUSE

1.1 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
   1. Quantities listed are for each pair of doors, or for each single door.
   2. The supplier is responsible for handing and sizing all products.
   3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

B. Manufacturer's Abbreviations:
   1. MK - McKinney
   2. RO - Rockwood
   3. SA - SARGENT
   4. PE - Pemko
   5. OT - Other

<u>Hardware Sets</u>

- **This project is designed to meet the Buy American Act.**
- **Waiver may be required to comply with Buy American Act. Compliancy of these products to current Buy American-type regulations must be validated with the manufacturer.**

Set: 1.0
Doors: 1004

5	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x BAA	US32D	MK	
1	Electric Hinge, Hvy Wt	T4A3386-QC x BAA	US32D	MK	⚡
1	Surface Bolt (bottom)	585-12 Sex Bolts	US26D	RO	
1	Surface Bolt (top)	585-24 Sex Bolts	US26D	RO	
1	Card Reader Lock 3/4" latch	1164 41 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
2	Surface Closer (STOP)	TB 351 CPS	EN	SA	
2	Armor Plate	K1050 (-F) 36" CSK	US32D	RO	
1	Security Astragal	353 x P941		PE	
1	Gasketing	305CR		PE	
1	Rain Guard	346C		PE	
2	Sweep	315CN		PE	
1	Threshold	1716A		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 2.0
Doors: 1001-1

2	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x BAA	US32D	MK	
1	Electric Hinge, Hvy Wt	T4A3386-QC x BAA	US32D	MK	⚡
1	Card Reader Lock	1164 SN210-10XG271 FIPS LL	US26D	SA	⚡
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA	
1	Surface Closer (STOP)	TB 351 CPS	EN	SA	
1	Kick Plate	K1050 10" CSK	US32D	RO	
1	Gasketing	305CR		PE	
1	Rain Guard	346C		PE	
1	Sweep	315CN		PE	
1	Threshold	2716A		PE	
1	Frame Wiring Harness	QC-C1500P		MK	⚡
1	Door Wiring Harness	QC-C___P as required		MK	⚡
1	Low Voltage Power (DIV 28)	By security contractor		OT	
1	Latch Protector	325	US26D	RO	

Notes: Door is normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 3.0
Doors: 1002-1

4	Hinge, Full Mortise, Hvy Wt	T4A3386 NRP x BAA	US32D	MK
2	Electric Hinge, Hvy Wt	T4A3386-QC x BAA	US32D	MK
1	Concealed Vert Rod Exit, Exit Only		BAA 55 MDPE8610	
EO		US32D	SA	
1	Card Reader Device	DG164 SN210-MDPE8674 FIPS P106 NEL	US32D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
2	Surface Closer (STOP)	TB 351 CPS	EN	SA
2	Armor Plate	K1050 (-F) 32" CSK	US32D	RO
2	Meeting Stile Seal	303AS		PE
1	Gasketing	305CR		PE
1	Rain Guard	346C		PE
2	Sweep	315CN		PE
1	Threshold	1716A		PE
1	Door Position Switch (DIV 28)	By security contractor		OT
2	Frame Wiring Harness	QC-C1500P		MK
2	Door Wiring Harness	QC-C___P as required		MK
1	Low Voltage Power (DIV 28)	By security contractor		OT

Notes: Doors are normally closed and locked. | Exterior access by presenting a valid credential to reader, momentarily unlocking lever for entry. | Free egress at all times. | Electrified lock is fail secure and stays locked from the secure side during alarm/power loss.| Integrated card reader lock has an integral REX and DPS.

Set: 4.0
Doors: 1003

6	Hinge, Full Mortise	TA2714 NRP x BAA	US26D	MK
1	Automatic Flush Bolt Set	2842	US26D	RO
1	Dust Proof Strike	570	US26D	RO
1	Storeroom Lock 3/4" latch	BAA 41 1164 10XG04 LL	US26D	SA
1	Permanent Keyed Core	11 XC 6300 MK LA & LB (match existing)	US15	SA
1	Coordinator	2600 x FB	US28	RO
2	Closer Mounting Bracket	2601D as required	US28	RO
2	Surface Closer (STOP)	TB 351 CPS	EN	SA
1	Security Astragal	353 x P941		PE
1	Gasketing	305CR		PE
2	Sweep	315CN		PE
1	Threshold	271A		PE

Set: 5.0
Doors: 1002-2

3	Hinge, Full Mortise, Hvy Wt	T4A3786 x BAA	US26D	MK
1	Rim Exit Device, Passage	BAA PE8815 NEL	US32D	SA
1	Surface Closer	TB 351 O/P9	EN	SA
1	Kick Plate	K1050 10" CSK	US32D	RO
1	Wall Stop	400	US26D	RO
3	Silencer	608-RKW		RO

Set: 6.0
Doors: 1001-2

1	Hardware	Door manufacturer	OT

END OF SECTION

SECTION 088000 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:
   1. Windows.
   2. Doors.
   3. Glazed curtain walls.
   4. Storefront framing.
   5. Glazed entrances.
   6. Interior borrowed lites.
   7. Glazing sealants and accessories.

B. Related Requirements:
   1. Section 013573 "Delegated Design Requirements and Procedures" for definitions, submittal procedures, responsibilities, and scheduling requirements associated with delegated design assignment indicated in this Section.
   2. Section 088113 "Decorative Glass Glazing."
   3. Section 088813 "Fire-Rated Glazing."

1.2 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Fabrication: Using primary glass in the production of single pane glass products such as coated, laminated and heat treated glass. Can be done by either the Glass Manufacturer or the Glazing Product Manufacturer.

C. Glazing Product Manufacturer: Firm that uses fabricated glass in the production of insulating glass (multiple panes of glass).

D. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

E. IBC: International Building Code.

F. Interspace: Space between lites of an insulating-glass unit.

G. Large Glass Lites and Insulating Glass Units: Over 55 SF.

H. Structural Glazing Product Manufacturer: Firm that produces insulating glass for use in a structural glazing system.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review temporary protection requirements for glazing during and after installation.
3. Review glazing systems included in Project and specified in other Sections.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of glass product and glazing material specified.

B. Sustainable Design Submittals:
1. Product Data: For sealants, indicating VOC content.
2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings:
1. Submit shop drawings of glazing details. Draw details minimum full size (twice full size preferred) and indicate dimensions, tolerances, and materials.
2. Submit shop drawings for structural sealant glazing after review and approval of shop drawings by sealant and glass product manufacturers.

D. Glass Samples:
1. Each type of monolithic and laminated glass, except clear monolithic glass, no less than 3 by 6 inches.
2. Each type of insulating and insulating laminated glass, no less than 12 by 12 inches, including type of edge seal, spacer, and corner construction of spacer. Identify specific type of reflective and Low-e coated glass, coated surfaces, and exterior face of unit.
3. Each type of spandrel glass, no less than 12 by 12 inches.

E. Exposed Glazing Accessory Samples: For gaskets, sealants, and colored spacers, in 12 inch lengths. Install sealant samples between two strips of material representative in color of the adjoining framing system after sealant color selections have been made.

F. Other Glazing Accessory Samples:
1. Corner construction of compression gasket for dry glazing with each leg approximately 6 inches long.
2. Tape sealant, 6 inches long.
3. Compression wedge, 6 inches long.
4. Channel gasket, 6 inches long.
5. Bed gasket, 6 inches long.
6. Face shim or spacer.
7. Setting block.
8. Edge block.
9. Compressible filler.
10. Open cell filler.

G. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

H. Delegated-Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.

1. Provide delegated-design submittals for glass.

I. Qualification Data: For Installer, manufacturers of insulating-glass units with sputter-coated, low-E coatings, glass testing agency, and sealant testing agency.

J. Product Certificates:
1. Submit statement from glazing product manufacturer stating that glazing products meet the requirements of the specified standards, the project specifications, and that there is no incompatibility of glazing materials with the insulating glass unit sealants.
2. Provide glass fabrication manufacturer's statement that they have reviewed and approved the application of the glazing details for the project.
3. Upon request, submit reports indicating results of distortion and flatness monitoring and inspection for laminated and heat treated glass and for continuous on-line color measurement via spectrophotometer inspection device.
4. Submit statement from structural glazing product manufacturer indicating the following:
   a. The details of construction have been reviewed and are approved for use with the glass products.
   b. The secondary seal of insulating glass units has been designed and sized to resist the applied loads.
   c. The Contractor's quality assurance program has been reviewed and is approved.
5. Submit statement from structural glazing sealant manufacturer indicating that structural sealants have been tested prior to installation and conform to the requirements of the Contract Documents and the following:
   a. The structural sealant meets ASTM C1184.
   b. The structural sealant is compatible with specified sealant backing and spacer materials as determined by ASTM C1087.
   c. The structural sealant is compatible with and does not adhere to specified bond breaker and spacer materials as determined by ASTM C1087.
   d. The structural sealant is compatible with the insulating glass unit edge seal.
   e. The structural sealant is compatible with and has been tested for adequate adhesion to each respective substrate.
   f. The details of construction have been reviewed and are approved for use with the structural sealant.
   g. The design stress of the sealant due to the application of the primary forces does not exceed 20 psi.
6. If any of the above required statements involve more than one manufacturer, submit certificates from each of those manufacturers.

K. Glazing Analysis:
1. For exterior glazing, provide an analysis confirming all in service thermal stressing of the glass has been evaluated and that expected thermal stressing will not exceed the strength capacity of the glass and the glass is acceptable for the anticipated in-service conditions of exposure. All such analysis shall be performed by experts experienced in analyzing thermal stressing of glazing due to in service environmental conditions utilizing appropriate engineering means of thermal stress analysis.
   a. Provide copy of analysis and summary report.

b. Analysis shall include consideration for the following conditions where applicable:
   1) Thermal properties of the glass units, including laminate interlayers, coatings and applied frits, and thermal spacers in the case of insulated units.
   2) Geographic and weather conditions of the building site.
   3) Solar orientation of the glass units.
   4) Impact of shading by adjacent structures.
   5) Glazing system's properties that may impact temperature differentials within the glass units.
   6) Highly reflective surfaces in the immediate area which may impact temperature differentials within the glass units.
   7) Shading of glass units by properties of the building configuration including, but not limited to, fins, projections, changes in building lines in plan, overhangs, projections, and similar physical attributes.
   8) Glazing conditions including spandrels and shadow boxes including back pans and insulation layers on the inboard side of the glass.
   9) Interior conditions nearby the glass which may impact glazing unit temperatures including pockets resulting from interior configurations, interior shading or other window treatment devices, and mechanical heating or cooling systems.
   10) Consideration for potential loss of strength of glass due to application of frits or coatings.
   11) Industry standard ranges of strength for annealed, heat strengthened, or tempered glass units unless fabricator/manufacturer can demonstrate strength properties outside of these ranges.
   12) Consideration for predictability of post fabrication heat forming of glass units.
   13) Heated framing systems.

L. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for tinted glass, coated glass, insulating glass, glazing sealants, and glazing gaskets.
   1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

M. Preconstruction adhesion and compatibility test report.

N. Quality Assurance Program (QAP):
   1. Glass fabrication: Written QAP including but not limited to reference of applicable ASTM testing methodology, type and frequency of in-line monitoring of glass fabrication, and reporting and documentation. Test sample lite of glass, at Contractor™ ™s expense, for conformance to:
      a. Bow and warp.
      b. Localized distortion/roller wave.
      c. Concavity/convexity.
      d. Compression strength.
      e. Distortion and Flatness Monitoring and Inspection Device for Laminated and Heat Treated Glass: Osprey 8 by LiteSentry.

2. Installation: Written QAP to monitor quality of products such as cleaners, solvents, primers, and sealants; and sealant workmanship including, cleaning, priming, joint opening preparation, and sealant installation.
   a. Include as part of program random adhesion and compatibility testing of production run products.
   b. Do not install sealant work prior to review of program.
   c. Submit quality assurance program to glass and sealant manufacturers for review and approval prior to submission to Architect.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. At Owner's direction, and prior to construction completion, furnish for future maintenance and repair, the following glass types for attic stock:
   1. Furnish 5 percent of quantity for each size and type but not less than 1, nor more than 6 units for each size of each type of rectangular shaped units.

B. Units for attic stock shall be adequately crated and identified as to storage conditions, unit type, size, surface to be glazed to exterior, and any other pertinent information to assist the Owner in future maintenance.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved and certified by coated-glass manufacturer.

B. Glass Testing Agency Qualifications: A qualified independent testing agency accredited in accordance with the NFRC CAP 1 Certification Agency Program.

C. Sealant Testing Agency Qualifications: An independent testing agency qualified in accordance with ASTM C1021 to conduct the testing indicated.

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and to set quality standards for materials and execution.
   1. Glazing mock-up: Produce three full-sized IGUs for review and approval by the Architect before full production run.
   2. Install glazing in mockups specified in Division 08 Section "Aluminum-Framed Entrances and Storefronts, and Glazed Aluminum Curtain Walls " to match glazing systems required for Project, including glazing methods.
   3. Approved sample installation may become part of the completed Work if undisturbed at time of Substantial Completion.
   4. Place mockup where reflection from adjacent buildings or other structures with a regular pattern can be used to gauge overall appearance / distortion of the glass.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glass product, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
   1. Testing is not required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

2. Use ASTM C1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
3. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
4. Schedule enough time for testing and analyzing results to prevent delaying the Work.
5. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.10 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 deg F. Do not install sealants to wet or frost covered surfaces.

1.11 WARRANTY

A. General: During the warranty period, restore defective Work to the standard of the Contract Documents, including all labor, materials, refinishing and other costs incidental to the Work. Restore Work found to be defective as defined in the Contract Documents. The warranty period starts at the date of Substantial Completion.

B. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
1. Warranty Period: 10 years from date of Substantial Completion.

C. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
1. Warranty Period: 10 years from date of Substantial Completion.

D. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.
   1. Warranty Period: 10 years from date of Substantial Completion.

E. Manufacturer's Special Warranty for Heat Soaking of Tempered Glass: Manufacturer agrees to replace heat soaked tempered glass units that fail. Warrant that heat soaked tempered glass will not spontaneously break as a result of nickel sulfide (NiS) inclusions at a rate exceeding 0.3 percent (3/1000).
   1. Warranty Period: 10 years from date of Substantial Completion.

F. Installation: Glazing systems installation shall be warranted for a period of five years against defective materials and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND FABRICATORS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Source Limitations for Glass: Obtain from single source from single manufacturer for each glass type.
   1. Obtain tinted glass from single source from single manufacturer.
   2. Obtain reflective-coated glass from single source from single manufacturer.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design glazing.
   1. Material properties indicated in this Section shall be considered as minimum properties.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the IBC and ASTM E1300.
   1. Wind Load Design Criteria:
      a. As indicated on Drawings.

b. Design Wind Pressures: Determine design wind pressures applicable to Project in accordance with ASCE/SEI 7, based on heights above grade indicated on Drawings.

2. Design Snow Loads: As indicated on Drawings.
3. Thickness of Patterned Glass: Base design of patterned glass on thickness at thinnest part of the glass.
4. Maximum Lateral Deflection: For glass supported on all four edges, limit center-of-glass deflection at design wind pressure to not more than 1/50 times the short-side length or 1 inch, whichever is less.
5. Differential Shading: Design glass to resist thermal stresses induced by differential shading within individual glass lites.

D. Safety Glazing:
1. CPSC 16 CFR part 1201, testing requirements of ANSI Z97.1, and listed in the SGCC Certified Products Directory with appropriate SGCC certification mark or label permanently affixed.
2. Furnish safety glass for glass occurring in doors and sidelights, and where indicated and further required by authorities having jurisdiction.

E. Sound Control Glazing: Products with air borne sound transmission loss as measured by ASTM E90 and STC rating as classified by ASTM E413.

F. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
1. For monolithic-glass lites, properties are based on units with lites 6 mm thick.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, in accordance with NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F.
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, in accordance with NFRC 200 and based on LBL's WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing values, in accordance with NFRC 300.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
1. GANA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
2. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than the thickness indicated.
   1. Minimum Glass Thickness for Exterior Lites: 6 mm.
   2. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

E. Strength: Where heat-strengthened float glass is indicated, provide heat-strengthened float glass unless fully tempered float glass is required to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

F. Low-E Coatings: For glazing requiring low-e coatings, comply with the following.
   1. Provide a minimum of 95 percent edge deletion of low-e coating around the entire perimeter of the unit to ensure proper seal in insulated unit.
   2. Utilize coated glass produced using continuous in-line color measurement via spectrophotometer inspection device.
   3. Tolerance for color variation to be no greater than a total range of 4.5 delta E for color incident and at angle, based on measurement protocol described in ASTM C1376.
   4. Transmitted and reflected color for all coated glass shall be consistent and fall on the same side of the neutral axis of the color spectrum as defined in ASTM D2244.

2.4 GLASS PRODUCTS

A. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
   2. Heat Soak Testing: For all fully tempered glass, provide heat soak testing conforming to EN14179 which includes a 2 hour dwell at 290 deg C, +/- 10 deg C.

B. Heat-Strengthened Float Glass: ASTM C1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
   1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
   2. For uncoated glass, comply with requirements for Condition A.
   3. For coated vision glass, comply with requirements for Condition C (other coated glass).
   4. Limit Kind HS surface compression to upper end of ASTM C 1048 range, 7,500 psi.
   5. Distortion Tolerances:
      a. Roller Wave: Maximum 0.003 inch from peak to valley within the main body of the sheet and maximum 0.008 inch within 10.5 inches of a leading or trailing edge.

b. Localized Warp: Maximum 0.03 inch over any 12 inch span, but limited to 0.31 inch.

C. Low-E / Reflective-Coated Vision Glass: ASTM C1376.

D. Low-E / Reflective-Coated Ceramic Spandrel Glass: ASTM C1376, Kind CS, coated by vacuum deposition (sputter-coating) process, ASTM C1048, Condition B, Type I, Quality-Q3, and complying with other specified requirements.

2.5 LAMINATED GLASS

A. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
   1. Construction: Laminate glass with ionomeric polymer interlayer to comply with interlayer manufacturer's written instructions.
   2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
   3. Interlayer Color: Clear unless otherwise indicated.
   4. Glass Edge Alignment Tolerances:
      a. Concealed Laminated Glass Edge Offset:
         1) Edge length less than 80-inches: ±0.04-inch.
         2) Edge length greater than 80-inches: ±0.08-inch.
      b. Exposed Laminated Glass Edge Offset: The edges of the laminated glass plies shall be flush and level ±0.04-inch.

2.6 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E2190.
   1. Sealing System: Dual seal, with manufacturer's standard primary and secondary seal, and with soldered, welded, and/or bent spacer corner construction.
      a. Units for Structural Sealant Glazing: Dual seal construction of a polyisobutylene primary seal and silicone secondary seal, and with soldered, welded, and/or bent spacer corner construction.
      b. Secondary Seal: Continuous, free of skips and voids.
   2. Perimeter Spacer: Manufacturer's standard spacer material and construction.
   3. Desiccant: Molecular sieve or silica gel, or a blend of both.
   4. Units which will be shipped through or glazed at altitudes of 5000 feet or more above sea level, fabricated with breather or capillary tubes, to permit air space pressure equalization. Provide same warranty as for non-breather or capillary tube units. Pinch tubes during glazing if required by glass manufacturer.
   5. Flatness Tolerance: Manufacturer units so that maximum out-of-plane concavity/convexity, at center of each lite, does not exceed the following when ambient temperature is 70 degrees Fahrenheit and glass surface temperature is within +/- 5 degrees Fahrenheit of ambient temperature. Measure flatness with units installed in vertical position.
      a. Units 20 square feet and longer in area: + / - 1/16-inch maximum.
      b. Units smaller than 20 square feet: + / - 1/32-inch maximum.

c. If units are manufactured at geodetic elevation higher or lower than that of the Project, take measures to assure that flatness tolerance are met. If filling or deflating is used at time of manufacture to compensate for elevation difference, it shall be done after full curing of glass edge seals.

2.7 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:
1. Neoprene complying with ASTM C 864.
2. EPDM complying with ASTM C 864.
3. Silicone complying with ASTM C 1115.
4. Thermoplastic polyolefin rubber complying with ASTM C 1115.
5. Compression wedge for dry glazing system: of shape and size to compress the exterior compression gasket a minimum of 25 percent, and as recommended by glazing and sealing systems manufacturer.
6. Provide gaskets that are compatible with glazing sealants and will provide for silicone adhesion.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned silicone gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.
1. Bed gasket for wet glazing system: continuous with pressure sensitive adhesive 1 side, designed to be compressed 25-40 percent in the opening.
2. Compression gasket for dry glazing system: shape as required to be compressed in place a minimum of 25 percent and of one-piece construction with factory-assembled frames with injection-molded, vulcanized corners; produced oversize in opening dimension, as determined by measurements, to insure compression at corners but within limits so that compression does not create a "pucker".
3. Channel gasket: continuous channel of shape and dimensions for application in the opening with specified glazing.
4. Provide gaskets that are compatible with glazing sealants and will provide for silicone adhesion.

2.8 GLAZING SEALANTS

A. General:
1. Compatibility: Compatible with one another and with other materials they contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Sealant shall have a VOC content of 250 g/L or less.
4. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
5. Colors of Exposed Glazing Sealants: Match Architect's samples.

B. Glazing Sealant:
   1. Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 50, Use NT.
      a. Manufacturers: Subject to compliance with requirements, provide one of the following:
         1) Dow Corning Corporation; 756 SMS.
         2) GE Construction Sealants; Momentive Performance Materials Inc.; SilPruf NB SCS9000 .

2.9 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
   1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.
   2. AAMA 807.3 tape, for glazing applications in which tape is not subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:
   1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
   2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

C. For openings up to 75 united inches, use unshimmed tape. For openings over 75 united inches, use pre-shimmed tape.

2.10 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, with requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.
   1. Each block shall be properly sized for load, as wide or wider than glazing, no less than 4 inches long; profile to permit friction fit, dart insertion into metal chair, or pressure sensitive adhesive one side to fix block in glazing opening.

D. Spacers: Elastomeric blocks or continuous extrusions of 40 to 60 Shore "A" durometer hardness to maintain glass lites in place for installation indicated.
   1. Profile to permit friction fit, dart insertion or pressure sensitive adhesive one side to fix shim or spacer in location.

E. Edge Blocks: Elastomeric material of 40 to 60 Shore "A" durometer hardness to limit glass lateral movement (side walking).

1. Each block shall be a minimum of 4 inches long, as wide as glazing, placed in the vertical glazing channel, and sized to allow a nominal 1/8-inch clearance between glass edge and installed block; profile to permit friction fit or pressure sensitive adhesive one side to fix block in glazing opening.

F. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Open Cell Filter: Reticulated flexible polyester urethane foam having 20 pores per inch, sized at least 1 inch larger in dimension than weephole, of cross section to provide 15 to 25 percent compression for friction fit and as manufactured by Foam Division, Scott Paper Co.; H-O Products Corp. or approved comparable product.

H. Bond Breaker: Heavy duty, 11-mil minimum thickness, colored, polyethylene or teflon, self-adhesive bond breaker of type recommended by sealant manufacturer and suitable for conditions of usage. Liquid bond breaker is not permitted.

2.11 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
   1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
      a. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

B. Clean-cut or flat-grind vertical edges of butt-glazed monolithic lites to produce square edges with slight chamfers at junctions of edges and faces.

C. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Presence and functioning of weep systems.
   3. Minimum required face and edge clearances.
   4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
   1. Ensure approved Quality Assurance Program is implemented.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
   1. Locate one quarter of glass width from each corner, but with block edge nearest corner no closer than 6 inches from corner, unless otherwise specified or required by glass manufacturer.
   2. Insulating glass used in sloped glazing shall have both panes supported by setting blocks.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches.
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
   2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

M. Where butted glass without mullions is indicated, seal open joints with silicone sealant in accordance with sealant and glass manufacturer's written instructions. Set glass so that joint is plumb and glass edges are aligned to provide for a uniform joint width of 3/8 inch maximum. Mask edges of glass to confine sealant to joints and to avoid contact with either face of glass. Use primer where required. Neatly tool joints to slightly concave surface using recommended tooling agent. Remove masking from glass and clean glass surfaces completely free of sealant material.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first, then to jambs. Cover horizontal framing joints by applying tapes to jambs, then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Apply heel bead of elastomeric sealant.

G. Center glass lites in openings on setting blocks, and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

H. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.6 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or backings in place and in position to control location and depth of installed sealant for required sealant performance.

B. Force sealants into glazing channels to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants to provide a smooth surface and on exterior applications provide a wash away from glass.

3.7 STRUCTURAL SEALANT GLAZING

A. Install continuous spacers between glass lites and glazing channels to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Perform no structural sealant glazing prior to written certification of adhesion and compatibility test results, review and written approval of glazing details by glass and sealant manufacturers, and acceptance of written quality assurance program.

C. Install glass in metal windows or framing with continuous spacer installed between glass and window or frame, setting blocks properly sized and located and structural sealant installed in properly sized and located cavity formed by glass, spacer and window or frame.

D. Provide installation that maintains glass face clearances and prevents sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or backings in place and in position to control location and depth of installed sealant for required sealant performance.

E. Perform installation procedures per written sealant and glass manufacturers' requirements and written quality assurance program.

F. Force sealants into glazing channels to eliminate voids and to ensure complete wetting and bond of sealant to glass and channel surfaces.

G. Tool exposed surfaces of sealants to provide a smooth surface and on exterior applications provide a wash away from glass.

H. Do not allow sealant to bleed into the interface between the glass and glazing spacer.

I. Structural sealant work shall be shop-glazed.

3.8 CLEANING AND PROTECTION

A. Immediately after installation remove nonpermanent labels and clean surfaces.

B. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

C. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
   1. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

D. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

E. Remove and replace glass that is damaged during construction period.

F. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.9 MONOLITHIC GLASS SCHEDULE

A. Glass Type: Clear fully tempered float glass.
   1. Minimum Thickness: 6 mm.
   2. Safety glazing required.

3.10 LAMINATED GLASS SCHEDULE

A. Glass Type: Clear laminated glass with two plies of heat-strengthened float glass.
   1. Minimum Thickness of Each Glass Ply: 6 mm.
   2. Interlayer Thickness: 0.090 inch.
   3. Safety glazing required.

3.11 INSULATING GLASS SCHEDULE

A. Glass Type GL-1: High Performance Vision Unit.
   1. Basis-of-Design Product: 1" VNE35-53 Insulating Glass as manufactured by Viracon.
   2. Overall Unit Thickness: 1 inch.
   3. Minimum Thickness of Each Glass Lite: 6 mm.
   4. Outdoor Lite: Heat-strengthened float glass, Pure Mid Iron.
   5. Coating: VNE-53 on #2 surface.
   6. Interspace Content: 1/2" VTS black spacer - Argon filled.
   7. Silicone: Black
   8. Indoor Lite: Heat-strengthened float glass, Pure Mid Iron.
   9. Visible Light Transmittance: 51%
   10. Exterior Reflectance: 20%

11. Winter Nighttime U-Factor: 0.24.
12. Summer Daytime U-Factor: 0.20.
13. Shading Coefficient: 0.26
14. Solar Heat Gain Coefficient: 0.22
15. Light to Solar Gain Ratio: 2.32
16. Safety glazing required.

B. Glass Type GL-2: (GL-1 with Painted Back Pan).
1. Basis-of-Design Product: 1" VNE35-53 Insulating Glass as manufactured by Viracon.
2. Overall Unit Thickness: 1 inch.
3. Minimum Thickness of Each Glass Lite: 6 mm.
4. Outdoor Lite: Heat-strengthened float glass, Pure Mid Iron.
5. Coating: VNE-53 on #2 surface.
6. Interspace Content: 1/2" VTS black spacer - Argon filled.
7. Silicone: Black
8. Indoor Lite: Heat-strengthened float glass, Pure Mid Iron; V957 SUBDUED GRAY on #4 surface.
9. Visible Light Transmittance: N/A
10. Exterior Reflectance: N/A
11. Winter Nighttime U-Factor: 0.24.
12. Summer Daytime U-Factor: 0.20.
13. Shading Coefficient: N/A
14. Solar Heat Gain Coefficient: N/A
15. Light to Solar Gain Ratio: N/A
16. Safety glazing required.

C. Glass Type GL-3: High Performance Vision Unit with Ceramic Frit.
1. Basis-of-Design Product: 1" VNE35-53 Insulating Glass as manufactured by Viracon.
2. Overall Unit Thickness: 1 inch.
3. Minimum Thickness of Each Glass Lite: 6 mm.
4. Outdoor Lite: Heat-strengthened float glass, Pure Mid Iron.
5. Coating: VNE-53 on #2 surface.
6. Ceramic Frit: V957 SUBDUED GRAY on #2 surface; print as indicated on Drawings.
7. Interspace Content: 1/2" VTS black spacer - Argon filled.
8. Silicone: Black
9. Indoor Lite: Heat-strengthened float glass, Pure Mid Iron.
10. Visible Light Transmittance: 32%
11. Exterior Reflectance: 17%
12. Winter Nighttime U-Factor: 0.24.
13. Summer Daytime U-Factor: 0.20.
14. Shading Coefficient: 0.18
15. Solar Heat Gain Coefficient: 0.16
16. Light to Solar Gain Ratio: 2.00
17. Safety glazing required.

D. Glass Type GL-4: High Performance Vision Unit with Decorative Film.
1. Basis-of-Design Product: 1" VNE35-53 Insulating Glass as manufactured by Viracon.

2. Overall Unit Thickness: 1 inch.
3. Minimum Thickness of Each Glass Lite: 6 mm.
4. Outdoor Lite: Heat-strengthened float glass, Pure Mid Iron.
5. Coating: VNE-53 on #2 surface.
6. Interspace Content: 1/2" VTS black spacer - Argon filled.
7. Silicone: Black
8. Indoor Lite: Heat-strengthened float glass, Pure Mid Iron.
9. Safety glazing required.

E. Glass Type GL-5: (GL-1 with Privacy Film).
1. Basis-of-Design Product: 1" VNE35-53 Insulating Glass as manufactured by Viracon.
2. Overall Unit Thickness: 1 inch.
3. Minimum Thickness of Each Glass Lite: 6 mm.
4. Outdoor Lite: Heat-strengthened float glass, Pure Mid Iron.
5. Coating: VNE-53 on #2 surface.
6. Interspace Content: 1/2" VTS black spacer - Argon filled.
7. Silicone: Black
8. Indoor Lite: Heat-strengthened float glass, Pure Mid Iron.
9. Safety glazing required.

F. Glass Type GL-6: (GL-1 with Meltdown Glass).
1. Basis-of-Design Product: 1" VNE35-53 Insulating Glass as manufactured by Viracon.
2. Overall Unit Thickness: 1 inch.
3. Minimum Thickness of Each Glass Lite: 6 mm.
4. Outdoor Lite: Heat-strengthened float glass, Pure Mid Iron.
5. Coating: VNE-53 on #2 surface.
6. Interspace Content: 1/2" VTS black spacer - Argon filled.
7. Silicone: Black
8. Indoor Lite: Heat-strengthened float glass, Pure Mid Iron.
9. Safety glazing required.

END OF SECTION

SECTION 088113 - DECORATIVE GLASS GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Patterned glass.
   2. Glass with decorative film overlay.
   3. Glass with finished edges.

B. Related Requirements:
   1. Section 013573 "Delegated Design Requirements and Procedures" for definitions, submittal procedures, responsibilities, and scheduling requirements associated with delegated design assignment indicated in this Section.

1.2 DEFINITION

A. Glass Thickness: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review temporary protection requirements for glazing during and after installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For decorative glass. Show fabrication and installation details. Include the following:
   1. Size and location of penetrations.
   2. Glazing method.
   3. Mounting method.
   4. Attachments to other work.
   5. Full-size details of edge-finished profiles.

C. Glass Samples: For the following products, 12 inches square:
   1. Each type of decorative glass.
   2. Each edge treatment on type of decorative glass.
   3. Each decorative film overlay on type of decorative glass.

D. Glazing Accessory Samples: For sealants, in 12-inch lengths. Install sealant Samples between two strips of material representative of the glazed system.

E. Decorative Glazing Schedule: List decorative glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

F. Delegated Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
   1. Provide delegated-design submittals for decorative glass.

1.6 INFORMATIONAL SUBMITTALS

A. Preconstruction adhesion and compatibility test report.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of decorative glass and each decorative film overlay to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under NGA's Certified Glass Installer Program.

B. Sealant Testing Agency Qualifications: An independent testing agency qualified in accordance with ASTM C1021 to conduct the testing indicated.

C. Provide the following upon request:
   1. Qualification Data: For Installer and sealant testing agency.
   2. Product Certificates: For each type of decorative glass.

D. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Build mockups in the location and of the size indicated or, if not indicated, as directed by Architect.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glass with decorative film overlay, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
   1. Use ASTM C1087 to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of glazing sealants to glass, tape sealants, gaskets, and glazing channel substrates.
   2. Test no fewer than eight Samples of each type of material, including joint substrates, shims, sealant backings, secondary seals, and miscellaneous materials.
   3. Schedule enough time for testing and analyzing results to prevent delaying the Work.
   4. For materials failing tests, submit sealant manufacturer's written instructions for corrective measures including the use of specially formulated primers.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Protect decorative glass and glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. Retain packaging and sequencing numbers for decorative glass units.

1.11 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install decorative glass until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify actual dimensions of openings and construction contiguous with decorative glass by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MANUFACTURERS OF DECORATIVE GLASS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Source Limitations for Glass: Obtain each type of decorative glass from single source from single manufacturer.

C. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer, for each product and installation method.

2.2 PERFORMANCE REQUIREMENTS

A. General Performance: Installed glazing systems shall withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design decorative glass.
   1. Material properties indicated in this Section shall be considered as minimum properties.

C. Structural Performance: Decorative glass installed adjacent to walking surfaces shall withstand the following design loads within limits and under conditions indicated:
   1. Differential deflection of adjacent unsupported edges shall not exceed glass thickness when subjected to 50 lbf/ft. applied horizontally to one panel at any point up to 42 inches above the adjacent walking surface.
   2. Base design on thickness at thinnest part of the glass.

D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

2.3 GLASS PRODUCTS, GENERAL

A. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

B. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

2.4 GLASS PRODUCTS

A. Fully Tempered Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.

B. Tempered Patterned Glass: ASTM C1048, Kind FT (fully tempered), Type II, Class 1 (clear) or Class 2 (tinted) as indicated, Form 3; finish, pattern, and quality as indicated.

C. Decorative Film Overlay: Translucent, dimensionally stable, cast PVC film, 2-mil-minimum thickness, with pressure-sensitive, clear adhesive back for adhering to glass and releasable protective backing.

2.5 GLAZING MATERIALS

A. Glazing Sealants, Tapes, and Miscellaneous Glazing Materials: As specified in Section 088000 "Glazing."
   1. Colors: As selected by Architect from manufacturer's full range.

2.6 HARDWARE FOR GLASS INSTALLATION

A. Hardware: Of configuration indicated.
   1. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect
      a. C.R. Laurence Co., Inc.

B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

C. Gaskets: Manufacturer's standard, compatible with decorative glass type indicated.

D. Anchors and Inserts: Provide devices as required for hardware installation. Provide metal expansion-bolt devices for drilled-in-place anchors. Provide stainless steel anchors and inserts.

2.7 DECORATIVE GLASS FABRICATION

A. Fabricate decorative glass and provide other glazing products in sizes required to glaze openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with product manufacturer's written instructions and with referenced glazing standard.

B. Edge Finishing: Finish edges smooth and polished, without chips, scratches, or warps.
   1. Finished Edge: Rounded polished.

C. Decorative Film Overlay: Apply squarely aligned to glass edges, uniformly smooth, and free from tears, air bubbles, wrinkles, and rough edges, in single sheet completely overlaying the back face of clean glass, in accordance with manufacturer's written instructions, including surface preparation and application temperature limitations.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine decorative glass framing members, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Minimum required face or edge clearances.
   3. Effective sealing between joints of decorative glass framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate orientation of outer surfaces. Label or mark units as needed so that surface orientation is readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 INSTALLATION

A. Set decorative glass units in each series true in line with uniform orientation, pattern, draw, bow, and similar characteristics.

B. Set glass lites with outer surface facing proper orientation.

C. Set decorative glass in locations indicated on Drawings. Install glass with hardware and accessories in accordance with hardware manufacturer's written instructions. Attach hardware securely to mounting surfaces.

3.4 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, gaskets, sealants, tapes, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

F. Provide spacers for glass lites where length plus width is more than 50 inches.
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances, and to comply with system performance requirements.
   2. Provide 1/8-inch- minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

3.5 SEALANT GLAZING (WET)

A. Install continuous spacers, or spacers combined with cylindrical sealant backing, between glass lites and glazing stops to maintain glass face clearances and to prevent sealant from extruding into glass channel and blocking weep systems until sealants cure. Secure spacers or spacers and backings in place and in position to control depth of installed sealant relative to edge clearance for optimum sealant performance.

B. Force sealants into glazing channels and between glass-to-glass joints to eliminate voids and to ensure complete wetting or bond of sealant to glass and channel surfaces.

C. Tool exposed surfaces of sealants smooth.

3.6 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.7 DECORATIVE GLASS SCHEDULE

A. Patterned Glass: Clear, patterned tempered patterned glass.
   1. Glass Thickness: 6.0 mm.
   2. Pattern: Match Architect's samples.
   3. Safety glazing required.

B. Decorative Film Overlays: Glass with decorative film overlay.
   1. Glass Type: Clear, fully tempered float glass.
   2. Glass Thickness: 6.0 mm.

3. Safety glazing required.
4. Use: Suitable for exterior and interior applications.
5. Outdoor Durability: Not less than five years.
6. Pattern: As indicated.

END OF SECTION

SECTION 088300 - MIRRORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Silvered flat glass mirrors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Mirrors: Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.

B. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachment details.

C. Samples: For each type of the following:
   1. Mirrors: 12 inches square, including edge treatment on two adjoining edges.
   2. Mirror Clips: Full size.
   3. Mirror Trim: 12 inches long.

D. Sustainable Design Submittals:
   1. Product Data: For adhesives, indicating VOC content.
   2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For mirrors to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified Installer, who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

B. Provide the following upon request:
   1. Product Certificates: For each type of mirror and mirror mastic.
   2. Preconstruction Test Reports: From mirror manufacturer indicating that mirror mastic was tested for compatibility and adhesion with mirror backing and substrates on which mirrors are installed.
   3. Qualification Statements: For Installer.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing.
   1. Testing is not required if data are submitted based on previous testing of mirror mastic products and mirror backing matching those submitted.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect mirrors in accordance with mirror manufacturer's written instructions and as needed to prevent damage to mirrors from moisture, condensation, temperature changes, direct exposure to sun, or other causes.

B. Comply with mirror manufacturer's written instructions for shipping, storing, and handling mirrors as needed to prevent deterioration of silvering, damage to edges, and abrasion of glass surfaces and applied coatings. Store indoors.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install mirrors until ambient temperature and humidity conditions are maintained at levels indicated for final occupancy.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to replace mirrors that deteriorate within specified warranty period. Deterioration of mirrors is defined as defects developed from normal use that are not attributed to mirror breakage or to maintaining and cleaning mirrors contrary to manufacturer's written instructions. Defects include discoloration, black spots, and clouding of the silver film.
   1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Source Limitations for Mirrors: Obtain mirrors from single source from single manufacturer.

B. Source Limitations for Mirror Accessories: Obtain mirror-glazing accessories from single source.

2.2 SILVERED FLAT GLASS MIRRORS

A. Mirrors, General: ASTM C1503; manufactured using copper-free, low-lead mirror coating process.

B. Laminated Mirrors: ASTM C1172, Type II.
   1. Glass for Outer Lite: Annealed float glass, Mirror Select Quality, clear.
   2. Nominal Thickness for Outer Lite: 6.0 mm.
   3. Glass for Inner Lite: Annealed float glass; ASTM C1036, Type I (transparent flat glass), Quality Q1; Class 1 (clear).
   4. Nominal Thickness for Inner Lite: 6.0 mm.
   5. Interlayer: Mirror manufacturer's standard 0.030-inch- thick, clear polyvinyl-butyral interlayer with a proven record of showing no tendency to delaminate from, or cause damage to, silver coating.

C. Safety Glazing Products: For laminated mirrors, provide products that comply with 16 CFR 1201, Category II.

2.3 MISCELLANEOUS MATERIALS

A. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

B. Edge Sealer: Coating compatible with glass coating and approved by mirror manufacturer for use in protecting against silver deterioration at mirrored glass edges.

C. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.

1. Adhesives shall have a VOC content of 70 g/L or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. Film Backing for Laminated Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.4 MIRROR HARDWARE

A. Aluminum J-Channels and Cleat: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover edges of mirrors in a single piece.
1. Aluminum J-Channel and Cleat, Bottom and Side Trim: J-channels formed with front leg and back leg not less than 5/16 and 3/4 inch in height, respectively.
2. Aluminum J-Channel and Cleat, Top Trim: Formed with front leg with a height matching bottom trim and back leg designed to fit into the pocket created by wall-mounted aluminum cleat.
3. Finish: Clear bright anodized.

B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

C. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield, expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.5 FABRICATION

A. Shop fabricate mirrors to greatest extent possible.

B. Fabricate cutouts for notches and holes in mirrors without marring visible surfaces. Locate and size cutouts, so they fit closely around penetrations in mirrors.

C. Mirror Edge Treatment: Rounded polished .
1. Seal edges of mirrors with edge sealer after edge treatment to prevent chemical or atmospheric penetration of glass coating.
2. Require mirror manufacturer to perform edge treatment and sealing in factory immediately after cutting to final sizes.

D. Film-Backed Laminated Safety Mirrors: Apply film backing with adhesive coating over mirror backing paint, as recommended in writing by film-backing manufacturer, to produce a surface free of bubbles, blisters, and other imperfections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, over which mirrors are to be mounted, with Installer present, for compliance with installation tolerances, substrate preparation, and other conditions affecting performance of the Work.

B. Verify compatibility with and suitability of substrates, including compatibility of existing finishes or primers with mirror mastic.

C. Proceed with installation only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

A. Comply with mastic manufacturer's written installation instructions for preparation of substrates, including coating substrates with mastic manufacturer's special bond coating where applicable.

3.3 INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced National Glass Association (NGA) publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.
   1. NGA Publications: "Laminated Glazing Reference Manual," "Glazing Manual" and "Installation Techniques Designed to Prolong the Life of Flat Glass Mirrors."

B. Provide a minimum airspace of 1/8 inch between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.

C. Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.
   1. Aluminum J-Channels: Provide setting blocks 1/8 inch thick by 4 inches long at quarter points. To prevent trapping water, provide, between setting blocks, two slotted weeps not less than 1/4 inch wide by 3/8 inch long at bottom channel.
   2. Aluminum J-Channels and Cleat: Fasten J-channel directly to wall and attach top trim to continuous cleat fastened directly to wall.
   3. Install mastic as follows:
      a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
      b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
      c. After mastic is applied, align mirrors and press into place while maintaining a minimum airspace of 1/8 inch between back of mirrors and mounting surface.

3.4 CLEANING AND PROTECTION

A. Protect mirrors from breakage and contaminating substances resulting from construction operations.

B. Do not permit edges of mirrors to be exposed to standing water.

C. Maintain environmental conditions that prevent mirrors from being exposed to moisture from condensation or other sources for continuous periods of time.

D. Clean exposed surface of mirrors not more than four days before date scheduled for inspections that establish date of Substantial Completion. Clean mirrors as recommended in writing by mirror manufacturer and NGA's publication "Proper Procedures for Cleaning Flat Glass Mirrors."

END OF SECTION

SECTION 088813 - FIRE-RATED GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fire-resistance-rated glazing.

1.2 DEFINITIONS

A. Fire-Resistance-Rated Glazing: Glazing that prevents spread of fire and smoke and radiant heat and complies with requirements for rated walls and rated openings; capable of blocking radiant heat

B. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

C. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

1.4 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures."

B. Product Data: For each type of product.

C. Sustainable Design Submittals:
   1. Product Data: For sealants, indicating VOC content.
   2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

D. Glass Samples: For each type of glass product; 12 inches square.

E. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the NGA's Certified Glass Installer Program.

B. Provide the following upon request:
   1. Qualification Data: For Installer and glass testing agency.
   2. Product Certificates: For each type of glass and glazing product.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install fire-resistant glazing until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature conditions at occupancy levels during remainder of construction period.

1.8 WARRANTY

A. Manufacturer's Special Warranty for Tempered Glazing Units with Clear Intumescent Interlayer: Manufacturer agrees to replace units that deteriorate within specified warranty period. Deterioration of tempered glazing units with clear intumenscent interlayer is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning glass contrary to manufacturer's written instructions. Evidence of failure is air bubbles within units, or obstruction of vision by contamination or deterioration of intumescent interlayer.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Glass: For each glass type, obtain from single source from single manufacturer.

B. Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; deterioration of glazing materials; or other defects in construction.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organization below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. NGA Publications: "Glazing Manual."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC. Label shall indicate manufacturer's name, type of glass, glass thickness, and safety glazing standard with which glass complies.

2.4 GLASS PRODUCTS

A. Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class I (clear) unless otherwise indicated, Quality-Q3.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

2.5 FIRE-RESISTANCE-RATED GLAZING

A. General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-resistance ratings indicated, based on testing in accordance with ASTM E119 or UL 263.

B. Fire-Resistance-Rated Glazing Labeling: Permanently mark fire-resistance-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, that glazing is approved for use in walls, and fire-resistance rating in minutes.

C. Fire-Resistance-Rated Framing and Doors: Fire-resistance-rated glazing with 60-, 90-, and 120-minute ratings requires framing and doors from glass supplier, tested as an assembly complying with ASTM E119 or UL 263.

D. Fire-Resistance-Rated Tempered Glazing Units with Clear Intumescent Interlayer: Glazing units made from two or more lites of uncoated, fully tempered, clear float glass; with a perimeter edge seal enclosing a cavity filled with optically clear, intumescent polymer; complying with 16 CFR 1201, Category II.

E. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. SAFTI FIRST Fire Rated Glazing Solutions.

2.6 GLAZING ACCESSORIES

A. Provide glazing gaskets, glazing sealants, glazing tapes, setting blocks, spacers, edge blocks, and other glazing accessories that are compatible with glazing products and each other and are approved by testing agencies that listed and labeled fire-resistant glazing products with which products are used for applications and fire-protection ratings indicated.

B. Glazing Sealants for Fire-Rated Glazing Products: Neutral-curing silicone glazing sealant complying with ASTM C920, Type S, Grade NS, Class 50, Use NT. Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated.
   1. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
   2. Colors of Exposed Glazing Sealants: Match Architect's samples.

C. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C1281 and AAMA 800 for products indicated below:
   1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

D. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as primary sealant.

2.7 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, recommended in writing by manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cylindrical Glazing Sealant Backing: ASTM C1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

C. Perimeter Insulation for Fire-Resistance-Rated Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

2.8 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with manufacturing and installation tolerances, including those for size, squareness, and offsets at corners, and for compliance with minimum required face and edge clearances.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate fire side and protected side. Label or mark units as needed so that fire side and protected side are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Use methods approved by testing agencies that listed and labeled fire-resistant glazing products.

B. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials unless more stringent requirements are indicated, including those in referenced glazing publications.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches.
   1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
   2. Provide 1/8-inch- minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.

I. Set glass lites with proper orientation so that coatings face fire side or protected side as specified.

J. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

K. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended in writing by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

G. Apply cap bead of elastomeric sealant over exposed edge of tape.

3.5 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop, so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

D. Install gaskets so they protrude past face of glazing stops.

3.6 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
   1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Remove and replace glass that is damaged during construction period.

D. Wash glass on both exposed surfaces not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION

SECTION 090561.13 - MOISTURE VAPOR EMISSION CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes fluid-applied, resin-based, membrane-forming systems that control the moisture-vapor-emission rate of high-moisture, interior concrete to prepare it for floor covering installation.

B. Contractor's Responsibility: Suitability of concrete slab to meet vapor emission limits as required by scheduled floor finish materials is the responsibility of the Contractor. Where concrete slab vapor emission exceeds limits, apply topical vapor retarders specified in this section.

1.2 DEFINITIONS

A. MVE: Moisture vapor emission.

B. MVER: Moisture vapor emission rate.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:
   1. Product Data: For coatings, indicating VOC content.

1.4 INFORMATIONAL SUBMITTALS

A. Certifications: Furnish written certification that the manufacturer has verified the compatibility between the vapor retarder provided and the flooring product scheduled to be applied, including adhesives and floor leveling materials.

B. Flooring Manufacturer Acceptance of Vapor Retarder Application: Furnish a signed written statement obtained from flooring manufacturer, stating that the water vapor emission levels, after application of vapor retarders, are acceptable and suitable for their flooring application.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Employs factory-trained personnel who are available for consultation and Project-site inspection.

B. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

C. Provide the following upon request:
   1. Qualification Data: For installer and manufacturer.
   2. Product Test Reports: For each MVE-control system, for tests performed by a qualified testing agency.
   3. Preinstallation testing reports.
   4. Field quality-control reports.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating directions for storage and mixing with other components.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Comply with MVE-control system manufacturer's written instructions for substrate and ambient temperatures, humidity, ventilation, and other conditions affecting system installation.
   1. Store system components in a temperature-controlled environment and protected from weather and at ambient temperature of not less than 65 deg F and not more than 85 deg F at least 48 hours before use.
   2. Maintain ambient temperature and relative humidity in installation areas within range recommended in writing by MVE-control system manufacturer, but not less than 65 deg F or more than 85 deg F and not less than 40 or more than 60 percent relative humidity, for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.
   3. Install MVE-control systems where concrete surface temperatures will remain a minimum of 5 deg F higher than the dew point for ambient temperature and relative humidity conditions in installation areas for 48 hours before installation, during installation, and for 48 hours after installation unless longer period is recommended in writing by manufacturer.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. MVE-Control System Capabilities: Capable of suppressing MVE without failure where installed on concrete that exhibits the following conditions:
   1. MVER: Maximum 25 lb of water/1000 sq. ft. when tested according to ASTM F1869.
   2. Relative Humidity: Maximum 100 percent when tested according to ASTM F2170 using in situ probes.

B. Water-Vapor Transmission: Through MVE-control system, maximum 0.10 perm when tested according to ASTM E96/E96M.

C. Tensile Bond Strength: For MVE-control system, greater than 200 psi with failure in the concrete according to ASTM D7234.

2.2 MVE-CONTROL SYSTEM

A. MVE-Control System: ASTM F3010-qualified, fluid-applied, two-component, epoxy-resin, membrane-forming system; formulated for application on concrete substrates to reduce MVER to level required for installation of floor coverings indicated and acceptable to manufacturers of floor covering products indicated, including adhesives.
   1. Substrate Primer: Provide MVE-control system manufacturer's concrete-substrate primer if required for system indicated by substrate conditions.

2. Cementitious Underlayment Primer: If required for subsequent installation of cementitious underlayment products, provide MVE-control system manufacturer's primer to ensure adhesion of products to MVE-control system.
3. VOC Content: Provide coating with VOC content of 100 g/L or less.

2.3 ACCESSORIES

A. Patching and Leveling Material: Moisture-, mildew-, and alkali-resistant product recommended in writing by MVE-control system manufacturer and with minimum of 3000-psi compressive strength after 28 days when tested according to ASTM C109/C109M.

B. Crack-Filling Material: Resin-based material recommended in writing by MVE-control system manufacturer for sealing concrete substrate crack repair.

C. Cementitious Underlayment: If required to maintain manufacturer's warranty, provide MVE-control system manufacturer's hydraulic cement-based underlayment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for maximum moisture content, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
1. Installation of system indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Preinstallation Testing:
1. Testing Agency: Owner will engage through the Contractor a qualified testing agency to perform tests.
2. Alkalinity Testing: Perform pH testing according to ASTM F710. Install MVE-control system in areas where pH readings are less than 7.0 and in areas where pH readings are greater than 8.5.
3. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
   a. Anhydrous Calcium Chloride Test: ASTM F1869. Install MVE-control system in locations where concrete substrate MVER exceeds 3 lb of water/1000 sq. ft. in 24 hours.
   b. Internal Relative Humidity Test: Using in situ probes, ASTM F2170. Install MVE-control system in locations where concrete substrates exhibit relative humidity level greater than 75 percent.
4. Tensile-Bond-Strength Testing: For typical locations indicated to receive installation of MVE-control system, install minimum 100-sq. ft. area of MVE-control system to prepared concrete substrate and test according to ASTM D7234.
   a. Proceed with installation only where tensile bond strength is greater than 200 psi with failure in the concrete.

B. Concrete Substrates: Prepare and clean substrates according to MVE-control system manufacturer's written instructions to ensure adhesion of system to concrete.
   1. Remove coatings and other substances that are incompatible with MVE-control system and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by MVE-control system manufacturer. Do not use solvents.
   2. Provide concrete surface profile complying with ICRI 310.2R CSP 3 by shot blasting using apparatus that abrades the concrete surface with shot, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
   3. After shot blasting, repair damaged and deteriorated concrete according to MVE-control system manufacturer's written instructions.
   4. Protect substrate voids and joints to prevent resins from flowing into or leaking through them.
   5. Fill surface depressions and irregularities with patching and leveling material.
   6. Fill surface cracks, grooves, control joints, and other nonmoving joints with crack-filling material.
   7. Allow concrete to dry, undisturbed, for period recommended in writing by MVE-control system manufacturer after surface preparation, but not less than 24 hours.
   8. Before installing MVE-control systems, broom sweep and vacuum prepared concrete.

C. Protect walls, floor openings, electrical openings, door frames, and other obstructions during installation.

3.3 INSTALLATION

A. Install MVE-control system according to ASTM F3010 and manufacturer's written instructions to produce a uniform, monolithic surface free of surface deficiencies such as pin holes, fish eyes, and voids.
   1. Install primers as required to comply with manufacturer's written instructions.

B. Do not apply MVE-control system across substrate expansion, isolation, and other moving joints.

C. Apply system, including component coats if any, in thickness recommended in writing by MVE-control system manufacturer for MVER indicated by preinstallation testing.

D. Cure MVE-control system components according to manufacturer's written instructions. Prevent contamination or other damage during installation and curing processes.

E. After curing, examine MVE-control system for surface deficiencies. Repair surface deficiencies according to manufacturer's written instructions.

F. Install cementitious underlayment over cured membrane if required to maintain manufacturer's warranty and in thickness required to maintain the warranty.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage through the Contractor a qualified testing agency to perform installation inspections.

B. Installation Inspections: Inspect substrate preparation and installation of system components to ensure compliance with manufacturer's written instructions and to ensure that a complete MVE-control system is installed without deficiencies.
   1. Verify that surface preparation meets requirements.
   2. Verify that component coats and complete MVE-control-system film thicknesses comply with manufacturer's written instructions.
   3. Verify that MVE-control-system components and installation areas that evidence deficiencies are repaired according to manufacturer's written instructions.

C. MVE-control system will be considered defective if it does not pass inspections.

3.5 PROTECTION

A. Protect MVE-control system from damage, wear, dirt, dust, and other contaminants before floor covering installation. Use protective methods and materials, including temporary coverings, recommended in writing by MVE-control system manufacturer.

B. Do not allow subsequent preinstallation examination and testing for floor covering installation to damage, puncture, or otherwise compromise the MVE-control system membrane.

END OF SECTION

SECTION 092116.23 - GYPSUM BOARD SHAFT WALL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

1. Section includes gypsum board shaft wall assemblies.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review requirements for control joint locations.

1.3 ACTION SUBMITTALS

A. Product Data: For each component of gypsum board shaft wall assembly.

B. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and pre-consumer recycled content and cost.
   2. Environmental Product Declaration (EPD): For each product.
   3. Product Data: Material Ingredient Documentation.
   4. Product Data: for wall panel products indicating compliance with General Emissions Evaluation.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and support them on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with gypsum-shaftliner-board manufacturer's written instructions.

B. Do not install finish panels until installation areas are enclosed and conditioned. Use moisture- and mold-resistant panels or moisture- and mold-resistant fiberglass-mat faced panels if installation must take place prior to installation area being enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, or mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: Provide materials and construction identical to those of assemblies tested according to ASTM E90 and classified according to ASTM E413 by a testing and inspecting agency.

C. Recycled Content of Gypsum Board Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 5 percent.

D. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

E. Environmental Product Declarations: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

F. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

G. General Emissions Evaluation: Wall panel products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range.

2.2 GYPSUM BOARD SHAFT WALL ASSEMBLIES

A. Fire-Resistance Rating: As indicated on Drawings.

B. STC Rating: As indicatedm but not less than 51.

C. Gypsum Shaftliner Board:
   1. Moisture- and Mold-Resistant Type X: ASTM C1396/C1396M; manufacturer's proprietary fire-resistive liner panels with ASTM D3273 mold-resistance score of 10 as rated according to ASTM D3274, 1 inch thick, and with double beveled long edges.

D. Non-Load-Bearing Steel Framing, General: Complying with ASTM C645 requirements for metal unless otherwise indicated and complying with requirements for fire-resistance-rated assembly indicated.
   1. Protective Coating: ASTM A653/A653M, G60, hot-dip galvanized unless otherwise indicated.

E. Studs: Manufacturer's standard profile for repetitive, corner, and end members as follows:
   1. Depth: As indicated.
   2. Minimum Base-Metal Thickness: As indicated, but not less than 0.030 inch.

F. Runner Tracks: Manufacturer's standard J-profile track with manufacturer's standard long-leg length, but not less than than 2 inches long and matching studs in depth.
   1. Minimum Base-Metal Thickness: Matching steel studs.

G. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

H. Elevator-Hoistway-Entrance Struts: Manufacturer's standard J-profile jamb strut with long-leg length of 3 inches, matching studs in depth, and not less than 0.033 inch thick.

I. Finish Panels: Gypsum board as specified in Section 092900 "Gypsum Board.".

2.3 Sound Attenuation Blankets: As specified in Section 092900 "Gypsum Board." AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with shaft wall manufacturer's written instructions.

B. Trim Accessories: Cornerbead, edge trim, and control joints of material and shapes as specified in Section 092900 "Gypsum Board" that comply with gypsum board shaft wall assembly manufacturer's written instructions for application indicated.

C. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

D. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.
   1. Expansion Anchors: Fabricated from corrosion-resistant materials, with allowable load or strength design capacities calculated according to ICC-ES AC193 and ACI 318 greater than or equal to the design load, as determined by testing per ASTM E488/E488M conducted by a qualified testing agency.

E. Reinforcing: Galvanized-steel reinforcing strips with 0.033-inch minimum thickness of base metal (uncoated).

F. Acoustical Sealant: Section 079219 "Acoustical Joint Sealants."

G. Gypsum Board Cants:
   1. Gypsum Board Panels: As specified in Section 092900 "Gypsum Board," Type X, 5/8-inch panels.
   2. Non-Load-Bearing Steel Framing: As specified in Section 092216 "Non-Structural Metal Framing."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Sprayed Fire-Resistive Materials: Coordinate with gypsum board shaft wall assemblies so both elements of Work remain complete and undamaged. Patch or replace sprayed fire-resistive materials removed or damaged during installation of shaft wall assemblies to comply with requirements specified in Section 078100 "Applied Fire Protection."

B. After sprayed fire-resistive materials are applied, remove only to extent necessary for installation of gypsum board shaft wall assemblies and without reducing the fire-resistive material thickness below that which is required to obtain fire-resistance rating indicated. Protect remaining fire-resistive materials from damage.

3.3 INSTALLATION

A. General: Install gypsum board shaft wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated and manufacturer's written installation instructions.

B. Do not bridge building expansion joints with shaft wall assemblies; frame both sides of expansion joints with furring and other support.

C. Install supplementary framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, wall-mounted door stops, and similar items that cannot be supported directly by shaft wall assembly framing.
   1. Elevator Hoistway: At elevator hoistway-entrance door frames, provide jamb struts on each side of door frame.
   2. Reinforcing: Provide where items attach directly to shaft wall assembly as indicated on Drawings; accurately position and secure behind at least one layer of face panel.

D. Penetrations: At penetrations in shaft wall, maintain fire-resistance rating of shaft wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons and floor indicators, and similar items.

E. Isolate perimeter of gypsum panels from building structure to prevent cracking of panels while maintaining continuity of fire-rated construction.

F. Firestop Tracks: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.

G. Control Joints: Install control joints according to ASTM C840, including compliance with ASTM 20.3.1 - 20.4 for control joint spacing, whether or not such joints are indicated on Drawings, in specific locations approved by Architect and as follows, while maintaining fire-resistance rating of gypsum board shaft wall assemblies.
   1. Install at changes in backup material.
   2. Framed Openings (Both Sides of Partition):
      a. Doors: Install above both jambs unless indicated or directed otherwise.
      b. Glazed Openings: Install above and below both jambs unless indicated or directed otherwise.
   3. Install at other locations indicated on Drawings.

H. Sound-Rated Shaft Wall Assemblies: Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other work and at joints and penetrations within each assembly.

I. Gypsum Board Cants: At projections into shaft exceeding 4 inches, install gypsum board cants covering tops of projections.

1. Slope cant panels at least 75 degrees from horizontal. Set base edge of panels in adhesive and secure top edges to shaft walls at 24 inches o.c. with screws fastened to shaft wall framing.
2. Where non-load-bearing steel framing is required to support gypsum board cants, install framing at 24 inches o.c. and extend studs from the projection to shaft wall framing.

J. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.4 PROTECTION

A. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

B. Remove and replace panels that are wet, moisture damaged, or mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Framing systems.
   2. Suspension systems.

1.2 ACTION SUBMITTALS

A. Product Data:
   1. Framing systems.
   2. Suspension systems.

B. Sustainable Design Submittals:
   1. Recycled Content: Provide manufacturer documentation for recycled content, indicating postconsumer and preconsumer recycled content.
   2. Product Data: Environmental Product Declaration (EPD).
   3. Product Data: Material Ingredient Documentation.

1.3 QUALITY ASSURANCE

A. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Certified Steel Stud Association, the Steel Framing Industry Association, or the Steel Stud Manufacturers Association.

B. Provide the following upon request:
   1. Product Certificates: For each type of code-compliance certification for studs and tracks.
   2. Evaluation Reports: For high-strength steel studs and tracks, firestop tracks,and post-installed anchors, from ICC-ES or other qualified testing agency acceptable to authorities having jurisdiction.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Notify manufacturer of damaged materials received prior to installation.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling as required by AISI S202, "Code of Standard Practice for Cold-Formed Steel Structural Framing."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, in accordance with ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated on Drawings, in accordance with ASTM E90 and classified in accordance with ASTM E413 by an independent testing agency.

C. Design framing systems in accordance with AISI S220, "North American Specification for the Design of Cold-Formed Steel Framing - Nonstructural Members," unless otherwise indicated.

D. Design Loads: As indicated on architectural Drawings or 5 lbf/sq. ft. minimum as required by the IBC.

E. Design framing systems to accommodate deflection of primary building structure and construction tolerances and to withstand design loads with a maximum deflection of 1 inch .

2.2 FRAMING SYSTEMS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Environmental Product Declarations: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

C. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

D. Framing Members, General: Comply with AISI S220 for conditions indicated.
   1. Steel Sheet Components: Comply with AISI S220 requirements for metal unless otherwise indicated
   2. Protective Coating: Comply with AISI S220; ASTM A653/A653M, G60 (Z180); or coating with equivalent corrosion resistance. Galvannealed products are unacceptable.
      a. Coating demonstrates equivalent corrosion resistance with an evaluation report acceptable to authorities having jurisdiction.

E. Studs and Track: AISI S220.
   1. Minimum Base-Steel Thickness: As indicated on Drawings.
   2. Depth: As indicated on Drawings.

F. High-Strength Steel Studs and Tracks: Roll-formed with surface deformations to stiffen the framing members.
   1. Minimum Base-Steel Thickness: As indicated on Drawings.
   2. Depth: As indicated on Drawings.

G. Slip-Type Head Joints: Where indicated, provide one of the following:
   1. Double-Track System: Top outer tracks, inside track with 2-inch- deep flanges in thickness not less than indicated for studs and fastened to studs, and outer track sized to friction-fit over inner track.
   2. Deflection Track: Steel sheet top track manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

H. Firestop Tracks: Top track manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

I. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
   1. Minimum Base-Steel Thickness: As indicated on Drawings.

J. Cold-Rolled Channel Bridging: Steel, 0.0538-inch minimum base-steel thickness, with minimum 1/2-inch- wide flanges.
   1. Depth: As indicated on Drawings.
   2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches, 0.068-inch- thick, galvanized steel.

K. Hat-Shaped, Rigid Furring Channels:
   1. Minimum Base-Steel Thickness: As indicated on Drawings.
   2. Depth: As indicated on Drawings.

L. Resilient Furring Channels: 1/2-inch- deep, steel sheet members designed to reduce sound transmission.
   1. Configuration: Asymmetrical or hat shaped.

M. Cold-Rolled Furring Channels: 0.053-inch uncoated-steel thickness, with minimum 1/2-inch- wide flanges.
   1. Depth: As indicated on Drawings.
   2. Furring Brackets: Adjustable, corrugated-edge-type steel sheet with minimum uncoated-steel thickness of 0.0329 inch.
   3. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.

N. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 3/4 inch, minimum uncoated-steel thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.062-inch- diameter wire, or double strand of 0.048-inch- diameter wire.

B. Hanger Attachments to Concrete:
   1. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, AC193, AC58, or AC308 as appropriate for the substrate.
      a. Uses: Securing hangers to structure.
      b. Type: torque-controlled, adhesive anchor adhesive anchor.
      c. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.

C. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper, 0.16 inch in diameter.

D. Wire Hangers: ASTM A641/A641M, Class 1 zinc coating, soft temper of the following sizes:
   1. 0.15 inch in diameter when spacing is 3'-0" by 4'-0".

2. 0.16 inch in diameter when spacing is 4'-0" by 4'-0".

E. Flat Hangers: Steel sheet, in size indicated on Drawings.

F. Carrying Channels (Main Runners): Cold-rolled, commercial-steel sheet with a base-steel thickness of 0.0538 inch and minimum 1/2-inch- wide flanges.
1. Depth: As indicated on Drawings.

G. Furring Channels (Furring Members):
1. Cold-Rolled Channels: 0.0538-inch uncoated-steel thickness, with minimum 1/2-inch-wide flanges, 3/4 inch deep.
2. Steel Studs and Tracks:
a. Minimum Base-Steel Thickness: As indicated on Drawings.
b. Depth: As indicated on Drawings.
3. High-Strength Steel Studs and Tracks:
a. Minimum Base-Steel Thickness: As indicated on Drawings .
b. Depth: As indicated on Drawings.
4. Hat-Shaped, Rigid Furring Channels: 7/8 inch deep.
a. Minimum Base-Steel Thickness: As indicated on Drawings.
5. Resilient Furring Channels: 1/2-inch- deep members designed to reduce sound transmission.
a. Configuration: Asymmetrical or hat shaped.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.
1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide the following:
1. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:

1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling tracks to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C754.
   1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.

B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.

C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

D. Install bracing at terminations in assemblies.

E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLATION OF FRAMING SYSTEMS

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
   1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
   2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install track section (for cripple studs) at head and secure to jamb studs.
      a. Install two studs at each jamb unless otherwise indicated.
      b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
      c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
   3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
   a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.
6. Curved Partitions:
   a. Bend track to uniform curve and locate straight lengths so they are tangent to arcs.
   b. Begin and end each arc with a stud, and space intermediate studs equally along arcs. On straight lengths of no fewer than two studs at ends of arcs, place studs 6 inches o.c.

E. Direct Furring:
1. Attach to concrete or masonry with stub nails, or screws designed for masonry attachment, spaced 24 inches o.c.

F. Z-Shaped Furring Members:
1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-shaped furring members spaced 24 inches o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails or screws designed for masonry attachment, spaced 24 inches o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch from the plane formed by faces of adjacent framing.

3.5 INSTALLATION OF SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
   a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
   a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
7. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
8. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

3.6 FIELD QUALITY CONTROL

A. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior gypsum board.
   2. Backing panels.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review requirements for control joint locations.

1.3 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures".

B. Product Data: For each type of product.

C. Shop Drawings: Show locations and installation of control and expansion joints, including plans, elevations, sections, details of components, and attachments to other work.

D. Samples: For the following products:
   1. Trim Accessories: Full-size Sample in 12-inch- long length for each trim accessory indicated.

E. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
   2. Environmental Product Declaration (EPD): For each product.
   3. Product Data: Material Ingredient Documentation.
   4. Product Data: for wall panel products indicating compliance with General Emissions Evaluation.
   5. Product Data: For insulation products indicating compliance with General Emissions Evaluation.
   6. Product Data: For adhesives, sealants, and coatings indicating compliance with General Emissions Evaluation and VOC content requirements.

1.4 MOCKUPS

A. Build mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.
   1. Build mockups for the following:
      a. Each level of gypsum board finish indicated for use in exposed locations.
   2. Apply or install final decoration indicated, including painting and wallcoverings, on exposed surfaces for review of mockups.
   3. Simulate finished lighting conditions for review of mockups.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned. Use mold-resistant gypsum board or glass-mat interior gypsum board if installation must take place prior to installation areas being enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of gypsum panel and joint finishing material from single source with resources to provide products of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E90 and classified according to ASTM E413 by an independent testing agency.

C. Ceiling and wall materials shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.3 GYPSUM BOARD, GENERAL

A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 5 percent.

B. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

C. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

D. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.4 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C1396/C1396M.
   1. Thickness: 5/8 inch.
   2. Long Edges: Tapered and featured (rounded or beveled) for prefilling.

B. Mold-Resistant Gypsum Board: ASTM C1396/C1396M. With moisture- and mold-resistant core and paper surfaces.
   1. Core: 5/8 inch, Type X.
   2. Long Edges: Tapered.
   3. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.5 BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.
   1. Core: 5/8 inch, Type X.
   2. Mold Resistance: ASTM D3273, score of 10 as rated according to ASTM D3274.

2.6 TRIM ACCESSORIES

A. Interior Trim: ASTM C1047.
   1. Material: Galvanized or aluminum-coated steel sheet.
   2. Shapes:
      a. Cornerbead.
      b. Bullnose bead.
      c. LC-Bead: J-shaped; exposed long flange receives joint compound.
      d. L-Bead: L-shaped; exposed long flange receives joint compound.
      e. U-Bead: J-shaped; exposed short flange does not receive joint compound.
      f. Expansion (control) joint.

2.7 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C475/C475M.

B. Joint Tape:
   1. Interior Gypsum Board: Paper.
   2. Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
   1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
   2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.
      a. Use setting-type compound for installing paper-faced metal trim accessories.
   3. Fill Coat: For second coat, use drying-type, all-purpose compound.
   4. Finish Coat: For third coat, use drying-type, all-purpose compound.

5. Skim Coat: For final coat of Level 5 finish, use drying-type, all-purpose compound.

D. Joint Compound for Backing Panels:
1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

2.8 AUXILIARY MATERIALS

A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.

B. Steel Drill Screws: ASTM C1002 unless otherwise indicated.
1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

C. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.
2. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 40 percent.
3. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.
4. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

D. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."
1. Sealant shall have a VOC content of 250 g/L or less.
2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Firestop Putty Pads for Electrical Boxes: Listed intumescent moldable firestop putty pads.

1. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
a. Specified Technologies Inc. (STI); "SpecSeal Series SSP Putty Pad".

F. Acoustic Putty Pads for Electrical Boxes: Asbestos-free, putty pads composed of polybutene-butyl and inert fillers.

1. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   a. Specified Technologies Inc. (STI); "SpecSeal Series SSP Putty Pad".

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF PANELS, GENERAL

A. Comply with ASTM C840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
   1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
   2. Fit gypsum panels around ducts, pipes, and conduits.
   3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch- wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.

J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:
   1. Type X: As indicated on Drawings.
   2. Mold-Resistant Type: As indicated on Drawings.
   3. Glass-Mat, Water-Resistant Backing Board: As indicated on Drawings.

B. Single-Layer Application:
   1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
   2. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
      a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
      b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
   3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
   4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:
   1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
   2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
   3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.

4. Fastening Methods: Fasten base layers and face layers separately to supports with screws.

3.4 INSTALLATION OF BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions. Install with 1/4-inch gap where panels abut other construction or penetrations.

B. Where backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLATION OF TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints according to ASTM C 840, including compliance with ASTM 20.3.1 - 20.4 for control joint spacing, whether or not such joints are indicated on Drawings, in specific locations approved by Architect for visual effect and as follows.
   1. Install at changes in backup material.
   2. Framed Openings (Both Sides of Partition):
      a. Doors: Install above both jambs unless indicated or directed otherwise.
      b. Glazed Openings: Install above and below both jambs unless indicated or directed otherwise.
   3. Install at other locations indicated on Drawings.

C. Interior Trim: Install in the following locations:
   1. Cornerbead: Use at outside corners unless otherwise indicated.
   2. Bullnose Bead: Use where indicated on Drawings.
   3. LC-Bead: Use at exposed panel edges.
   4. L-Bead: Use where indicated on Drawings.
   5. U-Bead: Use where indicated on Drawings.

D. Firestop Putty Pads: Install at power, audio/visual, data, light and similar boxes located in fire-rated partitions. Install in accordance with pad manufacturer's instructions.

E. Acoustic Putty Pads: Install at power, audio/visual, data, light and similar boxes located in acoustic-rated partitions. Install in accordance with pad manufacturer's instructions.

3.6 FINISHING OF GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C840:
   1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
   2. Level 2: Panels that are substrate for tile.
   3. Level 3: Panels that are substrate for heavy grade wall coverings.
   4. Level 4: Not used.
   5. Level 5: At all panel surfaces exposed to view, and elsewhere where indicated.

E. Glass-Mat Faced Panels: Finish according to manufacturer's written instructions.

3.7 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Porcelain tile.
2. Glazed wall tile.
3. Waterproof membranes.
4. Crack isolation membranes.
5. Setting material.
6. Grout materials.

1.2 DEFINITIONS

A. General: Definitions in ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. Face Size: Actual tile size, excluding spacer lugs.

C. Large Format Tile: Tile with at least one edge 15 inches or longer.

D. Module Size: Actual tile size plus joint width indicated.

E. Wet Area: The term "wet area" refers to shower rooms and other areas with similar usages. It does not refer to toilet rooms and other similar areas where water on the floor is seldom encountered.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show locations, plans, and elevations, of each type of tile and tile pattern. Show widths, details, and locations of movement joints in tile substrates and finished tile surfaces. Show thresholds.

C. Samples for Initial Selection: For tile, grout, and accessories involving color selection or shade variation.

D. Samples for Verification:
1. Full-size units of each type and composition of tile and for each color and finish required.
2. Assembled samples mounted on a rigid panel, with grouted joints, for each type and composition of tile and for each color and finish required. Make samples at least 36 inches square, but not fewer than four tiles. Use grout of type and in color or colors approved for completed Work.
3. Full-size units of each type of trim and accessory for each color and finish required.
4. Metal flooring transitions 6-inch lengths.

E. Sustainable Design Submittals:
   1. Environmental Product Declaration: For each product.
   2. Material Ingredient Documentation: For each product.
   3. Product Data: For liquid membranes and adhesives indicating compliance with General Emissions Evaluation and VOC content requirements.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.
   2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

1.6 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Installer is a Five-Star member of the National Tile Contractors Association a Trowel of Excellence member of the Tile Contractors' Association of America.
   2. Installer's supervisor for Project holds the International Masonry Institute's Supervisor Certification.

B. Minimizing Tile Lippage: Tile greater than 12 inches in either dimension shall be installed with a leveling system designed to control lippage and other related installation control activities. Refer to ANSI A108.03; Section 4.3.7.

C. Provide the following upon request:
   1. Qualification Data: For Installer.
   2. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.
   3. Product Certificates: For each type of product, including product use classification.
   4. Product Test Reports:
      a. Tile-setting and -grouting products.
      b. Certified porcelain tile.
      c. Slip-resistance test reports from qualified independent testing agency.
   5. Field Quality-Control Reports: Water test reports of membrane in wet areas.

1.7 MOCKUPS

A. Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Build mockup of each type of floor tile installation.
   2. Build mockup of each type of wall tile installation.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.10 WARRANTY

A. System Warranty: Manufacturer's non-prorated comprehensive warranty that agrees to repair and replace defective installation areas, material, and labor that fail under normal usage within specified warranty period.
   1. Warranty Period: Lifetime from date of Product Purchase.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Tile: Obtain tile of each type and color or finish from single source or producer.
   1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Tiling System: Obtain system products from single manufacturer and each aggregate from single source or producer.

C. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Obtain setting and grouting materials, except for unmodified portland cement and aggregate, from single manufacturer.
   2. Obtain underlayment from manufacturer of setting and grouting materials.
   3. Obtain waterproof membrane, crack isolation, and other required membranes from manufacturer of setting and grouting materials.
   4. Obtain joint sealants from manufacturer of setting and grouting materials.

D. Surface Friction: Not less than 0.6 according to ASTM D 2047.
   1. No high gloss finish.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
   1. Provide tile complying with Standard Grade requirements.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.
   1. Where tile is indicated for installation in wet areas, do not use back- or edge-mounted tile assemblies unless tile manufacturer specifies in writing that this type of mounting is suitable for installation indicated and has a record of successful in-service performance.

E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

F. Dynamic Coefficient of Friction: Provide tile installed on walkway surfaces with dynamic coefficient of friction indicated as determined by testing identical products per ANSI A137.1 DCOF AcuTest procedure.

2.3 PORCELAIN TILE

A. Porcelain Tile Type : Unglazed and Glazed.
   1. Certification: Tile certified by the Porcelain Tile Certification Agency.
   2. Face Size: As indicated.
   3. Face Size Variation: Rectified.
   4. Tile Color, Glaze, and Pattern: Match Architect's sample.
   5. Grout Color: Match Architect's sample.
   6. Precoat with temporary protective coating.
   7. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
      a. Base Cap: Surface bullnose, module size same as adjoining flat tile.
      b. Wainscot Cap: Surface bullnose, module size same as adjoining flat tile.
      c. External Corners: Surface bullnose, module size same as adjoining flat tile.
      d. Internal Corners: Field-butted square corners.

2.4 GLAZED WALL TILE

A. Glazed Wall Tile Type :
   1. Module Size: As indicated.
   2. Face Size Variation: Rectified.
   3. Tile Color and Pattern: Match Architect's sample.
   4. Grout Color: Match Architect's sample.
   5. Mounting:
      a. Factory, back mounted.

6. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:
   a. Base for Thinset Mortar Installations: Straight .
   b. Wainscot Cap for Thinset Mortar Installations: Surface bullnose .
   c. External Corners for Thinset Mortar Installations: Surface bullnose; same size as adjoining flat tile.
   d. Internal Corners: Field-butted square corners. For coved base and cap, use angle pieces designed to fit with stretcher shapes.

B. Accessories: Provide vitreous china accessories of type and size indicated; suitable for installing by same method as used for adjoining wall tile.
   1. Color and Finish: Match Architect's sample.

2.5 BACKING PANELS

A. Backing Panels: Specified in Section 092900 "Gypsum Board."

2.6 WATERPROOF MEMBRANES

A. General: Manufacturer's standard product that complies with ANSI A118.10 and ANSI A118.12 and is recommended by manufacturer for application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Waterproof Membrane, Fluid Applied: Liquid-latex rubber or elastomeric polymer with continuous fabric reinforcement.

C. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

D. Low-Emitting Requirements - General: For coatings, and flooring products internal to the weatherproofing envelope provide the following:
   1. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range, as well as the amount applied in mass per surface area (for wet applied products).
   2. VOC Content Limits: For wet applied product show compliance with VOC limits as defined in Section 018113 Sustainable Design Requirements.
   3. VOC Content Requirements: All paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.
   4. Methylene Chloride and perchloroethylene shall not be intentionally added in paints, coatings, adhesives, and sealants.

2.7 CRACK ISOLATION MEMBRANES

A. General: Manufacturer's standard product that complies with ANSI A118.12 for high performance and is recommended by manufacturer for application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Crack Isolation Membrane, Fluid Applied: Liquid-latex rubber or elastomeric polymer with continuous fabric reinforcement.

C. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

D. Low-Emitting Requirements - General: For coatings, and flooring products internal to the weatherproofing envelope provide the following:
   1. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range, as well as the amount applied in mass per surface area (for wet applied products).
   2. VOC Content Limits: For wet applied product show compliance with VOC limits as defined in Section 018113 Sustainable Design Requirements.
   3. VOC Content Requirements: All paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.
   4. Methylene Chloride and perchloroethylene shall not be intentionally added in paints, coatings, adhesives, and sealants.

2.8 SETTING MATERIALS

A. Environmental Product Declarations: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

B. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

C. Low-Emitting Requirements - General: For coatings, and flooring products internal to the weatherproofing envelope provide the following:
   1. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range, as well as the amount applied in mass per surface area (for wet applied products).
   2. VOC Content Limits: For wet applied product show compliance with VOC limits as defined in Section 018113 Sustainable Design Requirements.
   3. VOC Content Requirements: All paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.
   4. Methylene Chloride and perchloroethylene shall not be intentionally added in paints, coatings, adhesives, and sealants.

D. Portland Cement Mortar (Thickset) Installation Materials: ANSI A108.02.
   1. Reinforcing Wire Fabric: Galvanized, welded-wire fabric, 2 by 2 inches by 0.062-inch diameter; comply with ASTM A1064/A1064M except for minimum wire size.

2. Latex Additive: styrene-butadiene-rubber water emulsion, serving as replacement for part or all of gaging water, of type specifically recommended by latex-additive manufacturer for use with field-mixed portland cement and aggregate mortar bed.

E. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
1. Provide prepackaged, dry-mortar mix combined with styrene-butadiene-rubber liquid-latex additive at Project site.
2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to other requirements in ANSI A118.15.

F. Medium-Bed, Modified Dry-Set Mortar: Comply with requirements in ANSI A118.4. Provide product that is approved by manufacturer for application thickness of 5/8 inch.
1. Provide prepackaged, dry-mortar mix combined with styrene-butadiene-rubber liquid-latex additive at Project site.

2.9 GROUT MATERIALS

A. Environmental Product Declarations: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

B. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

C. Low-Emitting Requirements - General: For coatings, and flooring products internal to the weatherproofing envelope provide the following:
1. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range, as well as the amount applied in mass per surface area (for wet applied products).
2. VOC Content Limits: For wet applied product show compliance with VOC limits as defined in Section 018113 Sustainable Design Requirements.
3. VOC Content Requirements: All paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.
4. Methylene Chloride and perchloroethylene shall not be intentionally added in paints, coatings, adhesives, and sealants.

D. High-Performance Tile Grout: ANSI A118.7.
1. Polymer Type:
a. Liquid-latex form for addition to prepackaged dry-grout mix.

2.10 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting and adhesive materials for installations indicated.
1. Low-Emitting Requirements - General: For coatings, and flooring products internal to the weatherproofing envelope provide the following:

a. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range, as well as the amount applied in mass per surface area (for wet applied products).
b. VOC Content Limits: For wet applied product show compliance with VOC limits as defined in Section 018113 Sustainable Design Requirements.
c. VOC Content Requirements: All paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.
d. Methylene Chloride and perchloroethylene shall not be intentionally added in paints, coatings, adhesives, and sealants.

B. Metal Flooring Transitions: As indicated; profile designed specifically for flooring applications; height to match tile and setting-bed thickness.

C. Temporary Protective Coating: Formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products and easily removable after grouting is completed without damaging grout or tile.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

E. Grout Sealer: Grout manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.
1. Low-Emitting Requirements - General: For coatings, and flooring products internal to the weatherproofing envelope provide the following:
a. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range, as well as the amount applied in mass per surface area (for wet applied products).
b. VOC Content Limits: For wet applied product show compliance with VOC limits as defined in Section 018113 Sustainable Design Requirements.
c. VOC Content Requirements: All paints and coatings wet-applied on site must meet the applicable VOC limits of the California Air Resources Board (CARB) 2007, Suggested Control Measure (SCM) for Architectural Coatings, or South Coast Air Quality Management District (SCAQMD) Rule 1113, effective February 5, 2016.
d. Methylene Chloride and perchloroethylene shall not be intentionally added in paints, coatings, adhesives, and sealants.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with bonded mortar bed or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
   a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
   b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove coatings, including curing compounds or other coatings, that are incompatible with tile-setting materials.

B. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

C. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1 and is sloped 1/4 inch per foot toward drains.

D. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

E. Substrate Flatness:
   1. For tile shorter than 15 inches, confirm that structure or substrate is limited to variation of 1/4 inch in 10 ft. from the required plane, and no more than 1/16 inch in 12 inches when measured from tile surface high points.
   2. For large format tile, tile with at least one edge 15 inches or longer, confirm that structure or substrate is limited to 1/8 inch in 10 ft. from the required plane, and no more than 1/16 inch in 24 inches when measured from tile surface high points.

F. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 INSTALLATION OF CERAMIC TILE SYSTEM

A. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
   1. Allow waterproof membrane to cure and verify by testing that it is watertight before installing tile or setting materials over it.

B. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.
   1. Allow crack isolation membrane to cure before installing tile or setting materials over it.

C. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
   1. Add materials, water, and additives in accurate proportions.
   2. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

D. Install tile in accordance with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of ANSI A108 series that are referenced in TCNA installation methods and specified in tile installation schedules, and apply to types of setting and grouting materials used.
   1. For the following installations, follow procedures in ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
      a. Tile floors in wet areas.
      b. Tile floors consisting of tiles 8 by 8 inches or larger.
      c. Tile floors consisting of rib-backed tiles.
   2. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
   3. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
   4. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.
   5. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.
   6. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
      a. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets, so joints between sheets are not apparent in finished Work.

b. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
c. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

7. Lay out tile wainscots to dimensions indicated or to next full tile beyond dimensions indicated.
8. Joint Widths: Install tile with joint widths indicated on Drawings, or if not indicated, as directed by Architect.

E. Movement Joints: Provide movement joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated on Drawings. Form joints during installation of setting materials, mortar beds, and tile. Keep joints free of dirt, debris, and setting materials prior to filling with sealants. Do not saw-cut joints after installing tiles.
1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them.
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."
3. Comply with requirements of the TCNA Handbook for Ceramic, Glass, and Stone Tile Installation; "EJ171 - Movement Joint Guidelines for Ceramic, Glass, and Stone":
a. Movement Joints: Maximum spacing of joints in interior tile shall be 20 to 25 feet in each direction. Fill joints with sealant matching grout color.

F. Grout Sealer: Apply grout sealer to cementitious grout joints in tile floors in accordance with manufacturer's written instructions. As soon as sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 FIELD QUALITY CONTROL

A. Water Test:
1. Test of waterproofing membrane in showers and similar areas to be performed by Installation Contractor before setting tile.
a. Perform test after 24 hours of waterproof membrane installation.
b. Insert test plug in drain or waste line.
c. Fill shower base with water, high enough that the membrane-to-drain connection and floor-to-wall transition can be evaluated, and mark wall.
d. Check for leaks after 24 hours.
2. Test to be witnessed by authorities having jurisdiction.

B. Nonconforming Work:
1. Waterproof membrane will be considered defective if water level has dropped.
2. Remove and replace defective components and retest.

3.5 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile in accordance with tile and grout manufacturer's written instructions. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.6 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:
   1. TCNA F122: Thinset mortar on waterproof membrane.
      a. Thinset Mortar: Improved modified dry-set mortar.
         1) Use medium-bed, modified dry-set mortar at large format tile if recommended by tile manufacturer.
      b. Grout: High-performance sanded cement grout.
      c. Waterproof Membrane: Fabric-reinforced, fluid-applied membrane.
   2. TCNA F125-Full : Thinset mortar on crack isolation membrane.
      a. Thinset Mortar: Improved modified dry-set mortar.
         1) Use medium-bed, modified dry-set mortar at large format tile if recommended by tile manufacturer.
      b. Grout: High-performance unsanded cement grout.
      c. Crack Isolation Membrane: Fabric-reinforced, fluid-applied membrane.

B. Interior Wall Installations, Masonry or Concrete:
   1. TCNA W202I : Thinset mortar over waterproof membrane.
      a. Thinset Mortar: Improved modified dry-set mortar.
      b. Grout: High-performance unsanded cement grout.
      c. Waterproof Membrane: Fabric-reinforced, fluid-applied membrane.

C. Interior Wall Installations, Metal Studs or Furring:
   1. TCNA W245 : Thinset mortar on glass-mat, water-resistant gypsum backer board over waterproof membrane.
      a. Thinset Mortar: Improved modified dry-set mortar.
      b. Grout: High-performance unsanded cement grout.
      c. Waterproof Membrane: Fabric-reinforced, fluid-applied membrane.

END OF SECTION

SECTION 095113 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Acoustical panels.
   2. Metal suspension system.
   3. Metal edge moldings and trim.

B. Related Requirements:
   1. Section 013573 "Delegated Design Requirements and Procedures" for definitions, submittal procedures, responsibilities, and scheduling requirements associated with delegated design assignment indicated in this Section.

C. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures".

B. Product Data:
   1. Acoustical panels.
   2. Metal suspension system.
   3. Metal edge moldings and trim.

C. Sustainable Design Submittals:
   1. Recycled Content: Provide manufacturer documentation for recycled content, indicating postconsumer and preconsumer recycled content.
   2. Environmental Product Declaration: For each product.
   3. Product Data: Embodied Carbon/LCA Optimization
   4. Material Ingredient Documentation: For each product
   5. Laboratory Test Reports: For ceiling products, indicating compliance with requirements for low-emitting materials.

D. Shop Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Ceiling suspension-system members.
   2. Structural members to which suspension systems will be attached.
   3. Method of attaching hangers to building structure.
      a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
   4. Carrying channels or other supplemental support for hanger-wire attachment where conditions do not permit installation of hanger wires at required spacing.
   5. Size and location of initial access modules for acoustical panels.

6. Items penetrating finished ceiling and ceiling-mounted items including the following:
   a. Lighting fixtures.
   b. Diffusers.
   c. Grilles.
   d. Speakers.
   e. Sprinklers.
   f. Access panels.
   g. Perimeter moldings.
7. Show operation of hinged and sliding components covered by or adjacent to acoustical panels.
8. Minimum Drawing Scale: 1/4 inch = 1 foot.

E. Samples for Initial Selection: For components with factory-applied finishes.

F. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of sizes indicated below:
   1. Acoustical Panels: Set of full-size Samples of each type, color, pattern, and texture.
   2. Exposed Suspension-System Members, Moldings, and Trim: Set of 6-inch- long Samples of each type, finish, and color.
   3. Clips: Full-size hold-down, impact, and seismic clips.

G. Delegated-Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
   1. Provide delegated-design submittals for seismic restraints for ceiling systems.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Acoustical Ceiling Units: Full-size panels equal to 2 percent of quantity installed.
   2. Suspension-System Components: Quantity of each exposed component equal to 2 percent of quantity installed.
   3. Hold-Down Clips: Equal to 2 percent of quantity installed.
   4. Impact Clips: Equal to 2 percent of quantity installed.

1.6 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Build mockup of typical ceiling area as indicated on Drawings.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

B. Provide the following upon request:
   1. Qualification Data: For testing agency.
   2. Product Test Reports: For each acoustical panel ceiling, for tests performed by a qualified testing agency.
   3. Evaluation Reports: For each acoustical panel ceiling suspension system and anchor and fastener type, from ICC-ES.
   4. Field quality-control reports.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension-system components, and accessories to Project site and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
   1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Source Limitations for Ceiling System: Obtain each type of acoustical ceiling panel and its supporting suspension system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design seismic restraints for ceiling systems.
   1. Material properties indicated in this Section shall be considered as minimum properties.

C. Seismic Performance: Suspended ceilings to withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.

D. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: Class A in accordance with ASTM E1264.
   2. Smoke-Developed Index: 50 or less.

E. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL or from the listings of another qualified testing agency.

2.3 ACOUSTICAL PANELS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Acoustical Panel Standard: Provide manufacturer's standard panels in accordance with ASTM E1264 and designated by type, form, pattern, acoustical rating, and light reflectance unless otherwise indicated.

C. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

D. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

E. Environmental Product Declaration Optimization Assessment or LCA Action Plan: Provide Type III Product Specific Environmental Product Declaration that includes an embodied carbon optimization report or action plan.

F. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

G. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range.

H. Color: Match Architect's sample.

I. Antimicrobial Treatment: Manufacturer's standard broad spectrum, antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested in accordance with ASTM D3273, ASTM D3274, or ASTM G21 and evaluated in accordance with ASTM D3274 or ASTM G21.

2.4 METAL SUSPENSION SYSTEM

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Metal Suspension-System Standard: Provide manufacturer's standard, direct-hung, metal suspension system and accessories in accordance with ASTM C635/C635M and designated by type, structural classification, and finish indicated.

C. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

D. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

E. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

2.5 ACCESSORIES

A. Attachment Devices: Size for five times the design load indicated in ASTM C635/C635M, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.
   1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing in accordance with ASTM E488/E488M or ASTM E1512 as applicable, conducted by a qualified testing and inspecting agency.
      a. Type: Cast-in-place anchors.
      b. Corrosion Protection, Stainless Steel: Components complying with ASTM F593 and ASTM F594, Group 1 Alloy 304 or 316.

B. Wire Hangers, Braces, and Ties: Provide wires as follows:
   1. Stainless Steel Wire: ASTM A580/A580M, Type 304, nonmagnetic.
   2. Size: Wire diameter sufficient for its stress at three times hanger design load (ASTM C635/C635M, Table 1, "Direct Hung") will be less than yield stress of wire, but not less than 0.135-inch- diameter wire.
   3. Size:
      a. Hanger Wire Size: 0.106 inch (No. 12-gauge) diameter wire.
      b. Seismic Bracing Wire Size: 0.106 inch (No. 12-gauge) diameter wire.
      c. Slack Safety Wire Size: 0.106 inch (No. 12-gauge) diameter wire.

C. Hanger Rods: Mild steel, zinc coated or protected with rust-inhibitive paint.

D. Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

E. Angle Hangers: Angles with legs not less than 7/8 inch wide; formed with 0.04-inch-thick, galvanized-steel sheet complying with ASTM A653/A653M, G90 coating designation; with bolted connections and 5/16-inch- diameter bolts.

F. Hold-Down Clips: Manufacturer's standard hold-down.

G. Impact Clips: Manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.

H. Seismic Clips: Manufacturer's standard seismic clips designed to secure acoustical panels in place during a seismic event.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension-system runners.
   1. Edge moldings to fit acoustical panel edge details and suspension systems indicated and match width and configuration of exposed runners unless otherwise indicated.
      a. Provide manufacturer's seismic perimeter clips used with standard nominal 7/8-inch wall angles, with current ICC Evaluation Service Report (ESR) acceptable to authority having jurisdiction.
   2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
   3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

C. Extruded-Aluminum Edge Moldings and Trim: Where indicated, provide manufacturer's extruded-aluminum edge moldings and trim of profile indicated or referenced by manufacturer's designations, including splice plates, corner pieces, and attachment and other clips, complying with seismic design requirements.
   1. Baked-Enamel or Powder-Coat Finish: Minimum dry film thickness of 1.5 mils. Comply with ASTM C635/C635M and coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
   2. Seismic Requirements: Provide manufacturer's seismic perimeter clips used with standard nominal 7/8-inch wall angles, with current ICC Evaluation Service Report (ESR) acceptable to authority having jurisdiction.

2.7 ACOUSTICAL SEALANT

A. Acoustical Sealant: As specified in Section 079219 "Acoustical Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Examine acoustical panels before installation. Reject acoustical panels that are wet, moisture damaged, or mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders unless otherwise indicated, and comply with layout shown on reflected ceiling plans.

B. Layout openings for penetrations centered on the penetrating items.

3.3 INSTALLATION OF ACOUSTICAL PANEL CEILINGS

A. Install acoustical panel ceilings in accordance with ASTM C636/C636M, seismic design requirements, and manufacturer's written instructions.
   1. Seismic Design Requirements: Install in accordance with the following:
      a. ASTM E 580/E 580M.

B. Suspend ceiling hangers from building's structural members and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
   4. Secure wire hangers to ceiling-suspension members and to supports above with a minimum of three tight turns. Connect hangers directly to structure or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
   5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both the structure to which hangers are attached and the type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
   6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
   7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
   8. Do not attach hangers to steel deck tabs.
   9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
   10. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
   11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.
   1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
   2. Screw attach moldings to substrate at intervals not more than 16 inches o.c. and not more than 3 inches from ends. Miter corners accurately and connect securely.
   3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension-system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide precise fit.
   1. Arrange directionally patterned acoustical panels as follows:
      a. As indicated on reflected ceiling plans.
   2. For square-edged panels, install panels with edges fully hidden from view by flanges of suspension-system runners and moldings.
   3. For reveal-edged panels on suspension-system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
   4. For reveal-edged panels on suspension-system members with box-shaped flanges, install panels with reveal surfaces in firm contact with suspension-system surfaces and panel faces flush with bottom face of runners.
   5. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.
   6. Install hold-down, impact, and seismic clips in areas indicated; space in accordance with panel manufacturer's written instructions unless otherwise indicated.
      a. Hold-Down Clips: Space 24 inches o.c. on all cross runners.
   7. Install stabilizer clips in areas receiving ceiling panels with a dimension of 48 inches or more on one or more sides. Install in accordance with manufacturer's instructions, at ceiling panel mid-points. At ceiling panels with a dimension greater than 48 inches, provide stabilizer clips at 24 inches o.c. maximum.
   8. Protect lighting fixtures and air ducts in accordance with requirements indicated for fire-resistance-rated assembly.

3.4 ERECTION TOLERANCES

A. Suspended Ceilings: Install main and cross runners level to a tolerance of 1/8 inch in 12 feet, non-cumulative.

B. Moldings and Trim: Install moldings and trim to substrate and level with ceiling suspension system to a tolerance of 1/8 inch in 12 feet, non-cumulative.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage through the Contractor a qualified special inspector to perform the following special inspections:
   1. Periodic inspection during the installation of suspended ceiling grids in accordance with ASCE/SEI 7.

B. Testing Agency: Owner will engage through the Contractor a qualified testing agency to perform tests and inspections.

C. Perform the following tests and inspections of completed installations of acoustical panel ceiling hangers and anchors and fasteners in successive stages and when installation of ceiling suspension systems on each floor has reached 20 percent completion, but no panels have been installed. Do not proceed with installations of acoustical panel ceiling hangers for the next area until test results for previously completed installations of acoustical panel ceiling hangers show compliance with requirements.
   1. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.
   2. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

D. Acoustical panel ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.

E. Prepare test and inspection reports.

3.6 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension-system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage.

B. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION

SECTION 095423 - LINEAR METAL CEILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Linear metal ceilings.

B. Related Requirements:
   1. Section 013573 "Delegated Design Requirements and Procedures" for definitions, submittal procedures, responsibilities, and scheduling requirements associated with delegated design assignment indicated in this Section.

1.2 COORDINATION

A. Coordinate layout and installation of linear metal pans and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures".

B. Product Data: For linear metal ceilings.

C. Sustainable Design Submittals:
   1. Recycled Content: Provide manufacturer documentation for recycled content, indicating postconsumer and preconsumer recycled content.
   2. Product Data: For adhesives, indicating VOC content.
   3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

D. Shop Drawings: For linear metal ceilings.
   1. Include reflected ceiling plans, sections, and details, drawn to scale, showing the following:
      a. Linear ceiling patterns and joints.
      b. Ceiling suspension members.
      c. Method of attaching hangers to building structure and locations of cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.
      d. Ceiling-mounted items including, but not limited to, light fixtures, diffusers, grilles, speakers, sprinklers, and access panels.
      e. Ceiling perimeter and penetrations through ceiling; trim and moldings.

E. Samples: For each exposed product and for each type, color, and finish specified, 12 inches long in size.

F. Delegated-Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
   1. Provide delegated-design submittals for the following:

a. Attachment devices.
b. Seismic restraints.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For finishes to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Linear-Metal-Ceiling Components: Quantity of each pan, carrier, accessory, and exposed molding and trim equal to 2 percent of quantity installed.

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: Accredited by National Voluntary Laboratory Accreditation Program for testing indicated.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and to set quality standards for materials and execution.
   1. Build mockup of each type of linear metal ceiling as shown on Drawings.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

D. Provide the following upon request:
   1. Qualification Data: For testing agency.
   2. Product Test Reports: For each linear metal ceiling, for tests performed by a qualified testing agency.
   3. Evaluation Reports: For linear-metal-ceiling framing systems.
   4. Field quality-control reports.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver ceiling components and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they are protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Handle ceiling components and accessories in a manner that prevents damage.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not install interior ceilings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design seismic restraints and attachment devices.
   1. Material properties indicated in this Section shall be considered as minimum properties.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.

C. Seismic Criteria: Provide linear metal ceilings designed and installed to withstand the effects of earthquake motions in accordance with ASCE/SEI 7 and requirements of authorities having jurisdiction.

2.2 LINEAR METAL CEILINGS

A. Pans and Suspension System:
   1. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.3 CARRIER-SYSTEM HANGERS, BRACES, AND TIES

A. Attachment Devices: Size for 5 times the design load indicated in ASTM C635/C635M, Table 1, Direct Hung, unless otherwise indicated.

B. Wire Hangers, Braces, and Ties: Provide wire complying with the following requirements:

2.4 ACCESSORIES

A. Access Panels: For access at locations indicated, provide door hinge assembly, retainer clip, and retainer bar, assembled with ceiling panels and carrier sections into access doors permitting upward or downward opening.

B. Air-Distribution Devices: Where indicated on Drawings, provide independently suspended air-distribution devices that are relocatable and adjustable from below finished ceiling, that do not interrupt ceiling components, and that are fully concealed by and integrated with ceiling system.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing and substrates to which linear metal ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of linear metal ceilings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of linear metal pans.
   1. Balance border widths at opposite edges of each ceiling.
   2. Avoid using less-than-half-width pans at borders.

3.3 INSTALLATION OF LINEAR METAL CEILINGS

A. Comply with ASTM C636/C636M and seismic requirement indicated, in accordance with manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:
   1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
   2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
   3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension-system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
   4. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts or postinstalled mechanical or adhesive anchors that extend through forms into concrete.
   5. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
   6. Do not attach hangers to steel deck tabs.
   7. Do not attach hangers to steel roof deck. Attach hangers to structural members.
   8. Space hangers not more than 48 inches o.c. along each member supported directly from hangers unless otherwise indicated; provide hangers not more than 8 inches from ends of each member.
   9. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns in 1-1/2 inches. Suspend bracing from building's structural members as required for hangers and without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim at perimeter of linear metal ceiling area and where necessary to conceal edges and ends of linear metal pans.
   1. Screw attach moldings to substrate at intervals of not more than 16 inches o.c. and not more than 3 inches from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet. Miter corners accurately and connect securely.
   2. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension-system carriers so they are aligned and securely interlocked with one another.
   1. Install stabilizer channels, tees, and bars at regular intervals to stabilize carriers and at light fixtures, air-distribution equipment, access doors, and other equipment; spaced as standard with manufacturer for use indicated.
   2. Remove and replace dented, bent, or kinked members.

F. Cut linear metal pans for accurate fit at borders and at interruptions and penetrations by other work through ceilings. Stiffen edges of cut units as required to eliminate evidence of buckling or variations in flatness.

G. Install linear metal pans in coordination with suspension system and exposed moldings and trim.
   1. Align joints in adjacent courses to form uniform, straight joints parallel to room axis in both directions unless otherwise indicated on Drawings.
   2. Fit adjoining units to form flush, tight joints. Scribe and cut units for accurate fit at borders and around construction penetrating ceiling.
      a. Install pans with butt joints aligned using internal pan splices.
   3. Install directionally textured or patterned metal pans in directions indicated.
   4. Where metal pan ends are visible, install end caps unless trim is indicated.
   5. Install sound-absorbent pads at right angle to perforated metal pans so pads do not hang unsupported.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage through the Contractor a qualified special inspector to perform the following special inspections:
   1. Suspended ceiling system.
   2. Hangers, anchors, and fasteners.

B. Testing Agency: Owner will engage through the Contractor a qualified testing agency to perform tests and inspections.

C. Tests and Inspections: Testing and inspecting of completed installations of linear metal ceiling hangers, anchors, and fasteners to take place in successive stages, in test areas and using methods as follows. Do not proceed with installations of linear metal ceiling hangers for the next area until test results for previously completed installations show compliance with requirements.
   1. Test Areas: Test installation of ceiling suspension systems on each floor when installation has reached 20 percent completion but before pans have been installed.
      a. Within each test area, testing agency will select one of every 10 power-actuated fasteners and postinstalled anchors used to attach hangers to concrete and will test them for 200 lbf of tension; it will also select one of every two postinstalled anchors used to attach bracing wires to concrete and will test them for 440 lbf of tension.

b. When testing discovers fasteners and anchors that do not comply with requirements, testing agency will test those anchors not previously tested until 20 pass consecutively and then will resume initial testing frequency.

D. Linear metal ceiling hangers, anchors, and fasteners will be considered defective if they do not pass tests and inspections.

3.5 CLEANING

A. Clean exposed surfaces of linear metal ceilings, including trim and edge moldings, after removing strippable, temporary protective covering if any. Comply with manufacturer's written instructions for stripping of temporary protective covering, cleaning, and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage, including dented and bent units.

END OF SECTION

SECTION 095446 - ACOUSTICAL BAFFLE SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Shop-fabricated, acoustical baffle system.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures.".

B. Product Data: For each product.
   1. Include baffle material and mounting indicated.

C. Sustainable Design Submittals:
   1. Recycled Content: Provide manufacturer documentation for recycled content, indicating postconsumer and preconsumer recycled content.
   2. Environmental Product Declaration: For each product.
   3. Material Ingredient Documentation: For each product.
   4. Laboratory Test Reports: For ceiling products, indicating compliance with requirements for low-emitting materials.

D. Shop Drawings: For baffle system assembly and installation.
   1. Include reflected ceiling plans, elevations, sections, and mounting devices and details.
   2. Include details at joints; and details at ceiling intersections and intersections with walls.

E. Samples for Initial Selection: For each type baffle.
   1. Include Samples of hardware and accessories involving color or finish selection.

F. Samples for Verification: For the following products:
   1. Mounting Devices: Full-size Samples.
   2. Assembled Baffles: Approximately 36 inches by full width and height, including joints and mounting methods.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Electrical outlets.
   2. Suspended ceiling components above baffle system.
   3. Structural members to which suspension devices will be attached.
   4. Items penetrating or covered by baffle system including the following:
      a. Lighting fixtures.
      b. Air outlets and inlets.
      c. Speakers.
      d. Alarms.
      e. Sprinklers.

f. Access panels.

5. Show operation of hinged and sliding components covered by or adjacent to baffle system.

B. Product Certificates: For each type of baffle.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of baffle to include in maintenance manuals. Include baffle manufacturer's written cleaning and stain-removal instructions.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Mounting Devices: Full-size units equal to 5 percent of amount installed, but no fewer than 5 devices.

1.7 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials, fabrication, and installation.

1. Build mockup of typical ceiling area96 inches wide by full width of ceiling. Include intersection of wall and ceiling, corners, and perimeters.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with baffle manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

B. Deliver materials in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install bafffles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Lighting: Do not install baffles until a permanent level of lighting is provided on surfaces to receive the baffles.

C. Air-Quality Limitations: Protect baffles from exposure to airborne odors, such as tobacco smoke, and install baffles under conditions free from odor contamination of ambient air.

D. Field Measurements: Verify baffle locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace baffles and components that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Warping, sagging, or distorting.
   2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain baffle system from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

B. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

C. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

D. Ceiling products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Fire-Test-Response Characteristics: Baffle system shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
   1. Surface-Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
      a. Flame-Spread Index: 15 or less.
      b. Smoke-Developed Index: 200 or less.
   2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested in accordance with NFPA 286.

2.3 SHOP-FABRICATED ACOUSTICAL BAFFLE SYSTEM

A. Acoustical Baffle: Manufacturer's standard baffle construction including polyester felt material .

B. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Baffle Shape: As indicated on Drawings.

2. Mounting: Back mounted with manufacturer's standard cable suspension system, secured to substrate as shown.
3. Nominal Baffle Thickness: As indicated on Drawings.
4. Baffle Width: As indicated on Drawings.
5. Baffle Lengths: As indicated on Drawings.

2.4 MATERIALS

A. Mounting Devices: Concealed on back of baffle, recommended by manufacturer to support weight of baffle system.

2.5 FABRICATION

A. Standard Construction: Use manufacturer's standard construction except as otherwise indicated; as required to ensure square baffle corners and against baffle warpage and damage.

B. Measure each area and establish layout of baffles and joints owithin a given area.

C. Dimensional Tolerances of Finished Baffles: Plus or minus 1/16 inch for the following:
1. Thickness.
2. Edge straightness.
3. Overall length and width.
4. Squareness from corner to corner.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine baffles, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting baffle system performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install baffles in locations indicated. Unless otherwise indicated, install units with edges in alignment with walls and other baffles, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

B. Comply with baffle manufacturer's written instructions for installation of baffles using type of mounting devices indicated. Mount baffle system securely to supporting substrate.

3.3 INSTALLATION TOLERANCES

A. Variation from Alignment with Surfaces: Plus or minus 1/16 inch in 48 inches, noncumulative.

B. Variation from Level or Slope: Plus or minus 1/16 inch.

C. Variation of Joint Width: Not more than 1/16 inch wide from hairline in 48 inches, noncumulative.

3.4 CLEANING

A. Clip loose threads; remove pills and extraneous materials.

B. Clean baffles on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Resilient base.

B. Related Requirements:
   1. Section 017823 "Operation and Maintenance Data".

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures".

B. Product Data: For each type of product.

C. Sustainable Design Submittals:
   1. Product Data: For adhesives, indicating VOC content.
   2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
   3. Product Data: For sealants, indicating VOC content.
   4. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
   5. Laboratory Test Reports: For resilient base and accessories, indicating compliance with requirements for low-emitting materials.
   6. Environmental Product Declaration: For each product.
   7. Material Ingredient Documentation: For each product.
   8. Sourcing of Raw Materials: Extended producer responsibility.

D. Samples for Initial Selection: For each type of product indicated.

E. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size Samples, but not less than 12 inches long.

F. Product Schedule: For resilient base and accessory products. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For resilient base and accessories to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.6 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Coordinate mockups in this Section with mockups specified in other Sections.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.8 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

C. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

D. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

E. Extended producer responsibility: Documentation that outlines extended producer responsibility program (take-back and recycling program for end of life products).

2.2 THERMOSET-RUBBER BASE

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Product Standard: ASTM F 1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).

2.3 Thickness: 0.125 inch.

A. Height: As indicated on Drawings.

B. Lengths: Coils in manufacturer's standard length.

C. Outside Corners: Job formed.

D. Inside Corners: Job formed.

E. Colors: Match Architect's sample.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.
   1. Adhesives shall have a VOC content of 50 g/L or less.
   2. Products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
   1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.
   1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
   1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Job-Formed Corners:
   1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
      a. Form without producing discoloration (whitening) at bends.
   2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
      a. Miter or cope corners to minimize open joints.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:
   1. Remove adhesive and other blemishes from surfaces.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

SECTION 096516 - RESILIENT SHEET FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Vinyl sheet flooring with backing.
   2. Rubber sheet flooring with backing.

B. Related Requirements:
   1. Section 090561.13 "Moisture Vapor Emission Control."

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to resilient sheet flooring including, but not limited to, the following:
      a. Examination and preparation of substrates to receive resilient sheet flooring.
      b. Installation including seamless installation techniques.

1.3 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures".

B. Product Data: For each type of product.

C. Sustainable Design Submittals:
   1. Laboratory Test Reports: For floor covering products, indicating compliance with requirements for low-emitting materials.
   2. Product Data: For adhesives, indicating VOC content.
   3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
   4. Product Data: For sealants, indicating VOC content.
   5. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
   6. Environmental Product Declaration: For each product.
   7. Material Ingredient Documentation: For each product.
   8. Sourcing of Raw Materials: Extended producer responsibility.

D. Shop Drawings: For each type of resilient sheet flooring.
   1. Include sheet flooring layouts, locations of seams, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
   2. Show details of special patterns.

E. Samples for Initial Selection: For each type of resilient sheet flooring indicated.

F. Samples for Verification: For each type of resilient sheet flooring, in manufacturer's standard size, but not less than 6-by-9-inchsections of each color, texture, and pattern required.
   1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.

G. Welded-Seam Samples: For seamless-installation technique indicated and for each resilient sheet flooring product, color, and pattern required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.

H. Product Schedule: For resilient sheet flooring. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Certifications: Submit in triplicate, a notarized certificate addressed to the State Fire Marshal or other authority having jurisdiction over the Project, stating that the resilient flooring has been installed as specified and in accordance with fire-test response characteristics.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of resilient sheet flooring to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Resilient Sheet Flooring: Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, in roll form and in full roll width for each type, color, and pattern of flooring installed.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for resilient sheet flooring installation and seaming method indicated.
   1. Engage an installer who employs workers for this Project who are trained or certified by resilient sheet flooring manufacturer for installation techniques required.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Coordinate mockups in this Section with mockups specified in other Sections.
      a. Size: Minimum 100 sq. ft. for each type, color, and pattern in locations directed by Architect.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Provide the following upon request:
   1. Qualification Data: For Installer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store resilient sheet flooring and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store rolls upright.

1.9 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 85 deg F, in spaces to receive resilient sheet flooring during the following periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during resilient sheet flooring installation.

D. Close spaces to traffic for 48 hours after resilient sheet flooring installation.

E. Install resilient sheet flooring after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient sheet flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
   1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

C. Material Ingredients: Cradle to Cradle Certified Documentation that demonstrates the chemical inventory of the product to at least 0.01 percent (100 ppm).

D. Extended producer responsibility: Documentation that outlines extended producer responsibility program (take-back and recycling program for end of life products).

E. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 VINYL SHEET FLOORING WITH BACKING

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Product Standard: ASTM F 1303.
   1. Overall Thickness: As indicated.

C. Surface Friction: Not less than 0.6 according to ASTM D 2047.
   1. No high gloss finish.

D. Sheet Width: As standard with manufacturer.

E. Seamless-Installation Method: Heat welded.

F. Colors and Patterns: As indicated.

2.3 RUBBER SHEET FLOORING WITH BACKING

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Product Standard: ASTM F 1860.

C. Surface Friction: Not less than 0.6 according to ASTM D 2047.
   1. No high gloss finish.

D. Overall Thickness: As indicated .
   1. Hardness: Manufacturer's standard hardness, measured using Shore, Type A durometer per ASTM D 2240.

E. Sheet Width: As standard with manufacturer.

F. Seamless-Installation Method: Cold welded.

G. Colors and Patterns: As indicated.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient sheet flooring manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by flooring and adhesive manufacturers to suit resilient sheet flooring and substrate conditions indicated.
   1. Adhesives shall have a VOC content of 50 g/L or less.
   2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Seamless-Installation Accessories:
   1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.
      a. Colors: Match Architecs's samples.

D. Integral-Flash-Cove-Base Accessories:
   1. Cap Strip: Square metal, or rubber cap provided or approved by resilient sheet flooring manufacturer, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
   1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient sheet flooring.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to resilient sheet flooring manufacturer's written instructions to ensure adhesion of resilient sheet flooring.

B. Concrete Substrates: Prepare according to ASTM F 710.
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient sheet flooring manufacturer. Do not use solvents.
   3. Alkalinity and Adhesion Testing: Perform tests recommended by resilient sheet flooring manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
   4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
      a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
      b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
      c. If water moisture tests exceed stated limits, apply vapor retarder for moisture vapor emission control as specified in Section 090561.13.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient sheet flooring until materials are the same temperature as space where they are to be installed.
   1. At least 48 hours in advance of installation, move flooring and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient sheet flooring.

3.3 RESILIENT SHEET FLOORING INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient sheet flooring.

B. Unroll resilient sheet flooring and allow it to stabilize before cutting and fitting.

C. Lay out resilient sheet flooring as follows:
   1. Maintain uniformity of flooring direction.
   2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in flooring substrates.
   3. Match edges of flooring for color shading at seams.
   4. Avoid cross seams.

D. Scribe and cut resilient sheet flooring to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend resilient sheet flooring into toe spaces, door reveals, closets, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on resilient sheet flooring as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install resilient sheet flooring on covers for telephone and electrical ducts and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of flooring installed on covers and adjoining flooring. Tightly adhere flooring edges to substrates that abut covers and to cover perimeters.

H. Adhere resilient sheet flooring to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Seamless Installation:
   1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and heat weld with welding bead to fuse sections permanently into a seamless flooring installation. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.

J. Integral-Flash-Cove Base: Cove resilient sheet flooring to dimension indicated up vertical surfaces. Support flooring at horizontal and vertical junction with cove strip. Butt at top against cap strip.
   1. Install cap strip corners at inside and outside corners.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient sheet flooring.

B. Perform the following operations immediately after completing resilient sheet flooring installation:
   1. Remove adhesive and other blemishes from surfaces.
   2. Sweep and vacuum surfaces thoroughly.
   3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient sheet flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient sheet flooring until Substantial Completion.

END OF SECTION

SECTION 096519 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Solid vinyl floor tile.

B. Related Requirements:
   1. Section 090561.13 "Moisture Vapor Emission Control."

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to resilient tile flooring including, but not limited to, the following:
      a. Examination and preparation of substrates to receive resilient tile flooring.
      b. Installation including seamless installation techniques.

1.3 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures.".

B. Product Data: For each type of product.

C. Sustainable Design Submittals:
   1. Product Data: For adhesives, indicating VOC content.
   2. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
   3. Product Data: For sealants, indicating VOC content.
   4. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
   5. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.
   6. Environmental Product Declaration: For each product.
   7. Material Ingredient Report: For each product.
   8. Sourcing of Raw Materials: Extended producer responsibility.

D. Shop Drawings: For each type of resilient floor tile.
   1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
   2. Show details of special patterns.

E. Samples for Initial Selection: For each type of floor tile indicated.

F. Samples for Verification: Full-size units of each color and pattern of floor tile required.
   1. For heat-welding bead, manufacturer's standard-size Samples, but not less than 9 inches long, of each color required.

G. Welded-Seam Samples: For seamless-installation technique indicated and for each floor covering product, color, and pattern required; with seam running lengthwise and in center of 6-by-9-inch Sample applied to a rigid backing and prepared by Installer for this Project.

H. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Certifications: Submit in triplicate, a notarized certificate addressed to the State Fire Marshal or other authority having jurisdiction over the Project, stating that the resilient flooring has been installed as specified and in accordance with fire-test response characteristics.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
   1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Coordinate mockups in this Section with mockups specified in other Sections.
      a. Size: Minimum 100 sq. ft.for each type, color, and pattern in locations directed by Architect.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Provide the following upon request:
   1. Qualification Data: For Installer.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F. Store floor tiles on flat surfaces.

1.9 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive floor tile during the following periods:
   1. 48 hours before installation.
   2. During installation.

3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

C. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

D. Extended producer responsibility: Documentation that outlines extended producer responsibility program (take-back and recycling program for end of life products).

E. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 SOLID VINYL FLOOR TILE

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Tile Standard: ASTM F 1700.

C. Surface Friction: Not less than 0.6 according to ASTM D 2047.
1. No high gloss finish.

D. Sizes: As indicated.

E. Colors and Patterns: Match Architect's samples.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.
   1. Adhesives shall have a VOC content of 50 g/L or less.
   2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Seamless-Installation Accessories:
   1. Heat-Welding Bead: Manufacturer's solid-strand product for heat welding seams.
      a. Colors: Match Architect's samples.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
   1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
   3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
   4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
      a. Anhydrous Calcium Chloride Test: ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
      b. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
   5. If water moisture tests exceed stated limits, apply vapor retarder for moisture vapor emission control as specified in Section 090561.13.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
   1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

I. Seamless Installation:
   1. Heat-Welded Seams: Comply with ASTM F 1516. Rout joints and heat weld with welding bead to fuse sections permanently into a seamless flooring installation. Prepare, weld, and finish seams to produce surfaces flush with adjoining flooring surfaces.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:
   1. Remove adhesive and other blemishes from surfaces.
   2. Sweep and vacuum surfaces thoroughly.
   3. Damp-mop surfaces to remove marks and soil.

C. Cover floor tile until Substantial Completion.

END OF SECTION

SECTION 096566 - RESILIENT ATHLETIC FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interlocking, rubber floor tile.
   2. Rubber sheet flooring.

B. Related Requirements:
   1. Section 090561.13 "Moisture Vapor Emission Control."

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to resilient athletic flooring including, but not limited to, the following:
      a. Examination and preparation of substrates to receive resilient athletic flooring.
      b. Installation including seamless installation techniques.

1.3 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures."

B. Product Data: For each type of product indicated.

C. Sustainable Design Submittals:
   1. Recycled Content: Provide manufacturer documentation for recycled content, indicating postconsumer and preconsumer recycled content.
   2. Sourcing of Raw Materials: Extended producer responsibility.
   3. Environmental Product Declaration: For each product.
   4. Material Ingredient Documentation: For each product.
   5. Product Data: For adhesives, indicating VOC content.
   6. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
   7. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.

D. Shop Drawings: Show installation details and locations of the following:
   1. Floor patterns.
   2. Locations of floor inserts for athletic equipment installed through flooring.
   3. Seam locations for sheet flooring.

E. Samples for Initial Selection: For each type of flooring indicated.

F. Samples for Verification: For each type, color, and pattern of flooring indicated, 6-inch-square Samples of same thickness and material indicated for the Work.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For flooring to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Floor Tile: Furnish no fewer than 1 box for each 50 boxes or fraction thereof, of each type, color, pattern, and size of floor tile installed.
   2. Sheet Flooring: Furnish full-width rolls of not less than 10 linear feet for each 500 linear feet or fraction thereof, of each type, color, and pattern of flooring installed.

1.6 QUALITY ASSURANCE

A. Provide the following upon request:
   1. Qualification Data: For qualified resilient athletic flooring Installer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storing.

B. Store materials to prevent deterioration. Store tiles on flat surfaces and rolls upright.

1.8 FIELD CONDITIONS

A. Adhesively Applied Products:
   1. Maintain temperatures during installation within range recommended in writing by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive flooring 48 hours before installation, during installation, and 48 hours after installation unless longer period is recommended in writing by manufacturer.
   2. After postinstallation period, maintain temperatures within range recommended in writing by manufacturer, but not less than 55 deg F or more than 95 deg F.
   3. Close spaces to traffic during flooring installation.
   4. Close spaces to traffic for 48 hours after flooring installation unless manufacturer recommends longer period in writing.

B. Install flooring after other finishing operations, including painting, have been completed.

1.9 COORDINATION

A. Coordinate layout and installation of flooring with floor inserts for gymnasium equipment.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

B. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

C. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

D. Extended producer responsibility: Documentation that outlines extended producer responsibility program (take-back and recycling program for end of life products).

E. Verify flooring products comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 INTERLOCKING, RUBBER FLOOR TILE

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Description: Athletic flooring consisting of modular rubber tiles with precision cut, interlocking edges, for free-lay installation.

C. Material: Recycled-rubber compound.
   1. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

D. Surface Friction: Not less than 0.6 according to ASTM D 2047.
   1. No high gloss finish.

E. Color and Pattern: As indicated.

F. Border: Interlocking, beveled-edge tiles, of same material as floor tile; with bevels that transition from thickness of floor tile to surface below it; with straight outside edges; and for use where flooring corners and edges do not abut vertical surfaces.
   1. Border Color and Pattern: As selected by Architect from manufacturer's full range to contrast with floor tile.

2.3 RUBBER SHEET FLOORING

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Description: Rubber athletic flooring provided as rolled goods for adhered installation.

C. Material: Recycled-rubber compound.
   1. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.

D. Surface Friction: Not less than 0.6 according to ASTM D 2047.
   1. No high gloss finish.

E. Roll Size: Not less than 48 inches wide by longest length that is practical to minimize splicing during installation.

F. Total System Thickness: 1-5/8 inch 3/8 inch.

G. Color and Pattern: As indicated.

2.4 ACCESSORIES

A. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by flooring manufacturer.

B. Adhesives: Water-resistant type recommended in writing by manufacturer for substrate and conditions indicated.
   1. Verify adhesives have a VOC content of 50 g/L or less.
   2. Verify adhesive complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance of the Work.
   1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of flooring.

B. Concrete Substrates: Prepare according to ASTM F 710.
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Alkalinity Testing: Perform pH testing according to ASTM F 710. Proceed with installation only if pH readings are not less than 7.0 and not greater than 8.5.
   3. Moisture Testing:
      a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
         1) Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than two tests in each installation area and with test areas evenly spaced in installation areas.
      b. Perform relative humidity test using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
      c. If water moisture tests exceed stated limits, apply vapor retarder for moisture vapor emission control as specified in Section 090561.13.

C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by manufacturer. Do not use solvents.

D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

E. Move flooring and installation materials into spaces where they will be installed at least 48 hours in advance of installation unless manufacturer recommends a longer period in writing.
   1. Do not install flooring until they are same temperature as space where they are to be installed.

F. Sweep and vacuum clean substrates to be covered by flooring immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust.

G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 FLOORING INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions.

B. Scribe, cut, and fit flooring to butt neatly and tightly to vertical surfaces, equipment anchors, floor outlets, and other interruptions of floor surface.

C. Extend flooring into toe spaces, door reveals, closets, and similar openings unless otherwise indicated.

D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating subfloor markings on flooring. Use nonpermanent, nonstaining marking device.

3.4 FLOOR TILE INSTALLATION

A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.
   1. Lay tiles in pattern indicated.

B. Discard broken, cracked, chipped, or deformed tiles.

C. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged if so numbered.
   1. Lay tiles in pattern of colors and sizes indicated.

D. Adhered Flooring: Adhere products to substrates using a full spread of adhesive applied to substrate to comply with adhesive and flooring manufacturers' written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.
   1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.5 SHEET FLOORING INSTALLATION

A. Unroll sheet flooring and allow it to stabilize before cutting and fitting.

B. Lay out sheet flooring as follows:
   1. Maintain uniformity of flooring direction.
   2. Minimize number of seams; place seams in inconspicuous and low-traffic areas, at least 6 inches away from parallel joints in flooring substrates.
   3. Match edges of flooring for color shading at seams.
   4. Locate seams per approved Shop Drawings.

C. Adhered Flooring: Adhere products to substrates using a full spread of adhesive applied to substrate to comply with adhesive and flooring manufacturers' written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.
   1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.6 CLEANING AND PROTECTING

A. Perform the following operations immediately after completing flooring installation:
   1. Remove adhesive and other blemishes from flooring surfaces.
   2. Sweep and vacuum flooring thoroughly.
   3. Damp-mop flooring to remove marks and soil after time period recommended in writing by manufacturer.

B. Protect flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
   1. Do not move heavy and sharp objects directly over flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

END OF SECTION

SECTION 096623 - RESINOUS MATRIX TERRAZZO FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Thin-set, epoxy-resin terrazzo flooring.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to terrazzo including, but not limited to, the following:
      a. Inspect and discuss condition of substrate and other preparatory work performed by other trades.
      b. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
      c. Review special terrazzo designs and patterns.

1.3 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures".

B. Product Data: For each type of product.

C. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
   2. Product Data: For adhesives and sealers, indicating VOC content.
   3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
   4. Laboratory Test Reports: For sealers, indicating compliance with requirements for low-emitting materials.

D. Shop Drawings: Include terrazzo installation requirements. Include plans, sections, component details, and relationship to other work. Show layout of the following:
   1. Divider strips.
   2. Control-joint strips.
   3. Accessory strips.
   4. Precast terrazzo jointing and edge configurations.
   5. Terrazzo patterns.

E. Samples for Initial Selection: NTMA's "Terrazzo Color Palette" showing the full range of colors and patterns available for each terrazzo type.

F. Samples for Verification: For each type, material, color, and pattern of terrazzo and accessory required showing the full range of color, texture, and pattern variations expected. Label each terrazzo Sample to identify manufacturer's matrix color and aggregate types, sizes, and proportions. Prepare Samples of same thickness and from same material to be used for the Work, in sizes indicated below:

1. Terrazzo: 6-inch- square Samples.
2. Accessories: 6-inch- long Samples of each exposed strip item required.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For terrazzo to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications:
1. Engage an installer who is certified in writing by terrazzo manufacturer as qualified to install manufacturer's products.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
1. Build mockups for terrazzo including accessories.
   a. Size: Minimum 100 sq. ft. of typical poured-in-place flooring and base condition for each color and pattern in locations directed by Architect.
   b. Include base.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.

C. Provide the following upon request:
1. Qualification Data: For Installer.
2. Material Certificates: For each type of terrazzo material or product.
3. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
4. Preinstallation moisture-testing reports.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name, and lot number if any.

B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Comply with manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting terrazzo installation.

B. Field Measurements: Verify actual dimensions of construction contiguous with precast terrazzo by field measurements before fabrication.

C. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.

D. Close spaces to traffic during terrazzo application and for not less than 24 hours after application unless manufacturer recommends a longer period.

E. Control and collect water and dust produced by grinding operations. Protect adjacent construction from detrimental effects of grinding operations.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Surface Friction: Not less than 0.6 according to ASTM D 2047.
   1. No high gloss finish.

C. Source Limitations: Obtain primary terrazzo materials from single source from single manufacturer. Provide secondary materials including patching and fill material, joint sealant, and repair materials of type and from source recommended by manufacturer of primary materials.

D. Source Limitations for Aggregates: Obtain each color, grade, type, and variety of granular materials from single source with resources to provide materials of consistent quality in appearance and physical properties.

2.2 PERFORMANCE REQUIREMENTS

A. NTMA Standards: Comply with NTMA's written recommendations for terrazzo type indicated unless more stringent requirements are specified.

B. VOC Content Limits: For wet applied product show compliance with VOC limits as defined in Section 018113 Sustainable Design Requirements.

C. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.3 EPOXY-RESIN TERRAZZO

A. Epoxy-Resin Terrazzo: Comply with manufacturer's written instructions for matrix and aggregate proportions and mixing.

B. Mix Color and Pattern: As indicated.

C. Materials:
   1. Moisture-Vapor-Emission-Control Membrane: Two-component, high-solids, high-density, low-odor, epoxy-based membrane-forming product produced by epoxy terrazzo manufacturer that reduces moisture emission from concrete substrate to not more than 3 lb of water/1000 sq. ft. in 24 hours.
   2. Substrate-Crack-Suppression Membrane: Product of terrazzo-resin manufacturer, having minimum 120 percent elongation potential according to ASTM D 412.
      a. Reinforcement: Fiberglass scrim.
   3. Primer: Manufacturer's product recommended for substrate and use indicated.
   4. Epoxy-Resin Matrix: Manufacturer's standard recommended for use indicated and in color required for mix indicated.
      a. Physical Properties without Aggregates:
         1) Hardness: 60 to 85 per ASTM D 2240, Shore D.

2) Minimum Tensile Strength: 3000 psi per ASTM D 638 for a 2-inch specimen made using a "C" die per ASTM D 412.
3) Minimum Compressive Strength: 10,000 psi per ASTM D 695, Specimen B cylinder.
4) Chemical Resistance: No deleterious effects by contaminants listed below after seven-day immersion at room temperature per ASTM D 1308.
a) Distilled water.
b) Mineral water.
c) Isopropanol.
d) Ethanol.
e) 0.025 percent detergent solution.
f) 1.0 percent soap solution.
g) 5 percent acetic acid.
h) 10 percent sodium hydroxide.
i) 10 percent hydrochloric acid.
j) 30 percent sulfuric acid.

b. Physical Properties with Aggregates: For terrazzo blended according to manufacturer's recommendations with one part epoxy resin with three parts marble aggregate consisting of 60 percent No. 1 chips and 40 percent No. 0 chips that is ground and grouted to a 1/4-inch nominal thickness, and cured for 7 days at 75 deg F plus or minus 2 deg F and at 50 percent plus or minus 2 percent relative humidity.
1) Flammability: Self-extinguishing, maximum extent of burning 1/4 inch according to ASTM D 635.
2) Thermal Coefficient of Linear Expansion: 0.0025 inch/inch per deg F according to ASTM C 531.

5. Aggregates: Comply with NTMA gradation standards for mix indicated and contain no deleterious or foreign matter.
a. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131/C 131M.
b. 24-Hour Absorption Rate: Less than 0.75 percent.
c. Dust Content: Less than 1.0 percent by weight.
6. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
7. Finishing Grout: Resin based.

2.4 STRIP MATERIALS

A. Thin-Set Divider Strips: L-type angle in depth required for topping thickness indicated.
1. Material: Aluminum.
2. Top Width: 1/8 inch.

B. Heavy-Top Divider Strips: L-type angle in depth required for topping thickness indicated.
1. Bottom-Section Material: Matching top-section material.
2. Top-Section Material: White-zinc alloy.
3. Top-Section Width: 1/8 inch.

C. Control-Joint Strips: Separate, double L-type angles, positioned back to back, that match material and color of divider strips and in depth required for topping thickness indicated.

D. Accessory Strips: Match divider-strip width, material, and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:
   1. Base-bead strips for exposed top edge of terrazzo base.
   2. Edge-bead strips for exposed edges of terrazzo.

2.5 MISCELLANEOUS ACCESSORIES

A. Strip Adhesive: Epoxy-resin adhesive recommended by adhesive manufacturer for this use.
   1. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Patching and Fill Material: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.

C. Joint Compound: Terrazzo manufacturer's resinous product approved and recommended by manufacturer for application indicated.

D. Resinous Matrix Terrazzo Cleaner: Chemically neutral cleaner with pH factor between 7 and 10 that is biodegradable, phosphate free, and recommended by sealer manufacturer for use on terrazzo type indicated.

E. Sealer: Slip- and stain-resistant, penetrating-type sealer that is chemically neutral; does not affect terrazzo color or physical properties; and is recommended by sealer manufacturer.
   1. Surface Friction: Not less than 0.6 according to ASTM D 2047.
   2. Acid-Base Properties: With pH factor between 7 and 10.
   3. VOC Content Limits: For wet applied product show compliance with VOC limits as defined in Section 018113 Sustainable Design Requirements.
   4. Products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions, including levelness tolerances, have been corrected.

3.2 PREPARATION

A. Clean substrates of substances, including oil, grease, and curing compounds, that might impair terrazzo bond. Provide clean, dry, and neutral substrate for terrazzo application.

B. Concrete Slabs:
   1. Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with terrazzo.
      a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
      b. Repair damaged and deteriorated concrete according to terrazzo manufacturer's written instructions.
      c. Use patching and fill material to fill holes and depressions in substrates according to terrazzo manufacturer's written instructions.

C. Verify that concrete substrates are dry and moisture-vapor emissions are within acceptable levels according to manufacturer's written instructions.

D. Preinstallation Moisture Testing:
   1. Testing Agency: Owner will engage through the Contractor a qualified testing agency to perform tests.
   2. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
      a. Moisture-Vapor-Emission Test: Maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours when tested according to ASTM F 1869 using anhydrous calcium chloride.
      b. Relative Humidity Test: Maximum 75 percent relative humidity measurement when tested according to ASTM F 2170 using in-situ probes.
   3. Proceed with terrazzo installation only after concrete substrates pass moisture testing or after installation of moisture-vapor-emission-control membrane on substrate areas that fail testing.

E. Moisture-Vapor-Emission-Control Membrane: Install according to manufacturer's written instructions.
   1. Install concrete substrates that fail preinstallation moisture testing.

F. Substrate-Crack-Suppression Membrane: Install to isolate and suppress substrate cracks according to manufacturer's written instructions.
   1. Prepare and prefill substrate cracks with membrane material.
   2. Install membrane to produce full substrate coverage in areas to receive terrazzo.
   3. Reinforce membrane with fiberglass scrim.

G. Protect other work from water and dust generated by grinding operations. Control water and dust to comply with environmental protection regulations.
   1. Erect and maintain temporary enclosures and other suitable methods to limit water damage and dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

3.3 EPOXY-RESIN TERRAZZO INSTALLATION

A. Comply with NTMA's written recommendations for terrazzo and accessory installation.

B. Strip Materials:
   1. Divider and Control-Joint Strips:
      a. Locate divider strips in locations indicated.
      b. Install control-joint strips back to back and directly above concrete-slab control joints.
      c. Install control-joint strips with 1/4-inch gap between strips, and install sealant in gap.
      d. Install strips in adhesive setting bed without voids below strips, or mechanically anchor strips as required to attach strips to substrate, as recommended by strip manufacturer.
   2. Accessory Strips: Install as required to provide a complete installation.

C. Apply primer to terrazzo substrates according to manufacturer's written instructions.

D. Place, rough grind, grout, cure grout, fine grind, and finish terrazzo according to manufacturer's written instructions.
   1. Installed Thickness: As indicated on Drawings nominal.
   2. Terrazzo Finishing: Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.
      a. Rough Grinding: Grind with 24-grit or finer stones or with comparable diamond abrasives. Follow initial grind with 60/80-grit stones or with comparable diamond abrasives.
      b. Grouting: Before grouting, clean terrazzo with water, rinse, and allow to dry. Apply and cure epoxy grout.
      c. Fine Grinding/Polishing: Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted. Grind with 80 -grit stones or with comparable diamond abrasives until grout is removed from surface.
   3. Installation Tolerance: Limit variation in terrazzo surface from level to 1/4 inch in 10 feet; noncumulative.

E. Install and finish poured-in-place terrazzo base at the same time the adjacent terrazzo flooring is installed.

3.4 REPAIR

A. Cut out and replace terrazzo areas that evidence lack of bond with substrate. Cut out terrazzo areas in panels defined by strips and replace to match adjacent terrazzo, or repair panels according to NTMA's written recommendations, as approved by Architect.

3.5 CLEANING AND PROTECTION

A. Cleaning:
   1. Remove grinding dust from installation and adjacent areas.
   2. Wash surfaces with cleaner according to NTMA's written recommendations and manufacturer's written instructions; rinse surfaces with water and allow them to dry thoroughly.

B. Sealing:
   1. Seal surfaces according to NTMA's written recommendations.

2. Apply sealer according to sealer manufacturer's written instructions.

C. Protection: Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure that terrazzo is without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 096723 - RESINOUS FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Resinous flooring.
   2. Integral cove base accessories.

B. Related Sections:
   1. Section 090561.13 "Moisture Vapor Emission Control".

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review manufacturer's written instructions for substrate preparation and environmental conditions affecting resinous flooring installation.
   2. Review details of integral cove bases.
   3. Review manufacturer's written instructions for installing resinous flooring systems.
   4. Review protection measures for adjacent construction and installed flooring, floor drainage requirements, curbs, base details, and so forth.

1.3 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures".

B. Product Data: For each type of product.
   1. Include manufacturer's technical data, installation instructions, and recommendations for each resinous flooring component required.

C. Sustainable Design Submittals:
   1. Environmental Product Declaration: For each product.
   2. Material Ingredient Documentation: For each product.
   3. Laboratory Test Reports: For flooring products, indicating compliance with requirements for low-emitting materials.
   4. Laboratory Test Reports: For finish system, indicating compliance with requirements for low-emitting materials.
   5. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

D. Samples: For each resinous floor system required and for each color and texture specified, 6 inches square in size, applied to a rigid backing by Installer for this Project.

E. Samples for Initial Selection: For each type of exposed finish required.

F. Samples for Verification: For each resinous flooring system required and for each color and texture specified, 6 inches square, applied to a rigid backing by Installer for this Project.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.
   1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Apply full-thickness mockups on 96-inch- square floor area selected by Architect.
      a. Include 96-inch length of integral cove base with inside and outsidecorner.
   2. Simulate finished lighting conditions for Architect's review of mockups.
   3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Provide the following upon request:
   1. Qualification Data: For Installer.
   2. Material Certificates: For each resinous flooring component.
   3. Material Test Reports: For each resinous flooring system, by a qualified testing agency.
   4. Field quality-control reports.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring installation.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring installation.

C. Close spaces to traffic during resinous flooring installation and for 24 hours after installation unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

B. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

C. VOC Content Limits: For wet applied product show compliance with VOC limits as defined in Section 018113 Sustainable Design Requirements.

D. Flooring products shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Flammability: Self-extinguishing in accordance with ASTM D635.

2.2 RESINOUS FLOORING

A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base.

B. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

C. Surface Friction: Not less than 0.6 according to ASTM D 2047.
   1. No high gloss finish.

D. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Obtain secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from manufacturer recommended in writing by manufacturer of primary materials.

E. System Characteristics:
   1. Color and Pattern: Match Architect's sample.
   2. Overall System Thickness: 1/4 inch.

F. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested in accordance with test methods indicated:
   1. Compressive Strength: 7700 psi minimum in accordance with ASTM C579.
   2. Tensile Strength: 1000 minimum in accordance with ASTM C307.
   3. Flexural Modulus of Elasticity: 2400 minimum in accordance with ASTM C580.
   4. Water Absorption: 1 percent maximum in accordance with ASTM C413.
   5. Impact Resistance: 160 in. lbs. minimum in accordance with ASTM D2794.
   6. Critical Radiant Flux: 0.45 W/sq. cm or greater in accordance with NFPA 253.

G. Primer: Type recommended in writing by resinous flooring manufacturer for substrate and resinous flooring system indicated.
   1. Formulation Description: 100 percent solids.

H. Waterproofing Membrane: Type recommended in writing by resinous flooring manufacturer for substrate and resinous flooring system indicated.
   1. Formulation Description: 100 percent solids.

I. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended in writing by manufacturer for installation indicated.

J. Grout Coat:
   1. Resin: Urethane.

2. Formulation Description: 100 percent solids.
3. Type: Pigmented.
4. Thickness of Coat: 3/16 inch.

K. Topcoats: Sealing or finish coats.
1. Resin: Urethane.
2. Formulation Description: 100 percent solids.
3. Type: Pigmented.
4. Number of Coats: One.
5. Thickness of Coats: 1/16 inch.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resinous flooring systems.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare and clean substrates in accordance with resinous flooring manufacturer's written instructions for substrate indicated to ensure adhesion.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.
1. Roughen concrete substrates as follows:
a. Shot-blast surfaces with an apparatus that abrades the concrete surface, contains the dispensed shot within the apparatus, and recirculates the shot by vacuum pickup.
b. Comply with requirements in SSPC-SP 13/NACE No. 6, with a Concrete Surface Profile of 3 or greater in accordance with ICRI Technical Guideline No. 310.2R, unless manufacturer's written instructions are more stringent.
2. Repair damaged and deteriorated concrete in accordance with resinous flooring manufacturer's written instructions.
3. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
c. If water moisture tests exceed stated limits, apply vapor retarder for moisture vapor emission control as specified in Section 090561.13.

4. Alkalinity and Adhesion Testing: Perform tests recommended in writing by resinous flooring manufacturer. Proceed with installation only after substrate alkalinity is not less than 6 or more than 8 pH unless otherwise recommended in writing by flooring manufacturer,

C. Patching and Filling: Use patching and fill material to fill holes and depressions in substrates in accordance with manufacturer's written instructions.
   1. Control Joint Treatment: Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring in accordance with manufacturer's written instructions.

D. Resinous Materials: Mix components and prepare materials in accordance with resinous flooring manufacturer's written instructions.

3.3 INSTALLATION

A. Apply components of resinous flooring system in accordance with manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness specified.
   1. Coordinate installation of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
   2. Cure resinous flooring components in accordance with manufacturer's written instructions. Prevent contamination during installation and curing processes.
   3. Expansion and Isolation Joint Treatment: At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.

B. Primer: Apply primer over prepared substrate at spreading rate recommended in writing by manufacturer.

C. Waterproofing Membrane: Apply waterproofing membrane over entire substrate surface, in thickness recommended in writing by manufacturer.
   1. Apply waterproofing membrane to integral cove base substrates.

D. Field-Formed Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring coats. Apply in accordance with manufacturer's written instructions and details, including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.
   1. Integral Cove Base: 4 inches high unless otherwise indicated.

E. Grout Coat: Apply grout coat to fill voids in surface of substrate.

F. Topcoats: Apply topcoats in number indicated for flooring system specified, at spreading rates recommended in writing by manufacturer, and to produce wearing surface specified.

3.4 FIELD QUALITY CONTROL

A. Material Sampling: Owner may, at any time and any number of times during resinous flooring installation, require material samples for testing for compliance with requirements.
   1. Owner will engage an independent testing agency to take samples of materials being used. Material samples will be taken, identified, sealed, and certified in presence of Contractor.

2. Testing agency will test samples for compliance with requirements, using applicable referenced testing procedures or, if not referenced, using testing procedures listed in manufacturer's product data.
3. If test results show applied materials do not comply with specified requirements, pay for testing, remove noncomplying materials, prepare surfaces coated with unacceptable materials, and reinstall flooring materials to comply with requirements.

B. Core Sampling: At Owner's direction and at locations designated by Owner, take one core sample per 1000 sq. ft. of resinous flooring, or portion of, to verify thickness. For each sample that fails to comply with requirements, take two additional samples. Repair damage caused by coring. Correct deficiencies in installed flooring as indicated by testing.

3.5 PROTECTION

A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Carpet tile.

B. Related Requirements:
   1. Section 090561.13 - Moisture Vapor Emission Control.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to carpet tile installation including, but not limited to, the following:
      a. Review delivery, storage, and handling procedures.
      b. Review ambient conditions and ventilation procedures.
      c. Review subfloor preparation procedures.

1.3 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures.".

B. Product Data: For each type of product.
   1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
   2. Include manufacturer's written installation recommendations for each type of substrate.

C. Shop Drawings: For carpet tile installation, showing the following:
   1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
   2. Carpet tile type, color, and dye lot.
   3. Type of subfloor.
   4. Type of installation.
   5. Pattern of installation.
   6. Pattern type, location, and direction.
   7. Pile direction.
   8. Type, color, and location of insets and borders.
   9. Type, color, and location of edge, transition, and other accessory strips.
   10. Transition details to other flooring materials.

D. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of carpet tile.
   1. Include Samples of exposed edge, transition, and other accessory stripping involving color or finish selection.

E. Samples for Verification: Actual sample of finished products for each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
   1. Carpet Tile: Full-size Sample.

2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- long Samples.

F. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

G. Sustainable Design Submittals:
1. Product Data: For adhesives, indicating VOC content.
2. Environmental Product Declaration: For each product.
3. Product Data: Embodied Carbon/LCA Optimization
4. Material Ingredient Report: For each product.
5. Sourcing of Raw Materials: Extended producer responsibility.
6. Recycled Content: Provide manufacturer documentation for recycled content, indicating postconsumer and preconsumer recycled content.
7. Laboratory Test Reports: Indicating compliance with requirements for low-emitting materials.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles. Include the following:
1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but no fewer than 10 full-size units.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

B. Provide the following upon request:
1. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

1.7 MOCKUPS

A. Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
1. Build mockups in locations as directed by the Architect.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Owner specifically approves such deviations by Change Order.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

1.9 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended in writing by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.10 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
   1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
   2. Failures include, but are not limited to, the following:
      a. More than 10 percent loss of face fiber, edge raveling, snags, and runs.
      b. Loss of tuft-bind strength.
      c. Excess static discharge.
      d. Delamination.
      e. Dimensional instability.
   3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Color: Match Architect's samples.

C. Pattern: Match Architect's samples.

D. Sizes: As indicated .

E. Sustainable Design Requirements:
   1. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

2. Environmental Product Declaration Optimization Assessment or LCA Action Plan: Provide Type III Product Specific Environmental Product Declaration that includes an embodied carbon optimization report or action plan.
3. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.01 percent (100 ppm) with Third Party Verification.
4. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 50 percent.
5. Extended producer responsibility: Documentation that outlines extended producer responsibility program (take-back and recycling program for end of life products).Sustainable Product Certification: In accordance with NSF/ANSI 140.
6. Verify flooring products comply with requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

F. Performance Characteristics:
1. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm in accordance with NFPA 253.
2. Colorfastness to Crocking: Not less than 4, wet and dry, in accordance with AATCC 165.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended in writing by carpet tile manufacturer.
1. Coatings shall have a VOC content of 50 g/L or less.
2. Coatings shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive types to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and that are recommended in writing by carpet tile manufacturer for releasable installation.
1. Adhesives shall have a VOC content of 50 g/L or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Transition Strips: As indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.

B. Examine carpet tile for type, color, pattern, and potential defects.

C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
   1. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
      a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. in 24 hours.
      b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
      c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
      d. If water moisture tests exceed stated limits, apply vapor retarder for moisture vapor emission control as specified in Section 090561.13.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates.

B. Use trowelable leveling and patching compounds, in accordance with manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider, and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: As recommended in writing by carpet tile manufacturer .

C. Maintain dye-lot integrity. Do not mix dye lots in same area.

D. Maintain pile-direction patterns indicated on Drawings.

E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended in writing by carpet tile manufacturer.

F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.

H. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:
   1. Remove excess adhesive and other surface blemishes using cleaner recommended in writing by carpet tile manufacturer.
   2. Remove yarns that protrude from carpet tile surface.
   3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI 104, Section 13.7.

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION

SECTION 097200 - WALL COVERINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. PVC free Vinyl wall covering.
   2. Wood-veneer wall covering.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference in person or virtual to review printed graphics.

1.3 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures."

B. Product Data: For each type of product.
   1. Include data on physical characteristics, durability, fade resistance, and fire-test-response characteristics.

C. Sustainable Design Submittals:
   1. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
   2. Chain-of-Custody Qualification Data: For manufacturer and vendor.
   3. Product Data: For adhesives, indicating VOC content.
   4. Laboratory Test Reports: For wall materials, indicating compliance with requirements for low-emitting materials.

D. Shop Drawings: Show location and extent of each wall-covering type. Indicate pattern placement seams and termination points.
   1. All wallcovering type with a printed graphic.

E. Samples: For each type of wall covering and for each color, pattern, texture, and finish specified, full width by 36 inches long in size.
   1. Wall-Covering Sample: From same production run to be used for the Work, with specified treatments applied.
   2. Graphic Wall Covering: for each type of custom wallcovering, a 2'-0" x 4'-0" full scale digital print.
      a. Show complete pattern repeat.

1.4 QUALITY ASSURANCE

A. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

B. Work of graphics shall be fabricated and installed by an experienced architectural graphics fabricator or manufacturer who has continuously been engaged in work of equivalent scope, quality level, and fabrication standards for a minimum of seven (7) years.

1. The Graphics Contractor shall be responsible for the high quality of all materials and workmanship required for the execution of the Project including materials and workmanship of any firm or individual who act as Signage Contractor's Sub-Contractor.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install wall coverings until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and HVAC system is operating and maintaining ambient temperature and humidity conditions at levels intended for occupants after Project completion during the remainder of the construction period.
   1. Wood-Veneer Wall Coverings: Condition spaces for not less than 48 hours before installation.

B. Lighting: Do not install wall covering until lighting that matches conditions intended for occupants after Project completion is provided on the surfaces to receive wall covering.

C. Ventilation: Provide continuous ventilation during installation and for not less than the time recommended by wall-covering manufacturer for full drying or curing.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: As determined by testing identical wall coverings applied with identical adhesives to substrates in accordance with test method indicated below by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
      a. Flame-Spread Index: 25 or less.
      b. Smoke-Developed Index: 50 or less.
   2. Fire-Growth Contribution: No flashover and heat and smoke release when tested in accordance with NFPA 265.

2.2 PVC FREE VINYL WALL COVERING

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Basis-of-Design Products: As indicated on Drawings.

B. Description: Provide products in rolls from same production run and complying with the following:

C. Width: 54 inches.

2.3 WOOD-VENEER WALL COVERING

A. Basis-of-Design Products: As indicated on Drawings.

B. Description: Provide wood-veneer wall covering in rolls from same production run.

C. Sheet Size: 48 by 96 inches.

2.4 ACCESSORIES

A. Adhesive: Mildew-resistant, nonstaining adhesive, for use with specific wall covering and substrate application indicated and as recommended in writing by wall-covering manufacturer.
   1. Adhesives shall have a VOC content of 50 g/L or less.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation surfaces being true in plane and vertical and horizontal alignment, maximum moisture content, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances that could impair bond of wall covering, including dirt, oil, grease, mold, and mildew.

C. Prepare substrates to achieve a smooth, dry, clean, structurally sound surface free of flaking, unsound coatings, cracks, and defects.
   1. Moisture Content: Maximum of 5 percent on new plaster, concrete, and concrete masonry units when tested with an electronic moisture meter.
   2. Plaster: Allow plaster to cure for at least 90 days. Neutralize areas of high alkalinity. Apply primer/sealer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
   3. Metals: If not factory primed, clean and apply metal primer as recommended in writing by metal-primer manufacturer and wall-covering manufacturer.
   4. Gypsum Board: Apply primer/sealer as recommended in writing by primer/sealer manufacturer and wall-covering manufacturer.
   5. Painted Surfaces:
      a. Check for pigment bleeding. Apply primer/sealer to areas susceptible to pigment bleeding as recommended in writing by primer/sealer manufacturer.
      b. Sand gloss, semigloss, and eggshell finishes with fine sandpaper.

D. Remove hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

E. Acclimatize wall-covering materials by removing them from packaging in the installation areas not less than 24 hours before installation.

3.3 INSTALLATION OF WALL COVERING

A. Comply with wall-covering manufacturers' written installation instructions applicable to products and applications indicated.

B. Cut wall-covering strips in roll number sequence. Change the roll numbers at partition breaks and corners.

C. Install strips in same order as cut from roll.
   1. For solid-color, even-texture, or random-match wall coverings, reverse every other strip.

D. Install wall covering without lifted or curling edges and without visible shrinkage.

E. Match pattern 72 inches above the finish floor.

F. Install seams vertical and plumb at least 6 inches from outside corners and 6 inches from inside corners unless a change of pattern or color exists at corner. Horizontal seams are not permitted.

G. Trim edges and seams for color uniformity, pattern match, and tight closure. Butt seams without overlaps or gaps between strips.

H. Fully bond wall covering to substrate. Remove air bubbles, wrinkles, blisters, and other defects.

3.4 FIELD FINISHING OF WOOD-VENEER WALL COVERINGS

A. Apply specified finish system according to coating manufacturer's written instructions to produce finish that is consistent in color and gloss and matches approved Samples.

3.5 CLEANING

A. Remove excess adhesive at seams, perimeter edges, and adjacent surfaces.

B. Use cleaning methods recommended in writing by wall-covering manufacturer.

C. Replace strips that cannot be cleaned.

D. Reinstall hardware and hardware accessories, electrical plates and covers, light fixture trims, and similar items.

END OF SECTION

SECTION 097723 - FABRIC-WRAPPED PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes shop-fabricated, fabric-wrapped wall panels.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures".

B. Product Data: For each type of product.
   1. Include fabric facing, panel edge, core material, and mounting indicated.

C. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
   2. Environmental Product Declaration (EPD): For each product.
   3. Product Data: For adhesives, indicating that product contains no urea formaldehyde.
   4. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
   5. Product Data: For installation adhesives, indicating VOC content.
   6. Laboratory Test Reports: For installation adhesives, indicating compliance with requirements for low-emitting materials.
   7. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.
   8. Laboratory Test Reports: For wall materials, indicating compliance with requirements for low-emitting materials.

D. Shop Drawings: For panel assembly and installation.
   1. Include plans, elevations, sections, and mounting devices and details.
   2. Include details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge profile and core materials.
   3. Include direction of fabric weave and pattern matching.

E. Samples for Initial Selection: For each type of fabric facing.
   1. Include Samples of hardware and accessories involving color or finish selection.

F. Samples for Verification:

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Electrical outlets, switches, and thermostats.
   2. Items penetrating or covered by panels including the following:
      a. Lighting fixtures.

b. Air outlets and inlets.
c. Speakers.
d. Alarms.
e. Sprinklers.
f. Access panels.

3. Show operation of hinged and sliding components covered by or adjacent to panels.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of panel to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal instructions.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials from same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Fabric: For each fabric, color, and pattern installed, provide length equal to 10 percent of amount installed, but no fewer than 10 sq. yd., full width of bolt.
2. Mounting Devices: Full-size units equal to 5 percent of amount installed, but no fewer than five devices, including unopened adhesives.

1.7 QUALITY ASSURANCE

A. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

B. Provide the following upon request:
1. Product Certificates: For each type of panel.

C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials, fabrication, and installation.
1. Build mockup of typical wall area 48 inches wide by full height. Include intersection of wall and ceiling, corners, and perimeters.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with fabric and panel manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

B. Deliver materials and panels in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install panels until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Air-Quality Limitations: Protect panels from exposure to airborne odors such as tobacco smoke, and install panels under conditions free from odor contamination of ambient air.

C. Field Measurements: Verify panel locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace panels and components that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Fabric sagging, distorting, or releasing from panel edge.
      b. Warping of core.
   2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain fabric-wrapped wall panels from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Wall materials shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Fire-Test-Response Characteristics: Panels shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
   1. Surface-Burning Characteristics: Comply with ASTM E84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
      a. Flame-Spread Index: 25 or less.
      b. Smoke-Developed Index: 450 or less.
   2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.

2.3 FABRIC-WRAPPED WALL PANELS

A. Fabric-Wrapped Wall Panel : Manufacturer's standard panel construction consisting of facing material stretched over front face of edge-framed core and bonded or attached to edges and back of frame.Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B.

1. Panel Shape: As indicated on Drawings.
2. Mounting:
   a. Back mounted with manufacturer's standard adhesive, secured to substrate.
3. Core: Manufacturer's standard .

2.4 MATERIALS

A. Sustainable Design Requirements:
   1. Composite Wood Products: Products shall be made without urea formaldehyde.

B. Mounting Devices: Concealed on back of panel, recommended by manufacturer to support weight of panel, and as follows:
   1. Adhesives shall have a VOC content of 70 g/L or less.
   2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.5 FABRICATION

A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.

B. Edge Hardening: For cores, chemically harden core edges and areas of core where mounting devices are attached.

C. Core-Face Layer: Evenly stretched over core face and edges and securely attached to core; free from puckers, ripples, wrinkles, or sags.

D. Facing Material: Apply fabric fully covering visible surfaces of panel; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.

E. Dimensional Tolerances of Finished Panels: Plus or minus 1/16 inch for the following:
   1. Thickness.
   2. Edge straightness.
   3. Overall length and width.
   4. Squareness from corner to corner.
   5. Chords, radii, and diameters.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fabric, fabricated panels, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting panel performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install panels in locations indicated. Unless otherwise indicated, install panels with vertical surfaces and edges plumb, top edges level and in alignment with other panels, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

B. Comply with manufacturer's written instructions for installation of panels using type of mounting devices indicated. Mount panels securely to supporting substrate.

C. Align fabric pattern and grain as indicated on Drawings.

3.3 INSTALLATION TOLERANCES

A. Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches, noncumulative.

B. Variation of Joint Width: Not more than 1/16 inch wide from reveal line in 48 inches, noncumulative.

3.4 CLEANING

A. Clip loose threads; remove pills and extraneous materials.

B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION

SECTION 098316 - ACOUSTICAL CEILING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Spray-applied cellulosic insulation.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each exposed product and for each color and texture specified, in manufacturer's standard dimensions in size.

C. Certification: Manufacturer's written certification that product contains no asbestos or fiberglass.

D. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and pre-consumer recycled content and cost.
   2. Product Data: For adhesives, indicating VOC content.
   3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
   4. Laboratory Test Reports: For insulation, indicating compliance with requirements for low-emitting materials.

E. Product Acoustics Test Reports: For spray-applied cellulosic insulation, tested in accordance with ASTM C423, performed by a qualified testing agency.

1.3 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects, to set quality standards for materials and execution.
   1. Build mockup of each required color and texture.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

B. Applicator shall be licensed by product manufacturer.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project site in their original containers or packages or bundles bearing label clearly identifying manufacturer's name, brand, grade, and other pertinent information.

B. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 SPRAY-APPLIED CELLULOSIC INSULATION

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. International Cellulose Corporation, "K-13 Spray-On Systems", (Basis of Design).

B. Insulation shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Recycled Fiber Content: Not less than 80 percent.

D. Self-Supported, Spray-Applied Cellulosic Insulation: ASTM C 1149, Type I (materials applied with liquid adhesive; suitable for either exposed or enclosed applications), chemically treated for flame-resistance, processing, and handling characteristics.
   1. Non-corrosive in accordance with ASTM C 1149.

E. Bond strength: Not less than 150 psf in accordance with ASTM E 736.

F. Flame Spread and Smoke Developed Indexes: Class A in accordance with ASTM E 84.

G. Deflection: No cracking, spalling, or delamination in accordance with ASTM E 759.

H. Thickness: Nominal 1 inches.

I. Color and Texture: As selected by the Architect.

J. Acoustic Performance: NRC 0.90.

2.2 ACCESSORIES

A. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
   1. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean substrates of substances that are harmful to insulation or that interfere with insulation adherence.

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that has not been left exposed to ice, rain, or snow at any time.

C. Apply insulation to envelop entire area to be insulated. Fit around obstructions. Remove projections that interfere with placement.

D. Apply single layer of insulation to produce the consistent thickness indicated unless multiple layers are otherwise shown or required to make up total thickness, but not less than 1 inch.

3.3 INSTALLATION OF SPRAY-APPLIED CELLULOSIC INSULATION

A. Spray-Applied Cellulosic Insulation: Apply spray-applied insulation in accordance with manufacturer's written instructions.
   1. Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked.
   2. Install spray applied insulation at a consystent thickness as required to achieve an average NRC of 1.00.

3.4 FIELD QUALITY CONTROL

A. Special Inspections: The Owner will engage a qualified special inspector to test for Bond Strength and Deflection.

B. Perform the tests and inspections of completed Work in successive stages. Do not proceed with application of insulation for the next area until test results for previously completed applications of insulation show compliance with requirements. Tested values shall equal or exceed values as specified.

C. Insulation will be considered defective if it does not pass tests and inspections.
   1. Remove and replace insulation that does not pass tests and inspections, and retest.

3.5 PROTECTION

A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.

B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 098433 - SOUND-ABSORBING WALL UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes shop-fabricated, acoustical panel units tested for acoustical performance, including the following:
   1. Sound-absorbing wall panels.

1.2 DEFINITIONS

A. NRC: Noise Reduction Coefficient.

B. SAA: Sound Absorption Average.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures."

B. Product Data: For each type of product.
   1. Include fabric facing, panel edge, core material, and mounting indicated.

C. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
   2. Environmental Product Declaration (EPD): For each product.
   3. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
   4. Chain-of-Custody Qualification Data: For manufacturer and vendor.
   5. Product Data: For adhesives, indicating VOC content.
   6. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
   7. Laboratory Test Reports: For wall materials, indicating compliance with requirements for low-emitting materials.

D. Shop Drawings: For unit assembly and installation.
   1. Include plans, elevations, sections, and mounting devices and details.
   2. Include details at panel head, base, joints, and corners; and details at ceiling, floor base, and wall intersections. Indicate panel edge profile and core materials.
   3. Include details at cutouts and penetrations for other work.
   4. Include direction of fabric weave and pattern matching.

E. Samples for Initial Selection: For each type of fabric facing.
   1. Include Samples of hardware and accessories involving color or finish selection.

F. Samples for Verification: For the following products:
   1. Panel Edge: 12-inch- long Sample(s) showing each edge profile, corner, and finish.
   2. Core Material: 12-inch- square Sample at corner.
   3. Mounting Devices: Full-size Samples.

4. Assembled Panels: Approximately 36 by 36 inches , including joints and mounting methods.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of unit to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal instructions.

1.6 MAINTENANCE MATERIAL SUBMITTALS

1.7 QUALITY ASSURANCE

A. Certified Wood: Provide an invoice including vendor's chain-of-custody number, product cost, and entity being invoiced.

B. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

C. Provide the following upon request:
1. Product Certificates: For each type of unit.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with fabric and unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work at and above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Air-Quality Limitations: Protect units from exposure to airborne odors, such as tobacco smoke, and install units under conditions free from odor contamination of ambient air.

C. Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to the following:
   a. Acoustical performance.
   b. Fabric sagging, distorting, or releasing from panel edge.
   c. Warping of core.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain wall units specified in this Section from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Verify wall materials comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
   1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
      a. Flame-Spread Index: 25 or less.
      b. Smoke-Developed Index: 450 or less.

2.3 SOUND-ABSORBING WALL UNITS

A. Sound-Absorbing Wall Panel : Manufacturer's standard panel construction consisting of facing material laminated to front face, edges, and back edge border of core.
   1. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

2.4 MATERIALS

A. Composite Wood Products: Verify products are made using ultra-low-emitting formaldehyde resins, as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products," or are made with no added formaldehyde.

B. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

C. Certified Wood: Wood products shall comply with requirements of ASTM D7612-10 (FSC, SFI, ATSM, CSA or PEFC certifications are acceptable).

D. Mounting Devices : Concealed on back of unit, recommended by manufacturer to support weight of unit, and as follows:
   1. Splines: Manufacturer's standard concealed metal or plastic splines that engage the kerfed edges of the unit, with other moldings and trim for interior corners, exterior corners, and exposed edges, with factory-applied finish on exposed items.
   2. Verify adhesives have a VOC content of 70 g/L or less.
   3. Verify adhesive complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
   4. Adhesive Tape Strips: Manufacturer's standard 1/16-inch- thick, double-sided foam tape.

E. FABRICATION

1. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face, edges, and back border of dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fabric, fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and scribed to fit adjoining work accurately at borders and at penetrations.

B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.

C. Align fabric pattern and grain with adjacent units.

3.3 INSTALLATION TOLERANCES

A. Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches , noncumulative.

B. Variation of Joint Width: Not more than 1/16-inch variation from hairline in 48 inches , noncumulative.

3.4 CLEANING

A. Clip loose threads; remove pills and extraneous materials.

B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION

SECTION 099113 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Surface preparation and application of paint systems on the following exterior substrates:
   1. Concrete.
   2. Concrete masonry units (CMUs).
   3. Steel and iron.
   4. Galvanized metal.

1.2 DEFINITIONS

A. MPI Gloss Level 1 (Matte or Flat Finish): Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.

B. MPI Gloss Level 3 (Eggshell Finish): 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.

C. MPI Gloss Level 4 (Satin Finish): 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.

D. MPI Gloss Level 5 (Semigloss Finish): 35 to 70 units at 60 degrees, according to ASTM D523.

E. MPI Gloss Level 6 (Gloss Finish): 70 to 85 units at 60 degrees, according to ASTM D523.

F. MPI Gloss Level 7 (High Gloss Finish): More than 85 units at 60 degrees, according to ASTM D523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include preparation requirements and application instructions.
   2. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
   3. Indicate VOC content.

B. Sustainable Design Submittals:
   1. Product Data: For paints and coatings, indicating VOC content.
   2. Environmental Product Declaration (EPD): For each product.
   3. Material Ingredient Documentation: For each product.

C. Samples for Initial Selection: For each type of topcoat product.

D. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
   1. Submit Samples on rigid backing, 8 inches square.
   2. Apply coats on Samples in steps to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.

E. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in the Exterior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.
   1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
      a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
      b. Other Items: Architect will designate items or areas required.
   2. Final approval of color selections will be based on mockups.
      a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
   3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain paint from single source from single manufacturer.

2.2 PAINT PRODUCTS

A. MPI Standards: Provide products complying with MPI standards indicated and listed in its "MPI Approved Products List."
   1. Provide products from manufacturer's premium or professional product line.

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

D. Manufacturer Inventory: For each product, provide manufacturer's manifest that product does not contain intentionally added cadmium or lead.

E. VOC Content: For field applications, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 50 g/L.
3. Dry-Fog Coatings: 150 g/L.
4. Primers, Sealers, and Undercoaters: 100 g/L.
5. Rust-Preventive Coatings: 100 g/L.
6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
7. Pretreatment Wash Primers: 420 g/L.

F. Colors: Match Architect's samples.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
1. Concrete: 12 percent.
2. Masonry (CMUs): 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected.
1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
   1. SSPC-SP 2.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

3.3 INSTALLATION

A. Apply paints in accordance with manufacturer's written instructions and recommendations in "MPI Manual."
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
   3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
   4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   5. Primers specified in the Exterior Painting Schedule may be omitted on items that are factory primed or factory finished if compatible with intermediate and topcoat coatings and acceptable to intermediate and topcoat paint manufacturers.

B. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
   1. Paint the following work where exposed to view:
      a. Equipment, including panelboards and switch gear.
      b. Uninsulated metal piping.
      c. Uninsulated plastic piping.
      d. Pipe hangers and supports.
      e. Metal conduit.
      f. Plastic conduit.
      g. Tanks that do not have factory-applied final finishes.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage through the Contractor the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
   1. Contractor shall touch up and restore painted surfaces damaged by testing.
   2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written instructions, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written instructions.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
   1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
   2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
   3. Allow empty paint cans to dry before disposal.
   4. Collect waste paint by type and deliver to recycling or collection facility.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:
   1. High-Build Latex System MPI EXT 3.1L: Dry film thickness of not less than 10 mils.
      a. Prime Coat: As recommended in writing by topcoat manufacturer.
      b. Intermediate Coat: As recommended in writing by topcoat manufacturer.
      c. Topcoat: Latex, exterior, high build, MPI #40.

B. CMU Substrates:

1. High-Build Latex System MPI EXT 4.2K: Dry film thickness of not less than 10 mils.
    a. Prime Coat: As recommended in writing by topcoat manufacturer.
    b. Intermediate Coat: As recommended in writing by topcoat manufacturer.
    c. Topcoat: Latex, exterior, high build, MPI #40.

C. Steel and Iron Substrates:
1. Alkyd System MPI EXT 5.1Q:
    a. Alkyd Prime Coat: Primer, alkyd, anticorrosive, for metal, MPI #79.
    b. Shop Prime Coat: Shop primer specified in Section where substrate is specified.
    c. Surface-Tolerant Prime Coat: Primer, metal, surface tolerant, MPI #23.
    d. Intermediate Coat: Exterior, alkyd enamel, matching topcoat.
    e. Gloss Topcoat: Alkyd, exterior, gloss (MPI Gloss Level 6), MPI #9.

D. Galvanized-Metal Substrates:
1. Alkyd System MPI EXT 5.3B:
    a. Prime Coat: Primer, galvanized, cementitious, MPI #26.
    b. Intermediate Coat: Exterior, alkyd enamel, matching topcoat.
    c. Gloss Topcoat: Alkyd, exterior, gloss (MPI Gloss Level 6), MPI #9.

END OF SECTION

SECTION 099123 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on the following interior substrates:
   1. Concrete.
   2. Concrete masonry units (CMUs).
   3. Steel and iron.
   4. Galvanized metal.
   5. Gypsum board.
   6. Cotton or canvas insulation covering.
   7. ASJ insulation covering.

1.2 DEFINITIONS

A. MPI Gloss Level 1 (Matte or Flat Finish): Not more than five units at 60 degrees and 10 units at 85 degrees, according to ASTM D523.

B. MPI Gloss Level 2 (Velvet Finish): Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.

C. MPI Gloss Level 3 (Eggshell Finish): 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D523.

D. MPI Gloss Level 4 (Satin Finish): 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D523.

E. MPI Gloss Level 5 (Semigloss Finish): 35 to 70 units at 60 degrees, according to ASTM D523.

F. MPI Gloss Level 6 (Gloss Finish): 70 to 85 units at 60 degrees, according to ASTM D523.

G. MPI Gloss Level 7 (High Gloss Finish): More than 85 units at 60 degrees, according to ASTM D523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.
   1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
   2. Indicate VOC content.

B. Sustainable Design Submittals:
   1. Product Data: For paints and coatings, indicating VOC content.
   2. Laboratory Test Reports: For paints and coatings, indicating compliance with requirements for low-emitting materials.
   3. Environmental Product Declaration: For each product.
   4. Material Ingredient Documentation: For each product.

C. Samples for Initial Selection: For each type of topcoat product.

D. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
   1. Submit Samples on rigid backing, 8 inches square.
   2. Apply coats on Samples in steps to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.

E. Product List: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Paint: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Architect will select one surface to represent surfaces and conditions for application of each paint system.
      a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft..
      b. Other Items: Architect will designate items or areas required.
   2. Final approval of color selections will be based on mockups.
      a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
   3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than 5 deg F above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

2.2 PAINT, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."
   1. Provide products from manufacturer's premium or professional product line.

B. Material Compatibility:
   1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.

C. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

D. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

E. Manufacturer Inventory: For each product, provide manufacturer's manifest that product does not contain intentionally added cadmium or lead.

F. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
   1. Flat Paints and Coatings: 50 g/L.
   2. Nonflat Paints and Coatings: 50 g/L.
   3. Dry-Fog Coatings: 150 g/L.
   4. Primers, Sealers, and Undercoaters: 100 g/L.
   5. Rust-Preventive Coatings: 100 g/L.
   6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
   7. Pretreatment Wash Primers: 420 g/L.

G. Low-Emitting Materials: Paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

H. Colors: Match Architect's samples.
   1. Items Not Included in Finish Schedule: As selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Concrete: 12 percent.
   2. Masonry (CMUs): 12 percent.
   3. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.
   1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceeds that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
   1. SSPC-SP 3.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Cotton or Canvas Insulation Covering Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.

3.3 INSTALLATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
   3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
   4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
   6. Paint latex sealants color as directed by Architect.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire-Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
   1. Paint the following work where exposed in equipment rooms:
      a. Equipment, including panelboards and switch gear.
      b. Uninsulated metal piping.
      c. Uninsulated plastic piping.
      d. Pipe hangers and supports.
      e. Metal conduit.
      f. Plastic conduit.
      g. Tanks that do not have factory-applied final finishes.
      h. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
   2. Paint the following work where exposed in occupied spaces:
      a. Equipment, including panelboards.
      b. Uninsulated metal piping.
      c. Uninsulated plastic piping.
      d. Pipe hangers and supports.
      e. Metal conduit.

f. Plastic conduit.
g. Duct, equipment, and pipe insulation having cotton or canvas insulation covering or other paintable jacket material.
h. Other items as directed by Architect.

3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

3.4 FIRE-RATED AND SMOKE CONTAINMENT ASSEMBLIES

A. Fire walls, fire barriers, fire partitions, smoke barriers and smoke partitions or any other wall required to have protected openings or penetrations shall be effectively and permanently identified with signs or stenciling. Such identification shall:
1. Be located in accessible concealed floor, floor-ceiling or attic spaces; and
2. Be located within 15 feet of each end of each wall and repeated at intervals not exceeding 30 feet measured horizontally along both sides of the wall or partition; and
3. Include lettering not less than 3 inches in height, incorporating the suggested wording: " FIRE AND/OR SMOKE BARRIER-PROTECT ALL OPENINGS" or other wording approved or required by AHJ (Authority Having Jurisdiction).
4. Apply a minimum one-inch wide bright red horizontal line, both sides of wall, interrupted for approved text, at the required interval.

3.5 FIELD QUALITY CONTROL

A. Dry-Film Thickness Testing: Owner may engage through the Contractor the services of a qualified testing and inspecting agency to inspect and test paint for dry-film thickness.
1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry-film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry-film thickness that complies with paint manufacturer's written recommendations.

3.6 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.7 INTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:
1. High-Performance Architectural Latex System, MPI INT 3.1C:
a. Prime Coat: Primer, alkali resistant, water based, MPI #3.

b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
c. Topcoat: Latex, interior, high performance architectural, satin (MPI Gloss Level 4), MPI #140.

B. CMU Substrates:
1. High-Performance Architectural Latex System, MPI INT 4.2P:
a. Block Filler: Latex, interior/exterior, MPI #4.
b. Prime Coat: Primer, alkali resistant, water based, MPI #3.
c. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
d. Topcoat: Latex, interior, high performance architectural, satin (MPI Gloss Level 4), MPI #140.

C. Steel Substrates:
1. High-Performance Architectural Latex System, MPI INT 5.1RR:
a. Prime Coat: Primer, alkyd, anticorrosive, for metal, MPI #79.
b. Prime Coat: Shop primer specified in Section where substrate is specified.
c. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
d. Topcoat: Latex, interior, high performance architectural, semigloss (MPI Gloss Level 5), MPI #141.

D. Galvanized-Metal Substrates:
1. High-Performance Architectural Latex System, MPI INT 5.3M:
a. Prime Coat: Primer, galvanized, water based, MPI #134.
b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
c. Topcoat: Latex, interior, high performance architectural, semigloss (MPI Gloss Level 5), MPI #141.

E. Gypsum Board Substrates:
1. High-Performance Architectural Latex System, MPI INT 9.2B:
a. Prime Coat: Primer sealer, latex, interior, MPI #50.
b. Intermediate Coat: Latex, interior, high performance architectural, matching topcoat.
c. Topcoat: Latex, interior, high performance architectural, eggshell (MPI Gloss Level 3), MPI #139.
d. Topcoat: Latex, interior, high performance architectural, satin (MPI Gloss Level 4), MPI #140.

F. Cotton or Canvas and ASJ Insulation-Covering Substrates: Including pipe and duct coverings.
1. Institutional Low-Odor/VOC Latex System, MPI INT 10.1D:
a. Prime Coat: Primer sealer, latex, interior, MPI #50.
b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
c. Topcoat: Latex, interior, institutional low odor/VOC, flat (MPI Gloss Level 1), MPI #143.

END OF SECTION

SECTION 099600 - HIGH PERFORMANCE COATINGS - WWTP

PART 1 - GENERAL

1.1 WORK INCLUDED

A. This section only applies to the Hospital WWTP and the Hon-Dah WWTP. The section only covers industrial coating systems. Architectural coating systems are specified in a parallel Section 099600, HIGH PERFORMANCE COATINGS as applicable to the hospital and the WWTPs.

B. General: This section covers surface preparation, furnishing, and application of industrial paint and special protective coatings, complete.

C. The intention of these Specifications is for new interior and exterior concrete, plastic, FRP, metal, and submerged metal surfaces to be painted, whether specifically mentioned or not, except as specified otherwise.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

A. Section 400510: Piping General - WWTP.

1.3 REFERENCE STANDARDS

A. General: The latest revision of the following standards shall apply, at a minimum, to the coating materials, testing, and installation except where more stringent standards are applicable. In case of conflict, the most stringent requirements shall apply.

B. American National Standards Institute (ANSI):
1. A13.1, Scheme for the Identification of Piping Systems.
2. Z535, Safety Color Code - Complete Set.

C. American Society for Testing and Materials (ASTM):
1. ASTM D16, Standard Terminology for Paint, Related Coatings, Materials, and Applications.
2. ASTM D1186, Standard Test Methods for Nondestructive Measurement of Dry Film Thickness of Nonmagnetic Coatings Applied to a Ferrous Base.
3. ASTM D1212, Standard Test Methods for Measurement of Wet Film Thickness of Organic Coatings.
4. ASTM D2200, Standard Practice for use of Pictorial Surface Preparation Standards and Guides for Painting Steel Surfaces (SSPC-VIS 1).
5. ASTM D3276, Standard Guide for Painting Inspectors (Metal Substrates).
6. ASTM D3359, Standard Test Methods for Measuring Adhesion by Tape Test.
7. ASTM D3363, Standard Test Method for Film Hardness by Pencil Test.
8. ASTM D4060, Standard Test Method for Abrasion Resistance of Organic Coatings by the Taber Abraser.
9. ASTM D4138, Standard Practices for Measurement of Dry Film Thickness of Protective Coating Systems by Destructive, Cross Sectioning Means.
10. ASTM D4258, Standard Practice for Surface Cleaning Concrete for Coating.
11. ASTM D4259, Standard Practice for Abrading Concrete.
12. ASTM D4263, Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
13. ASTM D4414, Standard Practice for Measurement of Wet Film Thickness by Notch Gages.
14. ASTM D4417, Standard Test Methods for Measurement of Surface Profile of Blast Cleaned Steel.

15. ASTM D4511, Standard Test Method for Pull-Off Strength of Coatings (metal substrates) Using Portable Adhesion Testers
16. ASTM D4541, Standard Test Method for Pull-Off Strength of Coatings (concrete substrates) Using Portable Adhesion Testers.
17. ASTM D4787, Standard Practice for Continuity Verification of Liquid or Sheet Linings Applied to Concrete Substrates.
18. ASTM D5064, Standard Practice for Conducting a Patch Test to Assess Coating Compatibility.
19. ASTM D5162, Standard Practice for Discontinuity (Holiday) Testing of Nonconductive Protective Coating on Metallic Substrates.

D. Association for Materials Protection and Performance (AMPP):
1. NACE Standard SPO288, Recommended Practices for Inspection of Linings on Steel and Concrete.
2. SSPC Surface Preparation Standards.
3. SSPC-Vis 1, Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning.
4. SSPC-SP COM, Surface Preparation Specifications Commentary.
5. SSPC-PA 1, Shop, Field, and Maintenance Painting of Steel.
6. SSPC-PA 2, Procedure for Determining Conformance to Dry Coating Thickness Requirements.
7. SSPC-PA Guide 10, Guide to Safety and Health Requirements for Industrial Painting Projects.
8. SSPC Guide 6, Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations.
9. SSPC Guide 20, Guide for Applying Thick Film Coatings and Surfacing Over Concrete Floors.
10. SSPC TU 6, Chemical Stripping of Organic Coatings from Steel Structures.

E. International Concrete Repair Institute (ICRI)
1. Guideline No. 310.2 – Selecting and Specifying Concrete Surface Preparation for Sealer, Linings, and Polymer Overlays

1.4 DEFINITIONS

A. Definitions of Painting Terms per ASTM D16, unless otherwise specified.

1.5 SUBMITTALS

A. Provide catalog cuts and other information for all products proposed for use that show compliance of those materials with these Specifications. Contractor submittals shall be made in accordance with the General Conditions and Section 013300, SUBMITTAL PROCEDURES. Provide a complete submittal package for each coating system to be utilized to include, but not necessarily be limited to, the following:
1. Data Sheets: Submit manufacturer's recommended coating system suitable for intended use per the Application Schedule included herein. For each coating system furnish the manufacturer's Technical Data Sheets, surface and application instructions, and colors available (where applicable) for each product used in the coating system.

B. Proof of any federal, state, or local permits or licenses necessary for the project.

C. Factory Applied Coatings: Manufacturer’s certification stating factory applied coating systems are recommended for intended exposure and meets or exceeds requirements specified herein.

D. If the manufacturer of any finish coating differs from that of shop primer or if different manufacturer products are utilized for any coating system, provide both manufacturers' written confirmation that materials are compatible.

E. Coating Product Manufacturer's Certificate of Compliance. At completion of project, provide product manufacturer's letter certificate stating factory or field applied coating systems provided are recommended for intended exposure and meets or exceeds requirements specified herein and that they were installed in accordance with coating manufacturer recommendations and contract documents requirements by Applicator.

F. Alternate Materials or Product Manufacturers Submittals: Alternate materials or product manufacturers shall be of same generic type of coating specified and provide equal to or greater quality, performance, chemical resistance, life, film thickness, solids by volume, and number of coats to be considered. Provide coating manufacturer letter stating that alternate material is equal to or better than specified product with supporting documentation of direct comparisons to verify equal to or better quality, chemical resistance, performance and life. Alternate coating systems to be considered must meet the same number of coats and minimum specified total dry film thickness.

1.6 QUALITY ASSURANCE

A. Applicator shall have a minimum five years experience with specified or similar products and similar surface preparation requirements**.**

B. Quality Control:
   1. If, in the coating manufacturer or Engineer's evaluation, surface preparation, application, or coating quality control testing are not as specified or there is excessive poor workmanship, number of defects, or damage, upon notification by Engineer, Contractor and Applicator shall immediately stop production. Stoppage of production and recoating shall be at the sole cost to the Contractor and Applicator.
   2. Failure to follow product manufacturer's written recommendations and these specifications shall be cause for stoppage of surface preparation and coating operations and rejection of all coated surfaces completed outside these parameters, at the sole cost to Contractor and Applicator.
   3. Surface preparation or coating application shall cease until quality control issues are resolved to the satisfaction of both the coating manufacturer and the Engineer. Surface preparation and repair procedures shall be mutually agreed upon between product manufacturer and Engineer before incorporation into work by the Contractor.

C. Field Test Instruments: Provide field test equipment and instruments as specified hereinafter in Part 2 Products.

1.7 APPLICATOR QUALITY CONTROL PLAN

A. Provide a Quality Control Program that monitors surface preparation and coating application procedures in accordance with the product manufacturer's written instructions, NACE SPO288, ASTM D3276, these specifications, and other referenced Standards.

B. Complete Applicator quality control inspections on all factory, field, and repair coatings. The Contractor is solely responsible for all inspection and quality control testing and record keeping for the project.

C. Immediately report any problems or non-compliance of these specifications or coating manufacturer's instructions to the Engineer.

1.8 REGULATORY COMPLIANCE

A. Perform surface preparation and coating in accordance with these specifications, and recommendations of the coating manufacturer's instructions and referenced standards.

B. Contractor shall be solely and completely responsible for condition of the project site, including safety of all persons (including employees) and property during performance of the work. The Engineer and/or Owner will NOT monitor safety practices and will not assume responsibility for safety.

C. Contractor shall monitor and be responsible for all health and regulatory compliance at the work site. The Engineer and/or Owner will NOT monitor health and compliance practices and will not assume responsibility for health and regulatory compliance issues.

D. Meet federal, state, and local requirements for limiting the emission of volatile organic compounds (VOCs) and worker exposure. Paints and coatings shall contain no lead, zinc or strontium chromate, asbestos, or mercury materials or compounds.

1.9 ENVIRONMENTAL (WEATHER) REQUIREMENTS

A. Do not prepare surfaces or apply coating in temperatures outside of manufacturer's recommended maximum or minimum allowable, or in dust, smoke-laden atmosphere, damp or humid weather, or under conditions that could cause ice build-up on the metal surface.

B. Perform abrasive blast cleaning, apply and cure coating only when relative humidity is below 85 percent and when structure surface temperature is more than 5 degrees F above dew point and rising unless approved by coating manufacturer. If heating is required, use only indirect fired heaters that do not increase humidity levels in the work area.

C. Coat surfaces the same day (within 8 hours maximum or sooner) of when abrasive blasted, before they start to rust. Re-blast surfaces that have started to rust or have been contaminated before coating.

D. Do not spray apply coatings if the wind velocity is above coating manufacturer’s limit or if spray application will cause over-spray damage to other structures.

E. Dust and Contaminants: Schedule work and provide protection to avoid excessive dust and airborne contaminants.

F. Ventilation: Provide ventilation as required to ensure that dust, contaminants, and vapor concentrations remain low and are safe.

1.10 OBSERVATION OF WORK

A. All surface preparation work and individual coats are subject to observation by Engineer, Owner, and coating manufacturer’s representatives. Provide access to the project site for Owner, Engineer, and coating manufacturer at all times during surface preparation, coating application, and to observe work.

B. Provide Engineer and coating manufacturer technical representative a minimum twenty working days advance notice to start of shop or field surface preparation work and coating application work.

C. Observation or testing by the Engineer, coating manufacturer, and/or Owner representative(s) or the waiver of observation or testing of any particular portion of the work shall not be construed to relieve the Contractor of his responsibility to correctly perform the work and testing required in accordance with these specifications and the coating manufacturer’s recommendations.

D. The Owner reserves the right to reject all work that does not meet the minimum requirements of this specification. This may be done either during or after completion of the surface preparation or coating work, during subsequent observations, warranty inspections, or at any time when discovered during the warranty period.

E. The Contractor shall repair any defective or rejected work in accordance with written recommendations of the particular coating or lining manufacturer as reviewed and approved by the Engineer. The Contractor shall remedy any defective or rejected work in a timely manner to the satisfaction of the Owner and Engineer at Contractor’s sole cost.

1.11 PROJECT WARRANTY

A. The Contractor, coating applicator, and coating manufacturer shall jointly and severally warrant to the Owner and guarantee the work under this section against defective workmanship and materials for a period of one year commencing on the date of final acceptance of the work.

B. A warranty inspection of the coating systems will be made within the warranty period. The Contractor and coating applicator may be present during the warranty inspection if desired at their option. A list of all coating defects and failures identified during the inspection will be prepared and transmitted to the Contractor. The list will serve as notice of repairs to be completed by the Contractor as required under warranty at no additional cost to the Owner.

C. Repairs: Any defects in the coating system discovered during inspection or during the warranty inspection(s) shall be repaired and retested in a timely manner (repairs shall be started within 30 days and finished with complete cure within 60 days) by the Contractor and/or Applicator. Complete all repairs in accordance with the written coating manufacturer's instructions as reviewed and approved by the Engineer. The repairs shall be completed to the satisfaction of the Engineer and Owner. All surface preparation and coating repair or any damage to other work caused by such defect or repairing of the defects including but not limited to any additional costs to the Owner, additional expenses or design/construction services by the Engineer, including additional testing and evaluation, full-time observation during repairs, and re-warranty inspections shall be at the sole cost to Contractor and/or Applicator.

PART 2 - PRODUCTS

2.1 GENERAL

A. Provide new materials intended for this type of service in accordance with this specification and the referenced standards. Whenever the requirements of these specifications or Drawings exceed those of the codes or manufacturer's instructions, the requirements of these specifications or Drawings shall prevail. Where a higher quality or better grade of material or a higher standard of workmanship is required, the most stringent requirement shall apply.

B. Products shall comply with federal, state, and local requirements limiting the emission of volatile organic compounds as well as any other applicable federal, state, or local regulations.

2.2 PRODUCT MANUFACTURERS

A. Each coating system provided herein shall be the end product of one manufacturer in order to achieve standardization for appearance, maintenance, and compatibility.

B. Field applied coating systems specified for each general type of coating (Supplier Code) shall be the end product of one manufacturer for all of the coating systems in that Supplier Code classification in order to achieve standardization for appearance, maintenance, and compatibility.

C. Suppliers listed below can usually supply the types of materials specified in this section. Alternate suppliers will be considered, subject to approval of the Engineer. Contact the suppliers for information regarding the location of their representative nearest the project site.

D. Industrial Coating Manufacturers Supplier Code A (able to supply most heavy-duty industrial coatings and architectural paints):
   1. AkzoNobel/Devoe High Performance Coatings.
   2. AkzoNobel/International Ceilcote Coatings.
   3. Carboline Global.
   4. Sherwin-Williams Company.
   5. Pacific Southwest Coatings/PPG Protective and Marine Coatings.
   6. Tnemec Coatings.

E. Fusion Bonded Coating Suppliers Code E:
   1. Axalta Coating Systems Nap-Gard.
   2. 3M Scotchkote.
   3. Valspar (subsidiary of Sherwin-Williams Company).
   4. Western Coatings, Inc./Farwest Steel Corporation.

F. Architectural Paint Manufacturers: Subject to compliance with requirements, provide products of one of the following:
   1. Benjamin Moore Company.
   2. Behr Process Corporation.
   3. Pratt & Lambert Paints.
   4. Sherwin-Williams Company/Valspar.
   5. PPG Industries.

2.3 MATERIALS

A. General:
   1. Material Quality: Manufacturer's highest quality products for specific application and suitable for intended service.
   2. Materials Including Primer and Finish Coats: Produced by same manufacturer.
   3. Thinners, Cleaners, Driers, and Other Additives: As recommended by manufacturer of the particular coating.

B. The use of a manufacturer's name and model or catalog number is solely for establishing the standard of quality and general configuration desired. Products of other manufacturers of equal or better standard and quality will be considered in accordance with the General Conditions.

C. Products are listed below according to their approximate order of appearance in the systems. The letter designating the manufacturer code refers to the corresponding manufacturers names listed under PRODUCT MANUFACTURERS hereinbefore.

Coating Product Generic Description and Manufacturer Supplier Code		
Product	**Definition**	**Manufacturer Supplier Code**
Tar Stop	Coating designed to prevent bleeding of black asphaltic varnish through finish paint; Shellac is a suitable alternate; not applicable for white and pastel colors	A
Potable Water Grade Polyamide Epoxy	Potable grade polyamide epoxy coatings approved for all water contact and conforming to NSF Standards 60 and 61	A
Surface Tolerant Epoxy	Surface tolerant, polyamide or polyamidoamine anticorrosive, converted epoxy primer containing rust-inhibitive pigments suitable for the intended service	A
Vinyl Ester	Premium, quality, high solids, (92%), thermosetting coating with exceptional corrosion resistance. Suitable for this intended service	A
Epoxy Primer	Polyamide, anticorrosive, converted epoxy primer containing rust-inhibitive pigments	A

Coating Product Generic Description and Manufacturer Supplier Code		
Product	**Definition**	**Manufacturer Supplier Code**
Epoxy Modified Cementitious Mortar	Aggregate reinforced epoxy, for patching and filling voids and bugholes in concrete	A
Coal-Tar Epoxy	Amine or phenolic epoxy type; 70 percent volume solids minimum, suitable for immersion service	A
Organic Zinc Rich Primer	Converted epoxy, epoxy/phenolic or urethane type, minimum 10 pounds metallic zinc content per gallon	A
Rust-Inhibitive Primer	Single-package steel primers with anticorrosive pigment loading	A
Modified Aromatic Polyurethane Primer	Moisture cured self-priming, anticorrosive primer with micaceous iron oxide and zinc, suitable for immersion and atmospheric service.	A
Alkyd Enamel	Optimum quality, gloss finish, medium long oil	A
Wash Primer	Vinyl butyral acid	A
Epoxy Nonskid Finish	Polyamide or amine converted epoxies aggregated; aggregate may be packaged separately	A
Inorganic Zinc Primer	Solvent or water based, 14 pounds metallic zinc content per gallon minimum; follow manufacturer's recommendation for top-coating	A
Silicone/Silicone Acrylic	Elevated temperature silicone or silicone/acrylic based	A
Cementitious Acrylic Emulsion	Two-component (liquid and aggregate) filler	A
Potable High Build Epoxy	Potable grade polyamide epoxy coatings approved for potable water contact and conforming to NSF Standard 61. Percent of volume solids 75 to 80 percent minimum, suitable for immersion service Capability of 4 to 8 MDFT per coat	A
Polyamide High Build Epoxy	Capability of 4 to 8 MDFT per coat. Must be compatible with wastewater basin coating requirements.	A

Coating Product Generic Description and Manufacturer Supplier Code		
Product	**Definition**	**Manufacturer Supplier Code**
High Build Epoxy, High Solids	High build, high solids epoxy with percent of volume solids 75 to 80 percent minimum, suitable for immersion service Capability of 4 to 8 MDFT per coat	A
Polyamide Epoxy, High Solids	Percent of volume solids 80 percent minimum, suitable for immersion service	A
Modified Polyamine Epoxy	100 percent solids minimum, for severe wastewater environments including H2S gas	A
Polyamine Epoxy	80 percent solids minimum, chemical and MIC resistance, abrasion resistance	A
Polyurethane Enamel	Two-component, aliphatic or acrylic based polyurethane; high gloss finish suitable for the intended service	A
Hydrophobic Aromatic Polyurethane	Moisture-cured, hydrocarbon-modified coating	A
Acrylic/Latex Finish	High-gloss, single-component suitable for the intended service	A
Canvas Sealer	Single-package latex or alkyd primer for canvas surfaces; follow manufacturer's recommendations for surface preparation	A
Bituminous Paint	Single-component, coal-tar pitch based	A
Block Filler	Primer-sealer designed for rough masonry surfaces, 100 percent acrylic emulsion	A
Epoxy Leveler	Leveler or sealer designed for rough concrete or masonry surfaces, epoxy based.	A
Alkyd Wood Primer	Flat alkyd	A
Alkyd (Semigloss)	Semigloss alkyd	A
Acrylic Latex (Flat)	Flat latex	A
Water Base Epoxy	A two-component, polyamide epoxy emulsion	A
Sanding Sealer	Co-polymer oil, clear, dull luster	A
Stain, Wood	Satin luster, linseed oil	A
Stain, Concrete	Acrylic, water repellant, penetrating stain	A
Acrylic Sealer	Clear acrylic	A

Coating Product Generic Description and Manufacturer Supplier Code		
Product	**Definition**	**Manufacturer Supplier Code**
Varnish	Nonpigmented vehicle based on a variety of resins (alkyd, phenolic, urethane) available in gloss, semigloss, and flat finishes	A
DTM Acrylic	Acrylic coating suitable for direct to metal applications and over coating of existing coatings suitable for the intended service.	A
Fusion Bonded Coating	100 percent solids, thermosetting, fusion bonded, dry powder epoxy or polyurethane resin, suitable for the intended service	E
Fusion Bonded, PTFE Lube or Grease Lube	Polytetrafluoroethylene grease as manufactured by CONDAT; or PTFE grease as supplied by McMaster-Carr Company; or RL 736 as manufactured by Amrep, Inc.	
Modified Polyamine Epoxy	100 percent solids minimum, for severe wastewater environments including H2S gas	A
Novolac Epoxy	Two-component Novolac Epoxy, 100% solids, with excellent chemical resistance, self-leveling, moisture tolerant, suitable for vertical and horizontal surfaces, and intended for chemical resistance and containment structures.	A

2.4 EXTRA COATING MATERIAL FOR OWNER

A. Spare Coating Materials: Provide at time of field coating final testing and acceptance, one unopened gallon can of each type and each color of field coating utilized. If plural component type coating, provide repair coating. Material shall be new and at beginning of shelf life.

2.5 COLORS:

A. General:
   1. Colors to be used are to be selected by the Owner from color samples to be supplied by the coating manufacturer, unless indicated otherwise.
   2. Any proprietary identification of colors is for identification only. Selected authorized manufacturer may supply matches.

B. Pipe Identification Painting:
   1. Color code exposed, non-submerged metal and plastic piping except electrical conduit. Paint fittings and valves the same color as pipe.
   2. Piping Color Coding: Coat piping in solid colors and provide bands in accordance with Pipe System and Color Code Schedule as shown in Section 400205, PIPING SCHEDULE-WWTP.
   3. Pipe Supports: Mild steel, painted light gray, Tnemec Company No. 32GR; Sherwin-Williams SW 6255; or equal.

C. Equipment Colors:
   1. Equipment includes the machinery or vessel itself plus the structural supports and fasteners and attached electrical conduits.

2. Factory coated equipment does not require additional painting, except for touch up if the factory coat was damaged during shipping or construction. Paint exposed, non-submerged portions of equipment supports and fasteners the same color as the piping it serves per the piping color code, except as itemized below:
   a. Dangerous Parts of Equipment and Machinery: OSHA Orange.
   b. Physical hazards in normal operating area and energy lockout devices, including, but not limited to, electrical disconnects for equipment and equipment isolation valves in air and liquid lines under pressure: OSHA Yellow.
3. Fiberglass reinforced plastic (FRP) equipment with an integral colored gel coat does not require painting, provided the color is as selected.

D. Pipe Identification Labels:
1. Identification labels shall bear full Pipe Description/Flow Stream Identifier name as shown on the Pipe System and Color Code Schedule shown in Section 400205, PIPING SCHEDULE - WWTP. Install separate flow directional arrows with each label.
2. Insulated pipe shall be labeled on the exterior of the insulation or jacketing. Pipe labels affixed to pipe insulation/jacketing shall be of the pipe color listed below.
3. Labels shall be self-adhesive vinyl, long lasting, resistant to moisture, oils, solvents, and weathering, meeting OSHA requirements. The label lettering colors and lettering heights shall be in accordance with the latest version of ANSI or ASME A13.1.
4. Locate labels at connections to equipment, valves, branch fittings, at wall boundaries, and at intervals along piping not greater than 18 feet on center, with at least one label applied to each exposed run of pipe.
5. Manufactured by Brady Worldwide, Inc.; Seton Signs, Labels, and Safety Solutions; or equal.

E. Pipe Identification Tags for Smaller Piping: For piping 3/4-inch diameter or smaller, identify with appropriate aluminum, brass, or stainless steel identification tags. Tags shall be minimum 2-inch diameter or 2-inch square shape with lettering etched and filled with enamel, as manufactured by Brady Worldwide, Inc.; Seton Signs, Labels, and Safety Solutions; or equal.

2.6 COATING INSPECTION TEST EQUIPMENT

A. Applicator or Contractor shall provide the following minimum equipment for Contractor's quality control testing as required depending on the coating type, the product manufacturers' recommended quality control procedures, and/or specific requirements of these specifications.
1. Provide the following environmental monitoring equipment items to measure ambient temperature**:**
   a. Surface Temperature: Provide a minimum of two surface thermometers, magnet mounted dial type to measure surface temperature, PTC Instruments Surface Thermometer Model 315 F (0 to 150 degrees F); Dwyer Instruments Surface Mount Thermometer ST 250 (0 to 250 degrees F); or equal.
   b. Provide ambient maximum and minimum temperature thermometer.
2. Surface Cleanliness Testing: Clear tape.
3. Provide Wet Film Thickness Gauge (1 to 80 mils).
4. Provide a magnetic type dry film thickness gauge to test coating thickness specified in mils. CG204 as manufactured by Extech; Positest DFT as manufactured by DeFelsko Corporation; QNix as manufactured by Automation Dr. Nix; or equal.

PART 3 - EXECUTION

3.1 GENERAL WORKMANSHIP

A. All materials and equipment associated with surface preparation and coating application as shown and specified herein shall be furnished and installed by, or under the direction of, the

Contractor. All work shall be supervised by qualified persons who have read and understood the minimum requirements of these specifications. Any changes in design or method of installation of an item as specified shall be reviewed and approved by the Engineer prior to installation.

B. All work shall be in accordance with these specifications and the printed directions and recommendations of the paint manufacturer whose product is to be applied. Where a higher standard of workmanship is required, the most stringent requirement shall apply.

C. Nothing included or omitted in this specification shall relieve the Contractor of the obligation of providing a complete and satisfactory coating system.

D. Obtain full cure of coating systems before immersion or allowing exposure to moisture. Consult coatings manufacturer's written instructions for these requirements. Do not immerse or expose coatings to moisture for any purpose until completion of curing cycle. Conduct final hardness and cure testing before exposure to water or fluids.

E. Any portion of the work that does not meet the minimum requirements of these specifications shall be corrected by the Contractor at no additional cost to the Owner.

3.2 PAINT DELIVERY, STORAGE, AND HANDLING

A. Deliver new coating materials to project site in original unopened containers and cartons. Store products in a covered and protected area that is heated or cooled to maintain temperatures within the range recommended by paint manufacturer. Store materials in original packaging until time of use.

B. Comply during storage, mixing, and application with all pertinent codes, fire regulations, and coating manufacturer’s requirements.

3.3 FACTORY AND SHOP COATED ITEMS AND FABRICATED EQUIPMENT

A. Unless otherwise indicated, all fabricated components and equipment shall be shop primed. At Contractor’s option, equipment may be shop or field mid- or top-coated. Surface preparation and factory or shop coating application shall be in accordance with the requirements of this specification. Degree of surface preparation and coating type shall be per the Application Schedule included herein or as specified in the specific equipment or item’s specification sections. In case of conflict, the most aggressive surface preparation and the coating system with the highest protection level provided shall be required.

B. Confirm that the equipment manufacturer’s standard or recommended coating will provide equal to or better quality, chemical performance, and durability than the specific coating system specified herein. If equipment manufacturer’s standard or recommended coating will not, then provide surface preparation and shop or factory coating equal to or better than that specified for that specific area per the Application Schedule. Shop-applied primer or coats shall be the same type as the specified coating system and shall be applied at the minimum dry film thickness recommended by the coating manufacturer.

C. Factory or shop applied primer and coating shall be compatible with field applied coatings submitted and being used for this project. Equipment manufacturer or shop or factory coating applicator shall provide product data sheets identifying the shop or factory primer and top coats to the on-site coating applicator, and provide information to Contractor to substantiate that coatings are compatible and to identify recoat windows.

D. Shipping: Where pre-coated items are to be shipped to the site, protect coating from damage. Coated items may be rejected for excessive damage as determined by the Engineer. All rejected items shall be immediately removed from the project site and replaced at sole cost to the Contractor.

E. Shop Coating Field Repairs: Damaged, deteriorated or poorly applied shop primed and coated items that do not meet the requirements specified herein shall be removed and the surfaces recoated. If the shop applied prime and finish coats meet the requirements specified herein, the field coating required shall consist of touch-up coating and then applying any finish coats necessary to achieve the specified film thickness and continuity.

3.4 SURFACES NOT REQUIRING PAINTING

A. Unless otherwise stated or shown, the following areas or items will not require painting or coating:
   1. Exterior concrete surfaces, interior concrete floors and exterior slabs, and concrete equipment pads, except for dampproofing, waterproofing, interior of water holding structures, and chemical containment areas.
   2. Reinforcing steel.
   3. Nonferrous and corrosion resistant ferrous alloys such as copper, bronze, monel, aluminum, chromium plate, atmospherically exposed weathering steel, and stainless steel, except where:
      a. Required for electrical insulation between dissimilar metals.
      b. Aluminum and stainless steel are embedded in concrete or masonry.
      c. Aluminum is in contact with concrete or masonry.
      d. Color coding of equipment and piping is required.
   4. Portions of ferrous material embedded in concrete. This does not apply to back faces of bare items or equipment mounted to concrete or masonry surfaces, which shall be galvanized or coated prior to erection.
   5. Nonmetallic materials such as glass, PVC, wood, porcelain, and plastic except as required for architectural painting or color coding. Plastic piping must be color code painted unless specifically stated otherwise.
   6. Fiberglass reinforced plastic (FRP) with an integral ultra-violet resistant colored gel coat except as required for architectural painting or color coding.
   7. Prefinished electrical and HVAC items such as motor control centers, switchboards, switchgear, panelboards, transformers, disconnect switches (if prefinished in OSHA yellow), building louvers, and wall panels; except where color coding of equipment is required.
   8. Prefinished hardware and hardware accessories, electrical fixtures, and plumbing fixtures.
   9. Exposed, non-submerged electrical conduits attached to unpainted concrete or masonry surfaces. Where the conduit is attached to painted surface, it may be painted the same color as that surface.
   10. Items specified to be galvanized after fabrication, unless specified otherwise elsewhere, or subject to immersion. Galvanized surfaces shall not be immersed without top coating(s). Submerged galvanized surfaces shall be coated with the same coating system as required for other ferrous materials in that area.

3.5 PROTECTION OF ITEMS NOT TO BE PAINTED

A. Unless otherwise stated or shown, protect the areas or items that will not require surface preparation or coating in the following manner:
   1. Remove, mask, or otherwise protect hardware, lighting fixtures, switchplates, aluminum or stainless-steel surfaces, machined surfaces, couplings, shafts, bearings, tags or nameplates on machinery, and other surfaces not intended to be painted.
   2. Protect working parts of mechanical and electrical equipment from damage during surface preparation and painting process. Mask openings in motors to prevent abrasives, paint, and other materials from entering the motors.

3. Cap or seal all open piping, valves, and conduits, prior to beginning any surface preparation or coating work to prevent entry of foreign material into the piping, valves, or conduit systems.
4. Protect nearby structures, equipment, vehicles, building, etc. from surface preparation and coating operations. Immediately remove coatings that are applied or fall on structures or items not intended to be coated.

3.6 SURFACE CLEANING AND BLASTING METHODS

A. General: Provide materials, equipment, procedures, and safety equipment for personnel in accordance with current SSPC specifications. Degree of cleanliness is as follows:
1. Solvent Cleaning: SP-1.
2. Hand Tool Cleaning: SP-2.
3. Power Tool Cleaning: SP-3.
4. White Metal Blast Cleaning: SP-5.
5. Commercial Blast Cleaning: SP-6.
6. Brush-Off Blast Cleaning: SP-7.
7. Pickling SP-8.
8. Near-White Blast Cleaning: SP-10.
9. Power Tool Cleaning to Bare Metal: SP-11.
10. High Pressure Water Jetting: SP-12.
11. Surface Preparation of Concrete: SP-13.

B. The words "solvent cleaning", "hand tool cleaning", "wire brushing", and "blast cleaning", or similar words of equal intent in these Specifications or in paint manufacturer's specifications refer to the applicable SSPC Specifications.

3.7 PREPARATION OF SURFACES

A. General:
1. Inspect and provide substrate surfaces prepared in accordance with these specifications and the printed directions and recommendations of the coating manufacturer according to the type of surface and type of coating to be applied.
2. Equipment, procedures, and degree of cleaning shall meet minimum requirements as specified under the Application Schedule. Minimum degree of surface preparation (SSPC Grade) is as specified herein and takes precedence over the coating manufacturer's recommendations unless the coating manufacturer’s recommendations are more stringent.
3. Minimum surface profile shall be according to specified thickness or coating manufacturer recommendations for each coating type, whichever is greater.
4. Ensure surface is completely dry before beginning surface preparation in accordance with coating manufacturer’s recommendations.

B. Metal Surfaces:
1. Equipment, procedures, and degree of cleaning shall meet minimum specified requirements per SSPC. Correct all metal surface and fabrication defects revealed by surface preparation.
2. Welds and Surface Defects:
   a. Prepare and correct defects such that there is no undercutting or reverse ridges on weld bead, no weld spatter on or adjacent to weld or any other area to be painted, or no sharp peaks or ridges along weld bead.
   b. Remove all weld flux and grind embedded pieces of electrode or wire flush with adjacent surface of weld bead. Grind porous welds down to solid weld material. Round or chamfer sharp edges and grind smooth burrs, jagged edges, and surface defects.

c. Complete all welding, burning, cutting, grinding, and other such work prior to field surface preparation and coating. Abrasive blast after all cutting, welding and/or grinding is completed to provide suitable anchor profile.

3. Pre-blast Cleaning Requirements (Decontamination):
   a. Remove oil, grease, welding fluxes, and other surface contaminants per SSPC SP-1 prior to abrasive blast cleaning.
   b. Cleaning Methods: Steam, open flame, high pressure (3,000 psi or greater) hot water or cold water with appropriate detergent additives followed with clean water rinsing.
   c. Clean small isolated areas as above or solvent clean with suitable solvents or degreasers and clean cloths.
4. Abrasive Blast Cleaning Requirements:
   a. Complete the surface preparation and lining or coating application in a continuous operation. Complete prime coat or lining during the same day (within 8 hours maximum) of when the surface preparation is completed.
   b. Complete surface blasting with proper equipment to obtain minimum SSPC SP degree of cleanliness specified herein.
   c. Provide type and size of abrasive to produce minimum surface depth, sharpness, and angular profile that meets coating manufacturer's recommendations for particular primer or coating to be used.
   d. Blasted surface shall be visually inspected for surface imperfections. Imperfections, which can be detrimental to application of the coating, shall be re-blasted or removed by filing or grinding and then re-blasted.
5. Post-Blast Cleaning and Other Cleaning Requirements:
   a. Clean surfaces of dust and residual particles from cleaning operations by dry (no oil or water vapor) air blast cleaning.
   b. Keep surfaces clean and protect from moisture, weather, dust, dirt, sandblast debris, and other contamination. The structure surfaces shall be completely clean, dust free, and dry before application of coating or lining. Paint surfaces the same day they are blasted. Re-blast surfaces that have started to rust before they are painted.

C. Cast and Ductile Iron Pipe and Fittings:
1. Piping provided with shop primer or fully coated must comply with the requirements specified herein or submit evidence of equal quality.
2. Surface preparation, primer, and first coat application will depend on pipe or fitting manufacturing process. Coordinate surface preparation and prime coat with pipe manufacturer, tape or coating manufacturer, and Applicator. Ductile iron pipe manufactured by the deLavaud Process (dual spray) requires careful surface preparation for application of coatings.
3. Surface profile of cast or ductile iron is different than steel surfaces; consult coating manufacturer for recommended surface preparation, and primer and coating type, and thicknesses.
4. For lower performance conventional coatings (alkyd), clean asphalt varnishes supplied on pipe in accordance with Existing Surfaces to be Painted Section included herein and provide barrier type coatings as recommended by coating manufacturer to stop bleed through. Provide with coating manufacturer’s recommended surface preparation and primer for each coating system.

D. Galvanized Surfaces:
1. Repair hot-dipped galvanized surfaces in accordance with ASTM A780. Remove oil and grease by wiping or scrubbing with suitable solvents per SSPC SP-1. Remove soil, cement splatter, white rust, and other surface contaminants with appropriate hand or power tools in accordance with SSPC SP-2 and SSPC SP-3.

2. Damaged locations, exposed threads, and cut edges (galvanized steel, galvanized piping, electrical conduit, metal pipe sleeves, etc.) shall be solvent cleaned per SSPC SP-1 and primed with an organic zinc rich primer. Thickness of prime coat should be equal or more than original galvanized coating. Use of aerosol bottles of zinc paint is not acceptable.
3. For Immersion Service or Color Coding or Coordination: Clean and prepare galvanized surfaces by light abrasive whip blast (SSPC SP-7, Brush Blast) to abrade surface. Do not remove galvanizing. Wipe down with coating manufacturer's recommended wash primer to prepare galvanized surfaces for top coating. Coat with specified mid and top finish coats for that specific environment and exposure.
4. Obtain coating manufacturer's recommendations for additional surface preparation that may be required based on type of topcoat and exposure.

E. Concrete Surfaces:
1. Prepare concrete surfaces in accordance with coating manufacturer's directions, these specifications, and SSPC SP-13 to achieve a minimum surface smoothness, texture, and profile for the specific level or grade recommended by the coating manufacturer for each concrete coating system.
2. Do not begin until 30 days minimum after concrete has been placed. New or repair concrete and cementitious based materials shall be allowed to cure before coating per coating manufacturer's written recommendations. Do not treat concrete with hardeners or sealers where special coatings are to be applied. Unless otherwise required for proper adhesion, ensure surfaces are dry prior to painting.
3. Provide water barrier coating on backside of concrete walls and floors to be coated to minimize hydrostatic pressure from groundwater or coat interior surfaces of water bearing structures to minimize hydrostatic pressure on interior room concrete walls or floors. All leaks and infiltration shall be eliminated and repaired per coating manufacturer recommendations.
4. Remove grease, oil, dirt, chalk, form release agents, salts or other chemicals, loose materials, or other foreign matter by solvent, detergent, or other suitable cleaning methods per ASTM D4258.
5. Remove and level all mortar splatter and concrete protrusions and round or trim sharp edges by grinding, chipping, wire brushing, or other methods approved by coating manufacturer.
6. Ensure surface pH is compatible with coating or lining system.
7. Concrete surface shall be smooth with no sharp edges, cavities, bug holes, etc. and profile shall have a texture feel of rough sandpaper to the degree in accordance with the coating manufacturer's recommendations.
8. Fill and patch bug-holes, pits, air pockets, voids, and prepare cracks with coating manufacturer's recommended filler/surfacer and crack repair materials. Secure coating manufacturer's recommendations for additional preparation and apply leveler material if required for excessive bug holes exposed after abrasive blasting.
9. Prepare surface and terminate coatings and fill or bevel at angles and edges in accordance with coating manufacturer's recommendations and special details for each type of coating.

F. Plastic Surfaces: Hand sand plastic surfaces to be coated with a medium grit sandpaper to provide tooth for the coating system. Large areas may be power sanded or brush-off blasted, provided sufficient controls are employed so surface is roughened without removing excess material. Lightly sand between coats.

3.8 COATING APPLICATION

A. General:
   1. Apply coatings in accordance with these specifications, the paint manufacturers' printed recommendations, and project specific details. The more stringent requirements shall apply.
   2. Utilize materials, application equipment, tools, pressure settings, and techniques in accordance with coating manufacturer recommendations for each specific type of coating and surface. Ensure that minimum and maximum allowable recoat times are not exceeded and that material is used before it's pot life is exceeded.
   3. Apply coating at wet film thickness as recommended by manufacturer so as to provide a uniform coverage as required to meet the specified minimum dry film thickness. Apply uniform monolithic coating, free of defects, holidays, pinholes, skips, or misses, with no runs, sags, and drips.
   4. The surface area covered per gallon of coating for various types of surfaces shall not exceed those coverage rates recommended by the coating manufacturer:
      a. Adjust application method rate for thinned coatings to provide same thickness or coverage as for unthinned materials.
      b. On rough or pitted metal or concrete and masonry surfaces, application rates will vary according to surface texture; do not exceed the manufacturer's printed coverage rates.
      c. On porous surfaces, decrease the coverage rate or apply additional coat of paint to achieve the desired protective and decorative coating finish and color.
   5. Keep surface clean and free of any moisture, sand, grit, dirt, or other contamination. Reclean if required before coating application.
   6. Apply only to surfaces within minimum and maximum range temperature as recommended by the product manufacturer.
   7. Thinning of Coatings:
      a. Thin coating immediately prior to use where necessary to meet weather, temperature, application method, and surface conditions as recommended by the coating manufacturer.
      b. Provide only the type of thinner as recommend by the coating manufacturer for each type of coating. Thin only in amount as allowed by the coating manufacturer.

B. Special Requirements:
   1. Coat surfaces with a one coat/multiple pass spray technique to build the specified millage. Apply and build coating as recommended by the product manufacturer to not cause out-gassing. Coat high profile areas with multiple passes from different directions, backroll if recommended by the coating manufacturer. If necessary, film thickness may be increased as needed per the coating manufacturer's recommendations.
   2. Inaccessible Locations or Bolted Connections:
      a. Coat units or surfaces to be bolted together or joined closely to structures or to one another prior to assembly or installation with prime and mid-coats, which will be accessible for topcoating after assembly.
      b. Apply total (full) number of specified coats and thicknesses to surfaces which are inaccessible after assembly prior to erection or assembly.
      c. Touch-up of all surfaces shall be completed after assembly and installation.
      d. Apply complete top finish coat to all items accessible after assembly and installation.
   3. Uncoated Equipment Bases and Supports: Prior to setting or connecting equipment in place, coat underside or backside of all ungalvanized or uncoated equipment bases and supports with a prime and mid-coat of epoxy except for bases to be encased in grout.

C. Coordination of Work with Other Specification Sections: Some paint systems require specific application details that are included in other sections of the Contract Documents or the coating manufacturer instructions. These specific detail requirements shall be considered as part of this work.

D. Film Thickness:
   1. Coverage is listed as either total minimum dry film thickness in mils (MDFT) or the maximum spreading rate in square feet per gallon (SFPG). Per coat (PC) determinations are listed as MDFTPC or SFPGPC.
   2. Conduct testing per SSPC-PA 2 with the exception that the averaging method is not allowed. Dry film thickness mils specified herein is the absolute minimum allowed. Conduct additional dry film measurements in any area if requested by Engineer.
   3. Number of Coats: Minimum specified required irrespective of the coating thickness. Additional coats may be required to obtain the minimum required paint thickness, depending on method of application, differences in manufacturers' products, and atmospheric conditions.
   4. Film Build per Coat or Coating System:
      a. Do not exceed coating manufacturer's recommendations. Measure with wet film gauge to ensure proper thickness during application.
      b. Where dry film thickness measurements are below the specified minimum, provide additional coat(s) of paint as necessary to meet the thickness required in accordance with the coating manufacturer directions.
      c. Give particular attention to edges, angles, flanges, bolts, nuts, rivets, and other similar areas where insufficient film thicknesses are likely to be present to ensure proper millage and coverage in these areas.

E. Coating System Curing:
   1. Obtain full cure of mortar, sealants, seam sealers, and cementitious coating systems before top coating. Consult product manufacturer's written instructions for these requirements.
   2. If required by weather conditions or project schedule, provide and continuously operate heating equipment during both coating and cure period in accordance with the coating manufacturer’s instructions. Use only indirect heat source types approved by the coating manufacturer.
   3. Allow sufficient time between coats to allow thorough drying of previous coat before application of finish coats.
   4. For coatings subject to immersion, obtain full cure for completed system before any exposure to liquid or water. Consult coatings manufacturer's written instructions for these requirements. Do not immerse coatings for any purpose until completion of the curing cycle.

F. Cast and Ductile Iron Pipe and Fittings: For lower performance conventional (alkyd) coatings, clean asphalt varnish supplied on pipe and apply one full coat of a tar stop or blocker type barrier coating before two full coats of the color coats specified.

G. Galvanized Metal:
   1. Concealed galvanized surfaces (behind building panels or walls) do not require coating unless specifically indicated herein, or in other sections of these Contract Documents.
   2. Galvanized surfaces shall be top coated where required for color coding as specified.
   3. All submerged galvanized surfaces shall be top coated with coatings specified for that immersion condition. Do not immerse galvanized surfaces without top coating.
   4. Prepare surface and apply wash primer or coating manufacturer’s recommended prime coat. Upon written recommendation of the coating manufacturer, recommended primer will replace the specification required coating system’s indicated primer.

5. Apply coating system (intermediate/finish coats) appropriate for the intended exposure according to the Application Schedule.

H. Porous Surfaces, Such As Concrete or Masonry:
1. Filler/Surfacer: Use coating manufacturer's recommended product to fill air holes, bug holes, and other surface defects prior to additional coats.
2. Prime Coat: May be thinned to provide maximum penetration and adhesion.
   a. Type and Amount of Thinning: Determined by paint manufacturer and dependent on surface density and type of coating.
   b. Do not exceed coating manufacturer's unthinned square foot coverage rate per gallon.
3. Surfaces Specified to Receive Water Base Coating: Damp, but free of running water, just prior to application of coating.

3.9 CONVENTIONAL AND CATALYZED COATINGS

A. Multiple-Component Coating Mixing:
1. Provide unopened product containers to designated mixing area. Prepare using the contents of the container for each component as packaged and recommended by the coating manufacturer. Mix in clean containers of adequate capacity. No partial batches will be permitted.
2. Provide heating or cooling of materials if required to meet minimum or maximum temperature requirements of the manufacturer during mixing and application.
3. No unauthorized thinners or other materials shall be mixed into the paint. Do not thin more than recommended by the coating manufacturer.

B. Conventional and Catalyzed Coating Application:
1. Apply coatings in accordance with these specifications and the paint manufacturer's printed recommendations and specific details for each type of coating. The more stringent requirements shall apply.
2. Apply with equipment, tools, pressure settings, and application techniques in accordance with the coating manufacturer's instructions for each type of surface and coating in accordance with SSPC-PA 1. Apply at a uniform thickness and at the rate specified by the manufacturer to achieve the minimum dry film thickness required for each coat. Apply in a manner to provide a uniform continuous coating film free of defects or holidays.
3. Brush and/or Roller Application: Top quality, proper style and size brushes and rollers shall be used. The brushing or rolling shall be done so that a smooth coat as nearly uniform in thickness as possible is obtained. Brush or roller strokes shall be made to smooth the film without leaving deep or detrimental marks. Surfaces not accessible to brushes or rollers may be painted by spray, by dauber or sheepskins, and paint mitt.
4. Spray Application:
   a. The equipment used shall be suitable for the intended purpose, shall be capable of properly atomizing the coating to be applied, and shall be equipped with suitable pressure regulators and gauges.
   b. Coating shall be applied in a uniform layer with a minimum 50 percent overlap pattern in accordance with the coating manufacturer's application instructions. All runs and sags should be brushed out immediately or the coating shall be removed and the surface recoated.
   c. High build coatings should be applied by a crosshatch method of spray application to ensure proper film thickness of the coating.
   d. Areas inaccessible to spray shall be brushed; if also inaccessible to brush, daubs or sheepskins shall be used, as authorized by the manufacturer.
   e. Special care shall be taken with thinners and paint temperatures so that coating of the correct formula reaches the receiving surface.

3.10 FIELD COATING OF SHOP PRIMED AND FACTORY COATED ITEMS

A. General:
1. Schedule inspection with Applicator and Engineer at project site before field priming or top-coating of shop or factory finished items previously delivered to the project site. Conduct dry film, solvent wipe, and adhesion testing before top-coating.
2. Field coating of shop primed or factory finished items shall be completed during the recoat window for shop or factory coating. If the shop or factory coating window is exceeded, obtain recommendations from the field coating material manufacturer for surface preparation requirements.
3. If in the opinion of the Engineer or the top-coating manufacturer, any shop or factory prime or finish coats have been improperly prepared and applied, are in an excessively damaged condition, if the surface preparation or coating materials used are contrary to those specified herein, or are not compatible with the specified field coats, then the factory or shop applied materials shall be completely removed and the factory coated item recoated at the sole cost to the Contractor.

B. Surface Preparation and Coating Application:
1. Prior to application of field finish coats, clean shop primed or coated surfaces with solvent wipe (SSPC SP-1) so they are free of dirt, oil, and grease. Hand or power sand areas of chipped, peeled, or abraded coating, feathering the edges (SSPC SP-11, or SP-2 and SP-3). Areas of rust bleeding, rust penetration, or damaged shop coated items shall be spot blasted to SSPC SP-5 (White Metal Blast) or power-tooled cleaned to bare metal SSPC SP-11.
2. Follow with a spot primer using the specified primer before the application of succeeding coats.
3. If the coating window is missed or if recommended by the coating manufacturer, lightly abrasive blast shop primed or coated items scheduled to receive field applied finish coats to remove glossy coating and provide a rough profile. Apply mist or tie coat of specified primer, minimum 1-mil dry film thickness, if recommended by the field applied coating manufacturer depending on the type of coating and surface condition.
4. Repair abraded areas on factory finished items as recommended by the coating manufacturer, as reviewed and approved by the Engineer. Apply spot primer, touch-up, and additional coats as required according to the field coating manufacturer's written recommendations. Carefully blend repaired areas into original finish.

C. Applicator Quality Control Inspection: Applicator shall conduct dry film measurements, holiday testing, and adhesion testing on cured coatings as specified.

3.11 EXISTING COATED SURFACES TO BE PAINTED

A. Unless otherwise specified, existing or recently constructed coating systems damaged by new construction shall be repaired and coated in accordance with the appropriate coating system specified for that area as new work.

3.12 APPLICATOR FIELD INSPECTION TESTING

A. Surface Preparation Inspection:
1. Abrasive blasted surface shall be visually inspected for degree of surface preparation and surface imperfections. Imperfections, which can be detrimental to application of the coating, shall be re-blasted or removed by filing or grinding.
2. Degree of surface preparation shall be visually inspected and compared to test coupons or visual standards (SSPC VIS 1) to verify grade of cleanliness.

B. Surface Cleanliness:
   1. Visually inspect and conduct pressure sensitive tape method (ISO 8502-3) to determine surface cleanliness. Reclean if there is visible dust or other contamination on scotch tape, and retest.
   2. Visually inspect surface and rag test for rust blush. Conduct clean white rag test to determine if any rust present. Re-blast any surfaces where rust found.

C. Solvent Wipe Test:
   1. Conduct rub test with clean rag and MEK solvent to confirm that coating is cured adequately and is the correct type. Complete in accordance with the coating manufacturer's recommended procedures.
   2. Do not coat over alkyd prime coats with epoxy based coating systems. Return improperly coated items and/or field abrasive blast to completely remove alkyd coatings if found on equipment or items with specified epoxy based coating systems, and recoat with the correct epoxy or specified type of coating.

D. Coating Application:
   1. Conduct wet film measurements during coating application.
   2. Calculate volume of coating utilized and surface area coated and visually inspect to ensure proper and complete coverage has been attained.

E. Film Thickness:
   1. Conduct dry film thickness measurements of the cured coatings in accordance with the coating manufacturer's written directions and these specifications.
   2. Test frequency and procedures for dry film thickness testing of coatings with a magnetic film thickness gauge shall be in accordance with SSPC-PA 2, with the exception that the minimum coating thickness allowed shall be the MDFT specified.

F. Number of Coats: Minimum specified required irrespective of coating thickness. Additional coats may be required to obtain minimum required paint thickness, depending on method of application, differences in manufacturers' products, and atmospheric or structure surface conditions.

G. Application Thickness: Do not exceed coating manufacturer's recommendations. Measure using a wet film thickness gauge and/or calculation of square foot coated and material used to ensure proper coating thickness during application.

H. Coating Adhesion: Test factory and field applied coatings per ASTM D4541 Pull-Off Test and the coating manufacturer's directions. Provide correct size dollies for each pipe size or structure shape and size. Minimum acceptance values for adhesion for factory, field, and repair coatings for steel and concrete surfaces shall be as specified hereinbefore, or printed acceptance values according to the manufacturer's data sheets, whichever is higher.

3.13 THIRD PARTY INSPECTION AND TESTING

A. Inspection:
   1. Inspection shall be provided for coatings in water holding structures.
   2. Inspection shall be provided by a third party inspector who is certified to inspect the types of coating systems specified herein. Inspector shall be hired by Contractor and Contractor shall coordinate to have the inspector onsite during and/or after application as specified.
   3. Owner/Engineer reserves the right to perform inspections of their own at any time.
   4. The coating shall be a uniform continuous (monolithic) film of correct coverage and appearance per coat, free of imperfections or defects. Coating materials shall be uniform with no evidence of disbondment, delamination, or blisters. Liner thickness shall be the minimum value as described herein. Evidence of defects, pinholes, voids, holidays or other imperfections shall be cause for rejection.

5. Inspector, Owner, Engineer, or coating manufacturer's representative may reject coated and lined items for excessive damage, poor workmanship, contamination, or inadequate surface preparation. Items determined by the inspector or Owner or coating manufacturer's representative to have excessive problems shall be corrected in a timely manner at the sole cost to the Contractor.

B. Testing:
1. Contractor and inspector shall coordinate testing procedures and submit a testing schedule to the Owner at least 14 days prior to start of coating system application.
2. Inspection and testing equipment must be in good working order and must be certified annually by the equipment manufacturer. Submit calibration certificates to the Engineer upon request.
3. Adhesion/bond testing shall be performed in accordance with ASTM D-7234.

3.14 DEFECTIVE WORK

A. Unsatisfactory Application:
1. The coating shall be a uniform continuous (monolithic) film of correct coverage and appearance per coat, free of imperfections or defects. Evidence of holidays, defects, pinholes, misses, runs, bridges, shiners, laps, or other imperfections shall be cause for rejection. Coating materials shall be uniform in color with no evidence of off-ratio application, disbondment, delamination, or blisters.
2. Where stains, contamination, or undercoats show through the final coat, correct defects and cover with additional coats until the coating is of uniform coverage, finish, color, and appearance.
3. Engineer may reject coated and lined items for excessive damage, poor workmanship, contamination, or inadequate surface preparation. Items determined by the Engineer or coating manufacturer's representative to have excessive problems shall be corrected in a timely manner at the sole cost to the Contractor.

B. If defective work or unsatisfactory application is discovered during initial surface preparation or coating application work, Contractor final inspections, during warranty inspections, or anytime during the warranty period, it shall be corrected at the sole cost to the Contractor including all additional costs incurred by the Owner, Engineer, or Engineer Representative.

C. All additional Owner and Engineer costs required to identify the scope and size of defective work and determine necessary corrective actions, shall be at the sole cost to Contractor. This shall include but not be limited to additional costs for time and expenses, laboratory analyses, additional testing, equipment rental, coating manufacturer site evaluation, recommendation time and laboratory costs, coordination and communication, review and evaluation of repair recommendations, full time observation during the defective work repair, and additional warranty inspection(s) of repair work.

3.15 FIELD COATING REPAIR

A. Materials and Surfaces Not Scheduled to be Coated: Repair or replace damaged surfaces and materials not scheduled to be coated.

B. Repairs, General: Complete repairs and surface preparation in accordance with these specifications and the manufacturer's recommended procedures. Confirm that repair materials are compatible with damaged or existing coatings.

C. Spot Repair of Damaged Existing Coatings, Pinholes, and Holidays: Prepare the surface as specified hereinbefore for "Existing Surfaces to Be Painted", or as required per the specific coating type. Apply one spot coat of the specified primer to bare areas overlapping the prepared existing coating. Apply specified finish coat(s).

D. Other Repair of Damaged Coatings, Pinholes, and Holidays:
   1. At completion of the work, inspect, touch-up, and restore coatings where damaged. Touch-up of minor damage is acceptable where the result is not visually different from the surrounding surfaces. Where touch-up results in visually different conditions, either in texture, color, sheen or appearance, recoat the entire surface.
   2. Remedy all defective work in a timely manner to the satisfaction of the Engineer and Owner, at the sole cost to the Contractor.
   3. If an item has an improper finish color, or insufficient film thickness, clean surface and topcoat with the specified paint material to obtain the specified color and coverage.
   4. Obtain specific surface preparation and coating repair information from the coating manufacturer for coatings that have exceeded the maximum recoat time (window).
   5. Hand or power sand visible areas of chipped, peeled, or abraded paint, and feather the edges. Follow with primer and finish coat. Depending on the extent of repair and appearance, a finish sanding and topcoat may be required in accordance with the coating manufacturer recommendations.
   6. Evidence of runs, bridges, shiners, laps, or other imperfections is cause for rejection and repair.
   7. Apply finish coats, including touchup and damage repair coats, in a manner which will present a uniform texture and color matched appearance.

3.16 PRESERVATION, RESTORATION, AND CLEANUP

A. Confine operations to construction easements, work areas described, or as approved by the Owner or Engineer. Protect existing structures, equipment, vehicles, and utilities and keep the work area neat and orderly. Keep the work site free from accumulation of waste materials or rubbish.

B. Control all contamination from surface preparation and coating application. Damage due to surface preparation, coating operations, or overspray on buildings, vehicles, trees, or other surfaces not specified to be coated shall be the sole responsibility of the Contractor.

C. Prevent contamination of the project site or surrounding areas. Do not dump coating materials, spent abrasive, paint debris, waste oil, rubbish, or other similar materials on the ground or in any water way. Use caution to prevent soil, stream, or groundwater contamination. Contractor shall be liable for containment and cleanup or any contamination of any aquifer, stream, or soil at their sole expense.

D. Upon completion of the work, remove all materials, scraps, and debris from project area and from the interior of all structures, pipes, tanks, devices and equipment. Remove staging, scaffolding, and containers from the site or destroy in a legal manner. Leave the work site free of rubbish or excess materials of any kind.

E. The Contractor is solely responsible for containment, packaging, treatment, transportation, and disposal of all debris generated during this work and shall be responsible for all associated costs.

F. Any damage to structures, equipment, utilities, vehicles, nearby facilities, or to the project site resulting from Contractor related work activities shall be promptly corrected by the Contractor. Repairs shall be completed in a timely manner to restore items to preconstruction condition to the Owner's satisfaction by the Contractor at their sole expense.

3.17 PROTECTIVE COATING SYSTEMS APPLICATION SCHEDULE

A. Unless otherwise shown or specified, paint surfaces in accordance with the following Application Schedule. In the event of discrepancies or omissions in the following, request clarification from the Engineer before starting work in question. The schedule below is not intended to be all-inclusive and some systems may not apply to this project.

B. System No. 1 Polyamine Epoxy, Submerged Metal :
   1. Use on the following items or areas:
      a. Metal surfaces new and existing below a plane 1 foot above the maximum liquid surface; metal surfaces above the maximum liquid surface that are a part of the immersed equipment.
      b. Interior or exterior surfaces of metal piping noted in Division 15, MECHANICAL.
      c. All metal located inside of basins and wet wells, unless factory finished with a suitable coating.
      d. Other areas where specified or noted on the Drawings.

System No. 1 Surface Prep.	**Paint Material**	**Min. Coats, Cover**
Abrasive Blast, or Centrifugal Wheel Blast (SP 5 White Metal)	Polyamine Epoxy	3 coats, 4 mils, MDFTPC

C. System No. 3 Concrete Encased Metal:
   1. Use on the following items or areas:
      a. Metal surfaces encased in concrete such as wall pipes, pipes, pipe sleeves, access manholes, gate guides and thimbles, and structural steel excluding reinforcing steel.
      b. All metal encased in concrete, unless already factory coated with a suitable coating.
   2. Other areas where specified or noted on the Drawings.

System No. 3 Surface Prep.	**Paint Material**	**Min. Coats, Cover**
Abrasive Blast, or Centrifugal Wheel Blast (SP 6 Commercial)	Prime in accordance with manufacturer's recommendations-epoxy primer	1 Coat, 2 to 4 MDFT
	Coal Tar Epoxy	2 coats, 16 MDFT

D. System No. 4 Submerged and Exterior Exposed Metal-Domestic Sewage or Other Non-potable Water – Highly Corrosive:
   1. Use on the following items or areas: Exposed metal surfaces, except aluminum and stainless steel, located inside or outside of the following structures or areas:
      a. Influent Pump Station.
      b. EQ Basin.
      c. Digester Basins.
   2. Submerged surfaces of metallic items such as wall pipes, pipes, pipe sleeves, access manholes, gate guides and thimbles; structural steel that is embedded in concrete.
   3. All exterior metal surfaces located inside of basins and wet wells, unless factory-finished with a suitable approved coating.
   4. Other areas where specified or noted on the Drawings.

System No. 4 Surface Prep.	Paint Material	Min. Coats, Cover
Near-White Blast Cleaning (SSPC-SP 10) Minimum angular anchor profile of 1.5 mils Uniformly scarified between coats	Polyamidoamine Epoxy Series N 69 Hi-Build Epoxoline II or approved equal	1 Stripe Coat, 4-6 mils on all edges or hard to reach areas, brushed or rolled 2 coats, 4-6 mil DFT/coat

E. System No. 5 Exposed Metal-Mildly Corrosive:
1. Use on the following items or areas: Exposed metal surfaces, located inside or outside of structures and exposed to weather or in a humid atmosphere, such as pump stations, treatment plant buildings, pipe galleries, vaults, and similar areas and the following specific surfaces:
   a. All (exterior surfaces) of exposed interior metallic piping, valves, fittings, and appurtenances in vaults, treatment plant buildings, or pump stations (except hot temperature piping).
   b. Exterior surfaces of pump station pumps, piping, pipe supports, and appurtenances.
   c. Metal doors and frames, vents, louvers, exterior metal ductwork, flashings, sheet metalwork, and miscellaneous architectural metal trim located inside and outside of pump stations, pipe galleries, treatment buildings, or vaults.
   d. Instrumentation and control systems exposed enclosures for process use in humid areas of pump stations, pipe galleries, treatment buildings, or vaults.
   e. Surge tank exterior surface.
   f. Steel roof joists and structural steel located in or above wet or damp areas if not specified to be coated with a more corrosion resistant coating because of exposure.
   g. Exterior dry surfaces of pump and mixer assemblies.
   h. Exterior dry surfaces of pump and mixer motor assemblies.
   i. Exterior surfaces of powdered activated carbon storage silo tank.
2. Apply surface preparation and primer and mid-coat to surfaces prior to installation. Finish coats need only be applied to interior surfaces exposed after completion of construction.
3. Do not use on exposed stainless steel, aluminum, or galvanized steel ductwork.
4. Other areas where specified or noted on the Drawings.

System No. 5 Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 10 Near White)	Polyamide, Anticorrosive Epoxy Primer	1 coat, 2.5 to 3.5 MDFT
	Polyamide, Anticorrosive Epoxy Mid-Coat	1 coat, 3 to 4 MDFT
	Polyurethane Enamel	1 or 2 coats (as required to hide mid-coat), 3 to 4 MDFT

F. System No. 10 Galvanized Metal Conditioning:
1. Use on the following items or areas:
   a. Galvanized surfaces requiring top coating.
   b. All galvanized materials shall be top coated prior to immersion service.
   c. After application of System No. 10, apply finish coats as required for exposure or color coding.
   d. Concealed galvanized surfaces do not require painting unless in wet or submerged environments.
2. Other areas where specified or noted on the Drawings.

System No 10 Surface Prep.	Paint Material	Min. Coats, Cover
Solvent Clean (SP 1) Followed by Hand Tool (SP 2) or Power Tool (SP 3) Abrasive Sweep Blast for All Wet or Immersed Galvanized Surfaces	Wash Primer (vinyl butyral acid) or Coating Manufacturer's Recommendation	1 coat, 0.4 MDFT
		Apply Finish Coats as Required For Exposure

G. System No. 11 Galvanized Metal Repair:
1. Prepare surface with System No. 10 as recommended by coating manufacturer; use on the following items or areas:
   a. Galvanized surfaces that are abraded, chipped, or otherwise damaged.
   b. Topcoat if required for color coding or exposure.
2. Other areas where specified or noted on the Drawings.

System No. 11 Surface Prep.	Paint Material	Min. Coats, Cover
Solvent Clean (SP 1) Followed by Hand Tool (SP 2), Power Tool (SP 3), or Brush-off Blast (SP 7)	Organic Zinc Rich Primer	1 coat, 3 MDFT

H. System No. 17 Special Coating - Concrete:
1. Use on the following items or areas:
   a. Interior of influent pump station wet well.
   b. Interior of EQ Basin.
   c. Interior of Digester Basins.
   d. Interior of secondary containment bays for the three chemical storage tanks in each WWTP.

2. Other areas where specified or noted on the Drawings.

System No. 17 Surface Prep.	Paint Material	Min. Coats, Cover
Concrete Surface Preparation per ASTM D4259 and SSPC SP-13 to a minimum ICRI CSP-5	Filler Surfacer, Epoxy Cementitious Mortar	As required to fill voids and level surface
	Prime in accordance with manufacturer's recommendations	
	Raven 405 Epoxy	1 coat, 100-125 mils

I. System No. 24 Exposed Fiberglass, PVC:
1. Use on the following items or areas:
   a. Exposed fiberglass or PVC pipe, ducts, or equipment requiring color coding or cosmetic painting.
   b. Exposed chemical feed pumps requiring color coding or cosmetic painting.
   c. As required to protect fiberglass or PVC where exposed to sunlight, including shaded areas.
2. Other fiberglass or PVC items required to be color coded or otherwise specified or shown to be painted.

System No. 24 Surface Prep.	Paint Material	Min. Coats, Cover
Plastic	Polyurethane Enamel	2 coats, 4 mils MDFTPC

J. System No. 25 Interior FRP, PVC:
1. Use on the following items or areas:
   a. Exposed fiberglass or PVC pipe or other items required to be color coded.
2. As required to be color coded or otherwise specified or shown to be painted.

System No. 25 Surface Prep.	Paint Material	Min. Coats, Cover
Plastic	Acrylic Latex	2 coats, 320 SFPGPC

K. System No. 27 Aluminum, Stainless Steel, and Dissimilar Metal Insulation:
1. Use on the following items or areas:
   a. All concrete embedded aluminum or stainless steel surfaces.
   b. Aluminum surfaces fastened to steel or concrete or masonry.
   c. Aluminum access hatch frames.
   d. Aluminum grating frames.
   e. Aluminum slide gate frame surfaces in contact with concrete.
   f. Other areas where specified or noted on the Drawings.

System No. 27 Surface Prep.	Paint Material	Min. Coats, Cover
Solvent Clean (SP 1)	Wash Primer	1 coat, 0.4 MDFT
	Bituminous Paint, Coal Tar Epoxy, or Epoxy	1 or 2 coats, 10 MDFT

L. System No. 29 Fusion Bonded Coating:
1. Use on the following items:
   a. Metallic fittings, valves, appurtenances, fasteners, bolts, nuts, and washers as specified or noted on the Drawings.
   b. Stainless steel anchor bolts used in submerged or wet areas, to maintain electrical isolation.
2. Other items where specified or noted on the Drawings.

System No. 29 Surface Prep.	Paint Material	Min. Coats, Cover
Abrasive Blast, or Centrifugal Wheel Blast (SP 10) or Acid Pickling (SP 8)	Fusion Bonded 100 percent Solids Epoxy or Polyurethane	1 or 2 coats, 12 to 16 MDFT

3.18 SUPPLEMENTS

A. The attached Certificate of Compliance Form is a part of the specification. Submit signed copies of attached Certificate of Compliance Form following each subsequent site visit.

END OF SECTION

COATING OR LINING MATERIAL MANUFACTURER's CERTIFICATE OF COMPLIANCE FORM FOR FACTORY, SHOP, OR FIELD APPLICATOR SURFACE PREPARATION AND COATING AND/OR LINING APPLICATION

As the coating or lining material manufacturer's representative for (Company Name) _____ for the dates from _____ to _____, I observed the following processes at the factory, shop, or field coating and lining location and certify that _____(Coating Applicator Name), at their _____ facility was is in compliance with our recommendations for surface preparation, coating or lining application, and testing procedures; the referenced standards; and the project contract documents. The specific coating material products and coating systems being utilized were correct and suitable for the intended exposures.

The processes observed included but are not limited to the following:

Surface Preparation	Coating and/or Lining Application	Quality Assurance Testing and Documentation
Abrasive Blast Equipment	Environmental Conditions	Type of Quality Control Testing Performed
Abrasive Blast Method	Surface Temperature/Cleanliness	
Abrasive Utilized		Holiday Testing
Degree of Surface Grade Cleanliness Provided	Material Storage, Handling, Preheating, Mixing, Etc.	Coating or Lining Thickness Measurements
Blast Profile	Application Equipment	Adhesion Testing
Angularity	Spray and Hand Application	Testing Procedures
Surface Cleanliness	Repair Procedures	Testing Equipment
Environmental Conditions	Pipe Storage and Handling	Frequency of Testing
Reports and Documentation	Reports and Documentation	Reports and Documentation

This Certificate of Compliance Form shall be provided to and signed by the coating or lining manufacturer's representative, prior to leaving the factory or applicator shop site or field location. A copy of the signed form shall be submitted to the Engineer following each field site visit by the coating or lining manufacturer's representative.

Note non-conformance and any additional comments or field observations may be summarized and submitted in a plant or site visit letter summary or trip report. If surface preparation, coating or lining, handling, or quality control issues are identified during the site visit that are outside the requirements of the manufacturer or the specification which may adversely affect the quality of the coating or lining, then the coating or lining manufacturer's representative shall remain at the plant or applicator shop site, or production shall stop, until the problems are satisfactory resolved and verified by the manufacturer's representative.

_____ _____

Manufacturer's Technical Representative Signature Date

SECTION 099600 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of high-performance coating systems on the following substrates:
   1. Exterior Substrates:
      a. Concrete, surfaces.
      b. Concrete masonry units (CMUs).
      c. Steel.
      d. Galvanized metal.
   2. Interior Substrates:
      a. Concrete, surfaces.
      b. Concrete masonry units (CMUs).
      c. Steel.
      d. Galvanized metal.
      e. Gypsum board.

1.2 DEFINITIONS

A. MPI Gloss Level 5 (Semi-Gloss Finish): 35 to 70 units at 60 degrees, according to ASTM D 523.

B. MPI Gloss Level 6 (Gloss Finish): 70 to 85 units at 60 degrees, according to ASTM D 523.

C. MPI Gloss Level 7 (High-Gloss Finish): More than 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.
   1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.

B. Sustainable Design Submittals:
   1. Product Data: For paints and coatings, indicating VOC content.
   2. Laboratory Test Reports: For paints and coatings, indicating compliance with requirements for low-emitting materials.
   3. Manufacturer Inventory: For each product, provide manufacturer's manifest of ingredients.

C. Samples for Initial Selection: For each type of topcoat product indicated.

D. Samples for Verification: For each type of coating system and each color and gloss of topcoat indicated.
   1. Submit Samples on rigid backing, 8 inches square.
   2. Apply coats on Samples in steps to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.

E. Product List: Cross-reference to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Coatings: 5 percent, but not less than 1 gal. of each material and color applied.

1.5 QUALITY ASSURANCE

A. Mockups: Apply mockups of each coating system indicated to verify preliminary selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Architect will select one surface to represent surfaces and conditions for application of each coating system.
      a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft..
      b. Other Items: Architect will designate items or areas required.
   2. Final approval of color selections will be based on mockups.
      a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
   3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and ambient air temperatures are between 50 and 95 deg F.

B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

C. Do not apply exterior coatings in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 HIGH-PERFORMANCE COATINGS, GENERAL

A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products Lists."
   1. Provide products from manufacturer's premium or professional product line.

B. Material Compatibility:
   1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
   3. Products shall be of same manufacturer for each coat in a coating system.

C. Manufacturer Inventory: For each product, provide manufacturer's manifest that product does not contain intentionally added cadmium or lead.

D. VOC Content: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
   1. Flat Paints and Coatings: 50 g/L.
   2. Nonflat Paints and Coatings: 50 g/L.
   3. Primers, Sealers, and Undercoaters: 100 g/L.
   4. Rust-Preventive Coatings: 100 g/L.
   5. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
   6. Pretreatment Wash Primers: 420 g/L.
   7. Floor Coatings: 50 g/L.

E. Low-Emitting Materials: For field applications that are inside the weatherproofing system, paints and coatings shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

F. Colors: Match Architect's samples.

2.2 SOURCE QUALITY CONTROL

A. Testing of Coating Materials: Owner reserves the right to invoke the following procedure:
   1. Owner will engage through the contractor the services of a qualified testing agency to sample coating materials. Contractor will be notified in advance and may be present when samples are taken. If coating materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
   2. Testing agency will perform tests for compliance with product requirements.
   3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying coating materials from Project site, pay for testing, and recoat surfaces coated with rejected materials. Contractor will be required to remove rejected materials from previously coated surfaces if, on recoating with complying materials, the two coatings are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Concrete: 12 percent.
   2. Masonry (Clay and CMUs): 12 percent.
   3. Gypsum Board: 12 percent.

C. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.

D. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.

E. Proceed with coating application only after unsatisfactory conditions have been corrected.
   1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce coating systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   1. Clean surfaces with pressurized water. Use pressure range of 1500 to 4000 psi at 6 to 12 inches .
   2. Abrasive blast clean surfaces to comply with SSPC-SP 7/NACE No. 4.

E. Masonry Substrates: Remove efflorescence and chalk. Do not coat surfaces if moisture content, alkalinity of surfaces, or alkalinity of mortar joints exceeds that permitted in manufacturer's written instructions.
   1. Clean surfaces with pressurized water. Use pressure range of 100 to 600 psi at 6 to 12 inches .

F. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:

1. SSPC-SP 6/NACE No. 3.

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied coatings.

3.3 APPLICATION

A. Apply high-performance coatings according to manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
   1. Use applicators and techniques suited for coating and substrate indicated.
   2. Coat surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, coat surfaces behind permanently fixed equipment or furniture with prime coat only.
   3. Coat backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
   4. Do not apply coatings over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of the same material are to be applied. Tint undercoats to match color of finish coat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through final coat, apply additional coats until cured film has a uniform coating finish, color, and appearance.

D. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner will engage through the Contractor the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.
   1. Contractor shall touch up and restore coated surfaces damaged by testing.
   2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating operation. Correct damage to work of other trades by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.

3.6 EXTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Concrete Substrates, Vertical Surfaces:
   1. Epoxy-Modified Latex System MPI EXT 3.1E:
      a. Prime Coat: Epoxy-modified latex, matching topcoat.
      b. Intermediate Coat: Epoxy-modified latex, matching topcoat.
      c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5), MPI #215.

B. CMU Substrates:
   1. Epoxy System MPI EXT 4.2E:
      a. Block Filler: Block filler, epoxy, MPI #116.
      b. Intermediate Coat: Epoxy, matching topcoat.
      c. Topcoat: Epoxy, gloss, MPI #77.

C. Steel Substrates:
   1. Epoxy System MPI EXT 5.1F:
      a. Prime Coat: Primer, epoxy, anti-corrosive, for metal, MPI #101.
      b. Intermediate Coat: Epoxy, high build, low gloss, MPI #108.
      c. Topcoat: Epoxy, gloss, MPI #77.

D. Galvanized-Metal Substrates:
   1. Epoxy System MPI EXT 5.3C:
      a. Prime Coat: Primer, epoxy, anti-corrosive, for metal, MPI #101.
      b. Intermediate Coat: Epoxy, matching topcoat.

3.7 INTERIOR HIGH-PERFORMANCE COATING SCHEDULE

A. Concrete Substrates, Vertical Surfaces:
   1. Epoxy-Modified Latex System MPI INT 3.1G:
      a. Prime Coat: Epoxy-modified latex, matching topcoat.
      b. Intermediate Coat: Epoxy-modified latex, matching topcoat.
      c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5), MPI #215.

B. CMU Substrates:
   1. Epoxy-Modified Latex System MPI INT 4.2J:
      a. Block Filler: Block filler, latex, interior/exterior, MPI #4.
      b. Intermediate Coat: Epoxy-modified latex, interior, matching topcoat.
      c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5), MPI #215.

C. Steel Substrates:
   1. Epoxy-Modified Latex System MPI INT 5.1K:
      a. Prime Coat: Primer, rust inhibitive, water based, MPI #107.
      b. Intermediate Coat: Epoxy-modified latex, interior, matching topcoat.
      c. Topcoat: Epoxy-modified latex, gloss (MPI Gloss Level 6), MPI #115.

D. Galvanized-Metal Substrates:
   1. Epoxy over Epoxy Primer System MPI INT 5.3D:
      a. Prime Coat: Primer, epoxy, anti-corrosive, for metal, MPI #101.
      b. Intermediate Coat: Epoxy, matching topcoat.

c. Topcoat: Epoxy, gloss, MPI #77.

E. Gypsum Board Substrates:

1. Epoxy-Modified Latex System MPI INT 9.2F:

a. Prime Coat: Primer sealer, latex, interior, MPI #50.

b. Intermediate Coat: Epoxy-modified latex, matching topcoat.

c. Topcoat: Epoxy-modified latex, semi-gloss (MPI Gloss Level 5), MPI #215.

END OF SECTION

SECTION 099713 – COATINGS FOR WELDED STEEL WATER STORAGE TANK

PART 1 - GENERAL

1.1 DESCRIPTION

A. The work of this section includes the coating of all interior tank surfaces, the coating of all exterior tank surfaces, coating systems, surface preparation, application, testing, and disinfection.

1.2 RELATED SECTIONS

A. Technical Provisions - Section 33: Welded Steel Water Storage Tank and Foundation

1.3 REFERENCE SPECIFICATIONS AND STANDARDS

A. Without limiting the general aspects of other requirements in these specifications, all surface preparation, coating of interior and exterior surfaces and inspection shall conform to the applicable requirements of the Steel Structures Painting Council, NACE International, ASTM (American Society for Testing and Materials), AWWA (American Water Works Association) and the coating system manufacturer's printed instructions. The following individual reference documents shall specifically apply to the welded steel tank coating process:

1. ASTM (American Society for Testing and Materials)
   a. ASTM D 520 - Standard Specification for Zinc Dust Pigment
   b. ASTM D 4417 - Standard Test Methods for Field Measurement of Surface Profile of Blast Cleaned Steel
   c. ASTM E 337 - Standard Practice Test Method for Measuring Humidity with a Psychrometer
   d. ASTM D610 - Standard Methods of Evaluating Degree of Rusting on Painted Surfaces
   e. ASTM D5402 - Standard Practice for Assessing the Solvent Resistance of Organic Coatings Using Solvent Rubs
2. AWWA (American Water Works Association)
   a. AWWA D102-17 - Coating Steel Water Storage Tanks
   b. AWWA C210-15 - Liquid Epoxy Coatings and Linings for Steel Water Pipe and Fittings
   c. AWWA D100-11 - Welded Steel Tanks for Water Storage
3. ANSI (American National Standards Institute)
   a. ANSI/ASC 29.4 - Exhaust Systems: Abrasive Blasting Operations – Ventilation and Safe Practice
   b. ANSI/NSF Standard 61 - Drinking Water Components
4. Consumer Product Safety Act, Part 1303
5. Environmental Protection Agency, EPA 524.2 Revision 4 Purgeable VOCs by GC/MS
6. NACE International
   a. NACE Publication TPC2 - Coatings and Linings for Immersion Service: Safety, Surface Preparation, Curing, Inspection
   b. NACE Standard RP0178 - Standard Recommended Practice: Fabrication Details, Surface Finish Requirements and Proper Design Considerations for Tanks and Vessels to be Lined for Immersion Service
   c. NACE Standard RP0188 - Standard Recommended Practice:

Discontinuity (Holiday) Testing of Protective Coatings
   d. NACE Standard RP0287 - Field Measurement of Surface Profile of Abrasive Blast-Cleaned Steel Surfaces Using a Replica Tape
   e. NACE Standard RP0288 - Standard Recommended Practice, Inspection of Linings on Steel and Concrete
7. OSHA (Occupational Safety & Health Administration), 1915.35 Standards 29 CFR – Painting
8. SSPC (Steel Structures Painting Council)
   a. SSPC-SP2 - Hand Tool Cleaning
   b. SSPC-SP3 - Power Tool Cleaning
   c. SSPC-PA-1 - Shop, Field and Maintenance Painting
   d. SSPC-PA-2 - Measurement of Dry Film Thickness with Magnetic Gages
   e. SSPC-PA-3 - Guide to Safety in Paint Application
   f. SSPC-Guide 12 - Guide for Illumination of Industrial Painting Project
   g. SSPC-VIS 1-89 - Pictorial Surface Preparation Standards for Painting Steel Surfaces
   h. SSPC Paint - Two Component Weather-Resistant Aliphatic Polyurethane Topcoat, Spec 36 Performance-Based
9. SSPC/NACE Joint Standards
   a. SSPC-SP5/NACE 1 - White Metal Blast Cleaning
   b. SSPC-SP6/NACE 3 - Commercial Blast Cleaning
   c. SSPC-SP7/NACE 4 - Brush-Off Blast Cleaning
   d. SSPC-SP10/NACE 2 - Near-White Metal Blast Cleaning
10. The decision of the Owner or Owner's Representative shall be final as the interpretation and/or conflict between any of the referenced specifications and standards contained herein.

1.4 CONTRACTOR

A. The Contractor shall have five years of practical experience and successful history in the application of the specified product to surfaces of steel water tanks. The contractor shall substantiate this requirement by furnishing a list of references and job completions.

B. The Contractor shall submit a written statement from the coatings manufacturer stating that the Contractor is familiar with the materials specified and that the contractor employs workers who are capable of performing the work specified herein.

C. The personnel performing the work shall be knowledgeable and have the required experience and skill to adequately perform the work for this project in accordance with SSPC-PA1 "Shop, Field and Maintenance Painting".

1.5 QUALITY ASSURANCE

A. General: Quality assurance procedures and practices shall be utilized to monitor all phases of surface preparation, application and inspection throughout the duration of the project. Procedures or practices not specifically defined herein may be utilized provided they meet recognized and accepted professional standards and are approved by the Owner or Owner's Representative.

B. Surface Preparation: Surface preparation will be based upon comparison with "Pictorial Surface Preparation Standards for Painting Steel Surfaces: SSPC-VIS 1-89", ASTM D2200-95, "Standard Methods of Evaluating Degree of Rusting on Painted Surfaces", ASTM D 4417-91, Method A and/or Method C or NACE Standard RP0287-87. In all cases the written standard shall take precedence over the visual standard. In addition, NACE Standard RP0178-91, along with the Visual Comparator, shall be used to verify the surface preparation of welds.

C. Application: No coating materials shall be applied when:
   1. The surrounding air temperature or the temperature of the surface to be coated or painted is below the minimum surface temperature for the products specified herein,
   2. rain, snow, fog or mist is present,
   3. surface temperature is less than 5°F above the dew-point, and
   4. air temperature is expected to drop below the minimum temperature for the products specified within six hours after application of coating.

   Dew-point shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with U.S. Department of Commerce Weather Bureau Psychometric Tables. If any of the above conditions are prevalent, coating or painting shall be delayed or postponed until conditions are favorable. The day's coating or painting shall be completed in time to permit sufficient film drying time prior to damage by atmospheric conditions.

D. Inspection: The Owner or Owner's Representative shall retain the services of an independent NACE certified inspector for this project. At a minimum, the inspector shall inspect the surface prior to abrasive blasting, after abrasive blasting but prior to application of coating materials, and between subsequent coats of material. Final inspection shall take place after all coatings are applied, but prior to placing the tank into service. The Contractor will insure that sufficient scaffolding and/or rigging is in place so that the inspector shall be able to safely conduct the required inspections.

E. Thickness and Holiday Checking: The Owner's retained independent NACE certified inspector shall check the dry film thickness (DFT) of coatings and linings with a non-destructive, magnetic-type thickness gauge, as per SSPC-PA 2 "Measurement of Dry Film Thickness with Magnetic Gages". References in PA 2 which allow 80% of the minimum thickness specified are not acceptable. The inspector will use an instrument such as a Tooke Gauge if a destructive test is deemed necessary by the Owner or Owner's Representative. The Owner-retained independent NACE certified inspector shall check the integrity of interior coated surfaces below the high water mark with a low voltage holiday detector in accordance with NACE Standard RP0188. The non-destructive holiday detector shall not exceed 67.5 volts, nor shall a destructive holiday detector exceed the voltage recommended by the manufacturer of the coating system. A 1-ounce solution of non-sudsing type wetting agent, equal to Kodak Photo-Flo, and one gallon of tap water shall be used to perform the holiday testing. All pinholes and/or holidays shall be marked and repaired in accordance with the manufacturer's printed recommendations and retested. No pinholes or other irregularities will be permitted in the final coating.

F. Inspection Devices: Until final acceptance of the coating, the Owner-retained independent NACE certified inspector shall furnish inspection devices in good working condition for detection of holidays and measurement of dry film thickness of coatings. Depending upon the thickness gauge utilized, the Owner- retained independent NACE certified inspector shall also furnish U.S. Department of Commerce, and National Bureau of Standards certified thickness calibration plates and/or plastic shims, to test the accuracy of dry film thickness gauges and certified instrumentation to test the accuracy of holiday detectors. Dry film gauges and holiday detectors shall be made available for use by the Owner or Owner's Representative at all times until final acceptance of the coating application. Holiday detection devices shall be operated in the presence of the Owner or Owner's Representative. The contractor shall furnish wet film thickness gauges to provide quality control of the coating thickness during application.

G. MEK Double Rub Test: After the tank has reached "full cure" in accordance with the recommendations and written published data sheets of the coating manufacturer, the Owner-retained independent NACE certified inspector shall perform MEK double rub tests in accordance with ASTM D5402 to verify curing of the interior coating system.

H. Warranty and Inspection: The Contractor shall guarantee interior and exterior coatings for a minimum of two (2) years. A certificate of the two-year coating guarantee, shall be signed and dated by the principal of the contracting company and shall be presented to the Owner at the acceptance inspection. In addition, an accompanying signed letter of warranty support/concurrence from the coating product manufacturer shall also be provided at the time of the acceptance inspection. At the contractor's expense, the coating will be inspected internally and externally approximately 22 months after the date of initial storage tank acceptance. At the Owner's preference, the inspection may be accomplished by draining the tank (facilitated by owner) or by utilizing a scuba diver or a submersible remote-controlled drone while the tank remains in service/on-line. Any and all coating system defects found during the inspection shall be repaired in accordance with this specification and to the approval of the owner's representative. All associated labor and material costs associated with those repairs shall be the responsibility of the contractor. The Owner will schedule the inspections and notify the Contractor at least two (2) weeks in advance so that a contractor's representative may be present for the inspections.

1.6 SAFETY AND HEALTH REQUIREMENTS

A. General: In accordance with requirements set forth by regulatory agencies applicable to the construction industry and manufacturer's printed instructions and appropriate technical bulletins and manuals, the Contractor shall provide and require use of personal protective lifesaving equipment for persons working on or about the project site. The Contractor's work force shall comply with the provisions outlined in SSPC-PA-3 "A Guide to Safety in Paint Application".

B. Head and Face Protection and Respiratory Devices: Equipment shall include protective helmets which shall be worn by all persons while in the vicinity of the work. In addition, workers engaged in or near the work during sandblasting shall wear eye and face protection devices and air purifying half-mask or mouthpiece respirators with appropriate filters.

1. All pressurized air hoses shall be static-discharge-proof.
2. Blasting air- hoses shall be equipped with "dead-man" control devices to provide

direct cut-off of blasting equipment when needed.

3. Air-hoods with positive-pressure type breathing apparatus for all personnel operating blasting equipment.

C. Ventilation: Ventilation shall be used continuously during preparation, application, and curing activity and shall be configured in a manner to effectively remove dust and residual contaminants during preparation activity and to remove volatilized solvents during application activity. Utilize OSHA approved forced air ventilation to control all hazardous exposure conditions. All equipment shall be intrinsically safe and explosion-proof. Ventilation shall provide an acceptable number of air changes and reduce the concentration of air contaminants to the degree that a hazard does not exist. Air circulation and exhausting of solvent vapors shall be continued until coatings have fully cured.

D. Sound Levels: Whenever the occupational noise exposure exceeds maximum allowable sound levels, the Contractor shall provide and require the use of approved ear protection devices.

E. Illumination: Adequate illumination shall be provided while work is in progress, including explosion-proof lights and electrical equipment. Whenever required by the Owner or Owner's Representative, the Contractor shall provide additional illumination and necessary supports to cover all areas to be inspected. The level of illumination for inspection purposes shall be determined by the Owner or Owner's Representative.

F. Temporary Ladders and Scaffolding: All temporary ladders and scaffolding shall conform to all applicable OSHA safety requirements. They shall be erected where requested by the Owner or Owner's Representative to facilitate inspection and shall be moved by the Contractor to locations requested by the Owner or Owner's Representative.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Throughout this technical specification document, materials are specified in accordance with AWWA D102- 17 Standard for Coating Steel Water Storage Tanks. Approved material suppliers are those reputable organizations who have well-established performance histories and 10 years or more experience producing compliant NSF-61 & 372 approved linings and exterior corrosion resistant coatings. Equivalent materials which are produced by other manufacturers may be submitted for written approval of the Owner or Owner's Representative. Approved material manufacturers include but are not limited to the following:

1. Akzo Nobel
2. Carboline
3. PPG
4. Sherwin Williams
5. Tnemec

B. Requests for product substitution shall include manufacturer's literature for each product giving name, product number, generic descriptive information, solids by volume, recommended dry film thickness, recommended application methods and certified lab test reports showing results to equal the performance criteria of the products specified herein. The certified test reports shall be produced by a nationally known, independent, ISO 9001 certified testing laboratory. Comparative tests between pre-approved coating material product(s) and contractor-requested substitution(s) shall address all specific criteria as may be specified by the Owner or Owner's Representative. In addition, a documentation list of five projects on which the requested substitute-products were successfully utilized shall be submitted to the Owner or Owner's Representative for review prior to approval for the use of the substitute coating product(s).

C. Any requests for product substitution shall be made at least 14 days prior to the bid date.

D. Manufacturer's color charts shall be submitted to the Owner or Owner's Representative at least 30 days prior to coating application. The General Contractor and the Painting Contractor shall coordinate work so as to allow sufficient time (normally seven to ten days) for paint to be delivered to the job site.

E. All materials shall be lead-free as defined by the Consumer Product Safety Act, Part 1303.

F. All zinc dust pigment contained in any zinc-rich material shall meet the requirements of ASTM D 520 Type III with regard to zinc content and purity.

G. All materials for the interior of the tank shall meet the requirements of ANSI/NSF Standard 61 & 372 for potable water contact.

H. All high gloss clear coat products shall incorporate the use of a fugitive dye to aid in the proper application and coverage of such coats.

2.2 PRODUCT DELIVERY, STORAGE, & HANDLING

A. All materials shall be brought to the jobsite in original sealed containers. Materials shall not be used until the Owner or Owner's Representative has inspected the contents and obtained data from information on containers or labels. Materials exceeding storage life recommended by the manufacturer shall be rejected.

B. All coating materials shall be stored in enclosed structures to protect them from weather and excessive heat or cold. Flammable coatings must be stored to conform to City, County, State and Federal safety codes for flammable coating materials. At all times coatings shall be protected from freezing.

2.3 MATERIAL PREPARATION

A. Mix and thin materials according to manufacturer's latest printed instructions.

B. Do not use materials beyond manufacturer's recommended shelf life.

C. Do not use mixed materials beyond manufacturer's recommended pot life.

2.4 MATERIALS

A. TANK INTERIOR COATING SYSTEMS:

The following AWWA D102-19 interior coating system(s) (ICS) are approved for usage under this specification:

1. AWWA D102-17, ICS 1-Modified, High-Solids, Epoxy Lining System:
   a. Coating Type: High solids epoxy, two component, minimum 65% volume solids
   b. Designated Surfaces:
      1) Interior of tank
   c. Surface preparation prior to abrasive blast cleaning: Weld flux and spatter shall be removed by power tool cleaning. Sharp projections shall be ground to a smooth contour. All welds shall be ground to a smooth contour as per NACE Standard RP0178 and herein.
   d. Surface Preparation: Per SSPC-SP10 near-white metal blast cleaning, anchor profile shall be 2.0 to 3.0 mils as per ASTM D 4417, Method C or NACE Standard RP0287.
   e. Lining System:
      1) Shop Primer: High-solids epoxy
      2) Field Primer (Unprimed weld seams and touch-up areas only): High solids epoxy
      3) Stripe Coat: High solids epoxy, 4 – 8 mils DFT
      4) 1st Coat: High solids epoxy, 9 – 14 mils DFT
      5) 2nd Coat: High solids epoxy, 9 – 14 mils DFT

      Total dry film thickness shall be a minimum of 18 mils.
2. AWWA D102-17, ICS 3, Ultra High Solids Epoxy or ICS 4, 100% Solids Polyurethane Lining System:
   a. Coating Type:
      1) Ultra-High solids epoxy, minimum 96% volume solids, or
      2) 100% volume solids elastomeric aromatic polyurethane
   b. Designated Surfaces: Interior tank shell, floor, base plates, and columns. Terminate lining two to four inches onto installed high solids epoxy system. Use manufacturer approved methods for tie-in procedures.
   c. Surface Preparation Prior to Abrasive Blast Cleaning: Weld flux and spatter shall be removed by power tool cleaning. Sharp projections shall be ground to a smooth contour. All welds shall be ground to a smooth contour as per NACE Standard RP0178 and herein.
   d. Surface Preparation: Per SSPC-SP10 Near-white metal blast cleaning, anchor profile shall be 3.0 to 5.0 mils as per ASTM D 4417, Method C or NACE Standard RP0287.
   e. Lining System:
      1) Shop Primer: N/A
      2) Field Primer (unprimed weld seams and touch up areas only): N/A
      3) Stripe Coat: High solids epoxy or Ultra High solids epoxy or polyurethane as approved by submitted manufacturer.
      4) 1st Coat: Ultra high solids epoxy or 100% solids aromatic polyurethane

      Total dry film thickness shall be a minimum of 20 mils.

B. TANK EXTERIOR COATING SYSTEM:

The AWWA D102-17 outside coating system (OCS) is approved for usage under this specification.

1. AWWA OCS 5-Modified, High Solids Epoxy, Aliphatic Polyurethane Coating System:
   a. Coating type:
      1) Epoxy high solids, two component, minimum 65% volume solids, complying with SSPC-Paint 42, or
      2) Aliphatic polyurethane, two component, minimum 65% volume solids, complying with SSPC-Paint 36, Level 3.
   b. Surface preparation prior to abrasive blast cleaning: Weld flux and spatter shall be removed by power tool cleaning. Sharp projections shall be ground to a smooth contour. All welds shall be ground to a smooth contour as per NACE Standard RP0178 and herein.
   c. Surface preparation: SSPC-SP6 Commercial Blast Cleaning. Anchor profile shall be 1.5 to 2.0 mils as per ASTM D 4417, Method C or NACE Standard RP0287.
   d. Coating system:
      1) Shop primer: High solids epoxy, 4 – 8 mils DFT
      2) 2nd coat: High solids epoxy, 5 – 10 mils DFT
      3) 3rd coat: Aliphatic polyurethane, 3 -5 mils DFT

      Total dry film thickness shall be a minimum of 12 mils.
2. Exterior tank floor (underside): If the underside of the tank floor has been blasted with a wheel abrader, apply 2.0-3.0 dry mils of corrosion resistant alkyd industrial enamel coating.
3. Interior roof laps: All interior roof lap joints shall be sealed with Sikaflex-1A after the coating system has been installed.
4. Buried steel pipe interior pipe coating: Per ANSI/AWWA C210-15, Liquid Epoxy Coatings and Linings for Steel Water Pipe and Fittings, all steel pipes entering and exiting the tank shall be coated on the interior of the pipe with 16 to 20 mils (dry film thickness) of an approved liquid epoxy up to the point where the steel pipe is converted to PVC, HDPE or ductile iron (typically approximately 5 feet outside the tank foundation).
5. Buried Steel Pipe Exterior Coating: All steel pipes entering and exiting the tank shall be coated on the exterior of the pipe with 20 mils of Coal Tar Epoxy up to the point where the steel pipe is converted to PVC or ductile iron (typically 5 feet outside the tank foundation).

PART 3 - EXECUTION

3.1 SURFACE PREPARATION – GENERAL

A. All surface preparation, coating and painting shall conform to applicable standards of the Steel Structures Painting Council, NACE International and the manufacturer's printed instructions. Materials applied to the surface prior to the approval of the Owner or Owner’s Representative shall be removed and re-applied to the satisfaction of the Owner or Owner’s Representative at the expense of the contractor.

B. All work shall be performed by skilled craftsmen qualified to perform the required work in a manner comparable with the best standards of practice. Continuity of personnel is highly important and shall be coordinated as a priority with the Owner or Owner’s Representative.

C. The Contractor shall provide a supervisor at the work site during cleaning and application operations. The supervisor shall have the authority to sign change orders, coordinate work and make decisions pertaining to the fulfillment of the contract.

D. Dust, dirt, oil, grease or any foreign matter that will affect the adhesion or durability of the coating or paint must be removed by washing with clean rags dipped in an approved cleaning solvent and wiped dry with clean rags.

E. Coating and painting systems include surface preparation, prime coating and finish coatings. Unless otherwise approved in writing by the Owner or Owner's Representative, prime coating shall be field applied. Where prime coatings are shop applied, the Contractor shall instruct suppliers to provide the prime coat compatible with the specified finish coat. Any off-site work which does not conform to this specification which is subjected to damage during transportation, construction or installation shall be thoroughly cleaned and touched-up in the field as directed by the Engineer.

F. The Contractor shall use repair procedures which insure the complete protection of all adjacent primer-coated surfaces. The specified repair method and equipment may include wire-brushing, hand or power tool cleaning, or dry air blast cleaning. In order to prevent injury to surrounding painted surfaces, blast cleaning may require use of lower air pressure, a smaller nozzle and/or abrasive blast particles, or shorter blast nozzle distances from surface shielding and masking. If damage is too extensive or uneconomical to touch-up, the entire item shall be blasted and then coated or painted as directed by the Owner or Owner's Representative.

G. The Contractor's coating and painting equipment shall be designed for application of the materials as specified and shall be maintained in first class working condition. Compressors shall have suitable traps and filters to remove water and oils from the air. The Contractor's equipment shall be subject to approval by the Owner or Owner's Representative.

H. Application of the first coat shall follow immediately after surface preparation, cleaning and stripe coat application, if applicable, before rust bloom occurs or the same day, whichever is less. Any cleaned areas not receiving first coat within this period shall be re-cleaned prior to application of the first coat. The use of dehumidification equipment shall first be reviewed by the Owner or Owner's Representative and coatings manufacturer prior to deviating from this provision.

I. Prior to assembly, all surfaces made inaccessible after assembly shall be prepared as specified herein and shall receive the coating or paint system specified.

3.2 SURFACE PREPARATION

A. The latest revision of the following surface preparation specifications of the Steel Structures Painting Council (SSPC) shall form a part of this specification. The summaries listed below are for informational purposes; consult the actual SSPC specification for full detail.

1. Solvent Cleaning (SSPC-SP1): Removal of oil, grease, soil and other contaminants by use of solvents, emulsions, cleaning compounds, steam cleaning or similar materials and methods which involve a solvent or cleaning action.
2. Hand Tool Cleaning (SSPC-SP2): Removal of loose rust, loose mil scale and other detrimental foreign matter to a degree specified by hand chipping, scraping, sanding and wire-brushing

3. Power Tool Cleaning (SSPC-SP3): Removal of loose rust, loose mil scale and other detrimental foreign matter by power wire-brushing, power impact tools or power sanders.
4. White Metal Blast Cleaning (SSPC-SP5/NACE No. 1): Air blast cleaning to a gray-white uniform metallic color until each element of surface area is free of all visible residues.
5. Commercial Blast Cleaning (SSPC-SP6 NACE No. 3): Air blast cleaning until at least two-thirds of each element of surface area is free of all visible residues.
6. Brush-Off Blast Cleaning (SSPC-SP7 NACE No. 4): Air blast cleaning to remove loose rust, loose mil scale and other detrimental foreign matter to a degree specified.
7. Near-White Metal Blast Cleaning (SSPC-SP10 NACE No. 2): Air blast cleaning until at least 95% of each element of surface area is free of all visible residues.
8. Power Tool Cleaning to Bare Metal (SSPC-SP11): Differs from SSPC-SP3 in that it requires removal of all corrosion products and a surface profile not less than 1 mil.

B. Slag, weld metal accumulation and spatters not removed by the Fabricator, Erector or Installer shall be removed by chipping and/or grinding. All sharp edges shall be peened, ground or otherwise blunted as required by the Owner or Owner's Representative. All grinding and finishing of welds, edges, etc. shall be performed prior to solvent cleaning and abrasive blasting. Welds shall be prepared as per NACE Standard RP0178 for all interior and exterior surfaces:
   1. Butt Welds: Shall be ground smooth and free of all defects, designation "D".
   2. Lap Welds: Shall be ground smooth and blended, designation "D".
   3. Fillet Welded Tee Joint: Shall be ground smooth and blended, designation "D".

C. Field blast cleaning for all surfaces shall be by dry method unless otherwise directed. Blast nozzles shall be venturi-type nozzles with a minimum pressure at the nozzle of 90 psi.

D. Particle size of abrasives used in blast cleaning shall be that which will produce a 1.5 - 2.5 mil (37.5 microns - 65.0 microns) surface profile or in accordance with recommendations of the manufacturer of the specified coating or paint system to be applied.

E. If the profile of the blasted steel exceeds the profile specified above, the Contractor shall be required to do one or both of the following:
   1. Re-blast the surface using a finer aggregate in order to produce the required profile.
   2. Apply a thicker prime coat, if possible given the limitations of the products being applied, in order to adequately cover the blast profile

F. Abrasive used in blast cleaning operations shall be new, washed, graded and free of contaminants that would interfere with adhesion of coating or paint and shall not be reused unless specifically approved in writing by the Owner or Owner's Representative.

G. Blast cleaning is not be allowed when the steel surface temperature is less than 5° F above the dew point temperature of the air in contact with the steel surface, or if the relative humidity of the air in contact with the steel surface is greater than 85 percent.

H. All blasted surfaces shall have the first coat of paint applied before rust or contamination can occur. In no case will finish blasted areas remain unprimed for more than 8 hours. At the end of each painting day there shall remain unpainted a 6-inch to 12-inch border of blasted steel. When blast cleaning resumes the following work day, this border shall be re-blasted up to and including 1-inch to 3-inches of the previous applied coating.

I. During blast cleaning operations, caution shall be exercised to insure that existing coatings are not exposed to abrasion from blast cleaning.

J. The Contractor shall keep the area of his work and the surrounding environment in a clean condition. The Contractor shall not permit blasting materials to accumulate as to constitute a nuisance or hazard to the accomplishment of the work, the operation of the existing facilities or to the surrounding environment.

K. Blast cleaned surfaces shall be cleaned prior to application of specified coatings or paint. All surfaces shall be free of dust, dirt, and other residue resulting from the abrasive blasting operation. No coatings or paint shall be applied over damp or moist surfaces.

L. All welds shall be neutralized with a suitable chemical compatible with the specified coating or paint.

M. Pitted areas on the tank interior shall be repaired by filling with a manufacturers approved 100% epoxy filling or patching compound or by welding. Epoxy filler shall be feathered smooth. Filler shall be applied prior to the application of the finish coat. No protrusions or spatter will be allowed. Pits deeper than 1/8” shall be filled by welding.

N. Surface preparation for the specific system shall be as noted in Sections TP-34.11 and TP-34.12.

3.3 NON-VISIBLE CONTAMINANTS

A. Chloride, sulfate and ferrous ions (Fe2+) tests shall be performed on the interior metal portions of the tank after sandblasting but prior to the application of coatings. The maximum allowable limit of these non-visible contaminants is:

1. The maximum level of chlorides is 30 milligrams per square meter or 3 micrograms per square centimeter.
2. The maximum level of sulfates is 100 milligrams per square meter or 10 micrograms per square centimeter.
3. The maximum level of ferrous ions (Fe2+) is 50 milligrams per square meter or 5 micrograms per square centimeter.

B. If testing shows amounts present in the test solution to be greater than the limits listed herein, the Contractor shall clean the surface of the entire tank interior with a 5,000 psi water blast with fine entrained abrasive until the levels in the test solutions are below the maximum acceptable level. Alternate cleaning methods may be allowed with prior approval of the Owner or Owner’s Representative. Surface shall be re-blasted as specified in TP-34.11 and TP-34.12 at no additional cost to the Owner.

C. The Contractor shall provide a written statement from the coating manufacturer stating that the maximum acceptable levels are not less than those listed herein. Results of the testing shall be provided to the Owner or Owner’s Representative before any coatings are applied.

D. When exterior coats are to be applied on subsequent days, or when the shroud is dropped between coats, the previously-applied coating shall be thoroughly pressure-washed to remove any fallout and/or salt that may have settled on the surface.

3.4 APPLICATION – GENERAL

A. Coating application shall conform to the requirements of the Steel Structure Painting Council Paint Application Specification SSPC-PA1, latest revision, for "Shop, Field and Maintenance Painting".

B. Thinning shall be permitted only as recommended by the manufacturer and approved by the Owner or Owner's Representative, and utilizing the thinners stated in Sections TP-34.11 and TP-34.12.

C. Each application of coating shall be applied evenly, free of brush marks, sags, runs, with no evidence of poor workmanship. Care shall be exercised to avoid lapping on glass or hardware. Coatings shall be sharply cut to lines. Finished surfaces shall be free from defects or blemishes.

D. Protective coverings or drop cloths shall be used to protect floors, fixtures and equipment. Care shall be exercised to prevent coatings from being spattered onto surfaces which are not to be coated. Report to the Owner or Owner's Representative surfaces from which materials cannot be satisfactorily removed.

E. When two coats of coating are specified, where possible, the first coat shall contain sufficient approved color additive to act as an indicator of coverage or the two coats must be of contrasting color.

F. Film thickness per coat as specified in Sections TP-34.11 and TP-34.12 are the minimum required. If roller application is deemed necessary, the Contractor shall apply additional coats as to achieve the specified thickness.

G. All material shall be as specified.

3.5 COATING SYSTEMS APPLICATION

A. After completion of surface preparation as specified for the specific system, coating materials shall be applied as noted in Sections in conformance with, and as referenced by, this Technical Specification.

B. Care shall be taken so as to eliminate overspray and dry spray on the tank interior. Where such conditions are encountered, the surface shall be cleaned of all over spray and dry spray prior to the application of the succeeding coat.

C. Areas rendered inaccessible after tank erection such as the spaces between roof plates and rafters shall receive the full coating system prior to erection and/or assembly.

D. If specified/permitted by the coating system manufacturer, full prime coat may be applied directly over stripe coat while stripe coat is wet.

3.6 CURE

A. General: Each coating system cures as a function of ambient temperature and coatings cure faster at higher temperatures and slower at lower temperatures. Coating times as are specified by manufacturer's literature shall be strictly followed during all coating and recoating processes. No modifications and/or exceptions to the specified cure times will be permitted.

B. Final cure: Minimum final cure time shall be in accordance with the manufacturer's supplied product data sheets and in accordance with NSF 61 certification requirements. Ventilation equipment shall be operated at an exchange rate of two (2) air changes per hours. The roof hatch and manholes shall be left open for the remainder of the final cure.

3.7 DISINFECTION

A. Disinfection shall be performed after protective coatings have been applied to the interior surfaces and allowed to thoroughly cure.

B. Prior to disinfecting, the complete interior shall be washed down with clean water and thoroughly flushed.

C. The Contractor shall disinfect the finished tank, and tank plumbing before they are placed into service. The tanks shall be thoroughly cleaned and disinfected according to AWWA C652-11, Method I, II, or III, as will be specified by the Owner or Owner's Representative. The tank and piping shall not be accepted or placed into service until the Owner or Owner's Representative receives from the Contractor a confirming negative bacteriological test. If the tank does not pass the bacteriological test, the Contractor, at no cost to the Owner, will be responsible for re-disinfection until acceptable results are obtained. Water required for disinfection procedures shall be provided by the Owner.

D. Depending on the inspection method utilized, disinfection shall be verified and/or repeated after any and all warranty inspections.

3.8 SOLVENT VAPOR REMOVAL

A. All solvent vapors shall be completely removed by suction-type exhaust fans and blowers before placing tank in operating service.

B. All solvent vapors will be exhausted both during and after coating application as per AWWA D 102-17 to allow the proper curing of the coating material.

C. Ventilation shall be continued until such time as the coating has reached "full cure" as specified by the coating manufacturer.

3.9 VOC TEST

A. After the tank has reached "full cure" as specified by the coating manufacturer, VOC tests shall be performed on the tank interior coating system. Samples shall be collected for testing by the Owner or his representative. Tests shall be performed in accordance with EPA 524.2 Revision 4 Purgeable VOCs by GC/MS. Total VOCs shall not exceed 100 ppb/100 micrograms per liter for 24 hour and 72 hour intervals.

B. If the limits cited herein are exceeded, the contractor shall take all actions necessary to reduce the total VOCs to the level specified herein. This includes, but is not limited to, continuing forced air ventilation, steam cleaning the structure, and rinsing the structure with clean potable water.

3.10 CLEANUP

A. Upon completion of the work, all staging, scaffolding and containers shall be removed from the site or destroyed in a manner approved by the Owner or Owner's Representative. Coating spots or oil stains upon adjacent surfaces shall be removed and the jobsite cleaned. All damage to surfaces resulting from the work of this section shall be cleaned, repaired or refinished to the satisfaction of the Owner or Owner's Representative at no cost to the Owner.

3.11 WORK PLAN

A. Submit a written work plan describing in detail all phases of the coating operations. Address work sequencing, surface preparation, coating application, recoat and cure time projections, as well as how each step will be controlled, tested, and evaluated. Provide detailed procedures, including manufacturer's instructions, for repairing defects in the coating film such as runs, drips, sags, holidays, overspray, etc. Address safety measures, work scheduling based on expected weather condition extremes, and record keeping.

END OF SECTION

SECTION 101100 - VISUAL DISPLAY UNITS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Glass markerboards.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data Submittals: For each product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, finishes, and accessories for visual display units.
   2. Include electrical characteristics for motorized units.

B. Shop Drawings: For visual display units.
   1. Include plans, elevations, sections, details, and attachment to other work.
   2. Show locations of panel joints. Show locations of field-assembled joints for factory-fabricated units too large to ship in one piece.
   3. Show locations and layout of special-purpose graphics.
   4. Include sections of typical trim members.

C. Samples for Initial Selection: For each type of visual display unit indicated, for units with factory-applied color finishes, and as follows:
   1. Samples of facings for each visual display panel type, indicating color and texture.
   2. Include accessory Samples to verify color selected.

D. Samples for Verification: For each type of visual display unit indicated.
   1. Visual Display Panel: Not less than 8-1/2 by 11 inches, with facing, core, and backing indicated for final Work. Include one panel for each type, color, and texture required.
   2. Display Rail: 6-inch- long section of each type.
   3. Modular Support System: 6-inch- long sections.
   4. Accessories: Full-size Sample of each type of accessory.

E. Product Schedule: For visual display units. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For visual display units to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Provide the following upon request:
   1. Qualification Data: For Installer.

2. Product Test Reports: For each visual display unit, for tests performed by a qualified testing agency.

1.6 MOCKUPS

A. Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.
   1. Build mockup of typical visual display unit as shown on Drawings. Include accessories.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-fabricated visual display units completely assembled in one piece. If dimensions exceed maximum manufactured unit size, or if unit size is impracticable to ship in one piece, provide two or more pieces with joints in locations indicated on approved Shop Drawings.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install visual display units until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: 25 or less.
   2. Smoke-Developed Index: 50 or less.

2.2 GLASS MARKERBOARDS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Manufacturers: Subject to compliance with requirements, provide products by the following:
   1. ASI Visual Display Products.
   2. Claridge Products and Equipment, Inc.
   3. Krystal Glass Writing Boards, Inc.
   4. Peter Pepper Products, Inc.

C. Glass Markerboards: Fabricated of 6-mm tempered-laminated low-iron glass with steel backing for use with magnets.
   1. Edge Treatment: Smooth polished edge with eased corners.

2. Surface: Matte.
3. Color: White.

D. Mounting:
1. Round, stainless steel standoffs, holding glass approximately 1 inch from wall surface; mounted in notches in standoffs at top and bottom edges of markerboard.

E. Marker Tray: Aluminum, attached with stainless steel clips.

2.3 MATERIALS

A. Clear Tempered Glass: ASTM C1048, Kind FT, Condition A, Type I, Class 1, Quality Q3, with exposed edges seamed before tempering.

B. Extruded Aluminum: ASTM B221, Alloy 6063.

2.4 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA AMP 500 for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.5 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.

B. Examine roughing-in for electrical power systems to verify actual locations of connections before installation of motorized, sliding visual display units.

C. Examine walls and partitions for proper preparation and backing for visual display units.

D. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.

E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances, such as dirt, mold, and mildew, that could impair the performance of and affect the smooth, finished surfaces of visual display boards.

C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display units and wall surfaces.

D. Prime wall surfaces indicated to receive visual display units and as recommended in writing by primer/sealer manufacturer and visual display unit manufacturer.

E. Prepare recesses for sliding visual display units as required by type and size of unit.

3.3 INSTALLATION

A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

B. Visual Display Board Assembly Mounting Heights: Install visual display units at mounting heights indicated on Drawings.

3.4 CLEANING AND PROTECTION

A. Clean visual display units in accordance with manufacturer's written instructions. Attach one removable cleaning instructions label to visual display unit in each room.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

C. Cover and protect visual display units after installation and cleaning.

END OF SECTION

SECTION 101400 - SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including Special Conditions, apply to this Section.

B. Architectural Barriers Act (ABA) Accessibility Guidelines.

C. Indian Health Service (IHS) guidelines and standards for hospital signage.

1.2 SUMMARY OF WORK INCLUDED

A. CONTRACTOR shall be responsible for securing all sign permits, including payment of fees, required by White Mountain Apache Tribe and all other local agencies. for the installation of all exterior and interior signage for the Project.

B. Sign Fabrication: Types of signs, messages, and graphics are indicated on the drawings and herein, and require various materials, finishes, illumination and fabrication and installation techniques.

C. Shop drawings, layouts, samples, and mock-ups for Indian Health Service (IHS) approval.

D. Installation of all fabricated signs, including all fasteners and fastenings and related electrical and data connections.

E. Coordination with all trades of this Contract required for the fabrication and installation of the signage, including the approvals by the IHS required in this Section. Fabrication and installation of the Work in accordance with National Electrical Code (NEC); latest edition, Underwriters Laboratory UL); latest edition, National Fire Protection Agency (NFPA); latest edition and National Electrical Manufacturers Association Standards.

F. Coordination and verification of all messages with IHS. Sign contractor to provide complete sign message and graphic layouts for review and approval by Design teams and IHS.

G. Verification of all conditions and sign dimensions in the field. Sign Fabricator to coordinate all signage requirements with the architectural, structural, lighting, electrical, civil, landscape, life safety, and telecommunications drawings to ensure that all proposed signs can be installed, with power and required data connections and structurally supported. Verification of conditions and sign dimensions to be completed prior to sign fabrication and approval of all required submittals.

H. Sign Types and Quantities

I. The Sign Fabricator is responsible for verifying quantities with the IHS and DESIGNER.

1.3 DESIGN CRITERIA

A. SHOP DRAWINGS

1. The Contract Drawings provided may communicate general basis of design or fabrication expectation to achieve design intention purposes but do not constitute fabrication or shop drawings. It is the responsibility of the Signage Contractor to develop and submit all details necessary to clearly communicate and define the fabrication process, as well as the expected performance of the installed product. The Signage Contractor must demonstrate a thorough understanding of the intended final product through comprehensive details and product specification, including the methods and processes to be used in its production. Field

verification and measurement are required prior to the submission of shop drawings. Repackaging the provided Contract Drawings with new title blocks and submitting them as shop drawings will not be accepted. While electronic artwork may be provided, the Signage Contractor must be prepared to create all graphic content from scratch, as needed, to verify and ensure the quality and accuracy of the final delivered product. Signage Contractor to verify final artwork dimensions comply with any federal or local regulations. Provide complete fabrication and installation shop drawings for each sign type. Drawings shall include all relevant information, including dimensions, materials, finishes, fastening methods, anchorage details, joints and visible seams, sealing methods, backing materials, utility requirements, rough-in conditions, and adjacent site conditions related to the installation.

B. The Architectural Graphics Drawings represent the design intent for the signs required for the Project. The Sign Fabricator is responsible for the proper engineering of all elements of the Work and where applicable. The internal structure, dimensions, and specifications for all items shall be indicated in the shop drawings. The Signage Contractor shall be responsible for the structural design and calculations for all ceiling-suspended, floor-mounted, projected signage, wall-mounted signs (weighing more than 5lbs.), and ground-mounted signage, including the provision of engineered foundation/footer to ensure the structural integrity of all support connections. Wind load calculations shall be provided for all exterior signage, or where otherwise applicable, in accordance with governing building codes and project requirements. All structural connections and calculations must be performed by and certified by a Professional Engineer licensed in the State of Nevada. Submit all stamped drawings for Designer and Owner's review and record.

C. Provide shop drawings for all items including, but not limited to the following:
   1. Complete fabrication and installation drawings for each sign type. Indicate dimensions, materials, finishes, fastening, anchorage, joining, sealing, backing, utility requirements, rough-in, and adjacent related site conditions.
   2. Each sign type with all graphic elements.
   3. Evacuation Map final graphics. The Designer will provide a clean evac map template for each level to be used for developing specific area plans and routes as coordinated with the local fire department representative and Emergency Egress plans during the early phases of Construction Administration. Fabricator to develop individual evac maps for all locations based on the templates. Include all fire alarms, fire pull, address, alarm sound, current level info, correctly oriented north symbol, fire extinguisher, and exit route locations on the maps, as required. Review fire life safety plans as required to verify equipment locations. Coordinate with AHJ (Authority Having Jurisdiction) or fire department as required. Include all maps in the shop drawings for review. Ensure the maps are oriented correctly based on each sign location.
   4. The Signage Contractor shall be responsible for coordinating and verifying all sign messages with the Designer. The Designer shall provide a complete set of sign location plans, including a sample sign numbering system and a message schedule in table format. The Signage Contractor shall use the message schedule to prepare complete visual sign message layouts for review and approval by the Designer and/or Owner. These visual layouts shall be used to verify final messages, ensure

graphic accuracy, and confirm proper typography. Multiple revisions should be anticipated to finalize all messages.

5. All final as-built drawings shall be provided by the Sign Fabricator as part of the project closeout procedures. These drawings shall include all commentary obtained during the project, including RFI responses, sample reviews, shop drawing reviews, and mockup reviews—reflecting all installed locations, conditions, and final quantities.
6. All letter styles shall be accurately reproduced.
7. Connections and routing for all power and data cabling.
8. Braille message coordinated with corresponding raised characters.

1.4 SUBMITTALS

A. Procedure: Prepare submittals in accordance with the Contract Drawings requirements and to include the following:
   1. Notes on Drawings shall clearly define any actions requiring review by the IHS.
   2. First article of production-run items, both large and small, will be reviewed by IHS before production run is commenced.
   3. It shall be the responsibility of the Contractor to schedule all review meetings with IHS.

B. Submit physical samples of sufficient size and quantity to illustrate materials, finishes, equipment, or workmanship, and to establish standards by which completed work will be judged. Samples must represent the functional characteristics of the product or material, with integrally related parts and attachment devices, colors, and finishes.

C. All samples to have a place for stamp approval.

D. Required samples for review:
   1. Full 4" x 4" set of all specified paint colors and finishes.
   2. Complete, scaled, message layout for each sign face, to demonstrate proper spacing and content (black text on white background: outline not accepted).
   3. Sample of each type of fastener to be used.
   4. Each type of exposed metal used for major elements of work with respective finish.
   5. Each type of adhesive vinyl film, including computer-cut designs, shown full-size on each of the specified ground colors.
   6. Mock-ups as scheduled in this section. Mock-ups shall become the property of IHS and are not to be part of the completed work.
   7. Unless otherwise noted, one full size, complete, item must be prepared and installed by the fabricator as “first article” for each sign type. Upon inspection and approval by the IHS, the fabrication of subsequent articles may continue.
   8. Other items as may be required by IHS, or as noted on the Drawings or herein.

E. Extra Materials / Spares: Deliver to the appropriate IHS Representative contact person, in manufacturer’s original packaging and store at the Project where directed.
   1. Furnish (1) gallon of each finish paint color for touch-up purposes.
   2. Furnish (6) lamps of each type and size used in the signage (as applicable).
   3. Furnish spare keys to master keyed locks on directory or Kiosk signage.

F. Supplementary Product Literature: Submit for information. Furnish within seven (7) days of request, manufacturer’s literature describing the general properties of each product to be used in the work.

1.5 PERMITS BY SIGNAGE CONTRACTOR

A. Signage Contractor shall be responsible for paying all fees, making adjustments as required, or any task necessary for obtaining local building and installation Sign permits for the proper execution of the Work.

1.6 QUALITY ASSURANCE

A. Mock-ups and Prototypes:
   1. Provide a mock-up for each sign type as indicated in Section 1.06 and the Contract Drawings. Mock-ups may be full-size signs or approved partial sections and must be fabricated at full scale (1:1) unless otherwise coordinated with the Owner and Designer. When a full-size mock-up is not feasible, an alternative scale or partial mock-up may be used if it meets the design intent and is approved by the Designer.
   2. Mock-ups must use the same materials, construction, and installation methods intended for the final Work. Schedule installation to allow adequate time for review and required adjustments before proceeding with fabrication. Unsatisfactory mock-ups must be replaced as directed.
   3. For freestanding signs, demonstrate the proposed mounting method, including stability, level placement, concealed attachments, and supporting structural calculations.
   4. Once approved by the Designer and Architect, the mock-up becomes the standard for materials, workmanship, and appearance. Approved mock-ups may serve as First Articles, and in some cases—with Designer approval—a single mock-up may be used to review multiple sign types with similar styles or designs. Reviewed and approved mock-ups may also be used for final installation when permitted by the Owner.

B. Work-In-Progress Approvals:
   1. Provide work-in-progress sign elements reviews. Scheduled or unscheduled viewings at the Fabrication Facility may be initiated by the IHS Representative as deemed necessary to ensure continued quality control and make any adjustments required during fabrication. Unsatisfactory items are to be corrected by the Signage Contractor as directed by IHS.

C. Regulatory Requirements:
   1. Comply with applicable requirements of the Applicable Laws and Authorities. Obtain necessary approvals and permits from Authorities as required.

D. Markings and Labels:
   1. All markings, labels, manufacturer names, and other identifying information must be located and concealed from public view. Concealment methods must be acceptable to the IHS Representative and comply with applicable standards.
   2. No trade name or other identification shall appear on any item where it will be seen by the public, except as specifically approved by IHS Representative in advance.

E. Final Location of Signs:
   1. The location of signs as shown on the Location Plans is for general reference only and in some cases is not representative of the exact final location. Final locations of Signs shall be field located in coordination with IHS.
   2. Signage Contractor shall arrange for meetings at the Project to accommodate direction of final locations according to Project Construction Schedule.

F. Lettering:
   1. The Signage Contractor shall be responsible for the quality control of all lettering. All letterforms shall be crisp, sharp, free of nicks, ragged edges, and discontinuous curves. All lettering shall conform to approved typeface, weight and letter spacing. No substitutions of typeface foundry, brand or version or implementation technique will be accepted without prior approval.
   2. Vinyl Die Cut Graphics: All vinyl artwork shall be digitized to a vector format to allow for digital cutting fabrication.
   3. All cutting and routing shall be executed in such a manner that all edges and corners of finished letterforms are true and clean. Letterforms with rounded positive or negative corners, nicked, cut, or ragged edges, etc., will not be accepted. All letterforms shall be so aligned as to maintain a baseline parallel to the sign format. Margins must be maintained as specified in drawings.
   4. All Work under the Agreement shall be performed by skilled craftsmen under supervision of trained foremen, experienced in the trade of craft required to accomplish the Work and produce a product of high quality.

G. Tactile sign messages:
   1. All tactile sign messages must comply with ABA guidelines, Chapter 7: Communication Elements and Features, Tactile Signs.
   2. Character spacing shall be measured between the two closest points of adjacent raised characters within a message, excluding word spaces. Where characters have rectangular cross sections, spacing between individual raised characters shall be 1/8-inch (3.2 mm) minimum and 4 times the raised character stroke width maximum. Where characters have other cross sections, spacing between individual raised characters shall be 1/16 inch (1.6 mm) minimum and 4 times the raised character stroke width maximum at the base of the cross sections, and 1/8 inch (3.2 mm) minimum and 4 times the raised character stroke width maximum at the top of the cross sections. Characters shall be separated from raised borders and decorative elements 3/8-inch (9.5 mm) minimum.
   3. Braille shall be contracted Braille (Grade 2), domed compliant with Arizona Building Code, and maintain a minimum 3/8 inch clear-space from other tactile elements.
   4. Proof-reading of Braille messages is to be performed by the sign fabricator prior to fabrication.

H. High quality of workmanship:
   1. The Signage Contractor shall be responsible for the high quality of all materials and workmanship required for the execution of the Agreement including materials and workmanship of any firm or individual who act as Signage Contractor's Sub-Contractor.

I. Dimensions:
   1. Written dimensions on drawings shall have precedence over scaled dimensions.

2. Signage Contractor shall verify and be responsible for all dimensions and conditions shown by these drawings. Shop details must be approved by IHS prior to fabrication.

J. Discrepancies
1. Signage Contractor shall notify IHS of any discrepancies in the Drawings, Sign Location Plan or Sign Message Schedule, in field dimensions or conditions and/or changes required in construction details.

K. Regulatory Requirements:
1. Comply with applicable portions in current ABA Standards.
2. References
a. Arizona Building Code/ Arizona Fire Code
b. Arizona Public Safety Codes
c. Arizona Environmental Protection Codes
d. National Association of Architectural Metal Manufacturers (NAAMM) “Metal Finishes Manual.”
e. American Welding Society (AWS) – AWS D1.1 “Structural Welding Code, Steel,” and AWS D1.2 “Structural Welding Code, Aluminum.”
f. Underwriters Laboratories Inc. (UL) – Standards for Safety, UL Publication 48 “Electric Signs.”

1.7 GRAPHICS/ARTWORK

A. IHS to provide artwork via electronic file transfer; Adobe Illustrator, Acrobat PDF, MAC Format for graphic layouts included in the Drawings.

1.8 WARRANTY

A. Signage Warranty
1. Submit to IHS a 5-year written warranty (effective the date of final acceptance) covering all Signs, by the Signage Contractor and Installer (if Sub-Contractor is used), agreeing to repair or replace the Defective Signs. Upon notification of such Defective Signs within the warranty period, make necessary repairs or replacement at the convenience of IHS.

B. Linear Polyurethane Paint Factory Finish Warranty
1. Submit to IHS a 5-year written warranty, warranting that the factory-applied linear polyurethane finishes will not develop excessive fading or excessive non uniformity of color or shade, and will not crack, peel, pit, corrode or otherwise fail as a result of Defects in materials or workmanship within the following defined limits. Upon notification of such Defects within the Warranty Period, make necessary repairs or replacement at the convenience of the IHS.

C. “Excessive Fading”
1. A change in appearance that is perceptible and objectionable as determined when visually compared with the original color range standards.

D. “Excessive Non-Uniformity”
1. Non-uniform fading to the extent that adjacent panels have a color difference greater than the original acceptable range of color.

E. "Will Not Pit or Otherwise Corrode"
   1. No pitting or other type of corrosion, discernible from a distance of 10' (3 m), resulting from the natural elements in the atmosphere at the project site.

1.9 MAINTENANCE

A. Maintenance and Operating Manuals
   1. Provide Maintenance and Operating Manuals to IHS per SECTION 017823 – OPERATION AND MAINTENANCE DATE.
   2. Furnish complete manuals describing the materials, devices and procedures to be followed in operating, cleaning and maintaining the Work. Include manufacturers' brochures and parts lists describing the actual materials used in the Work, including metal alloys, finishes, electrical components and other major components.
   3. Assemble manuals for component parts into single binders identified for each system.

B. Instruction
   1. Prior to acceptance, establish with IHS an instruction and training program for IHS personnel.
   2. Notify the IHS in writing at least 7 days prior to commencement of the program providing an outline of topics indexed to the Maintenance and Operating Manual.
   3. Provide a trained instructor. Provide three (3) consecutive 4-hour periods of training scheduled during the normal 8-hour working day. Instruction and training shall include, but shall not be limited to, procedures to be followed in the normal day-today maintenance and operation of the Work.

PART 2 - PRODUCTS

2.1 FABRICATION

A. Signage shall be complete for proper installation as described in the Drawings.

B. Finish work shall be firm, well anchored, in true alignment, properly squared, with smooth clean uniform appearance, without holes, cracks, discoloration, distortion, stains, or marks.

C. Construct all work to eliminate burrs, dents, cutting edges, and sharp corners.

D. Finish welds on exposed surfaces to be imperceptible in the finished work.

E. Except as indicated or directed otherwise, finish all surfaces smooth.

F. Surfaces, which are intended to be flat, shall be without dents, bulges, oil canning, gaps, or other physical deformities.

G. Surfaces, which are intended to be curved, shall be smoothly free flowing to required shapes.

H. Except where approved otherwise by IHS Authority, conceal all fasteners.

I. Make access panels tight-fitting, light proof, and flush with adjacent surfaces.

J. Conceal all identification labels and Underwriters Limited labels to conform to Underwriters Limited Codes.

K. Carefully follow manufacturer's recommended fabricating procedures regarding expansion or contraction, fastening, and restraining of acrylic plastic.

L. Exercise care to ensure that painted, polished, and plated surfaces are unblemished in the finished work.

M. Isolate dissimilar materials. Exercise particular care to isolate nonferrous metals from ferrous metals.

N. All illumination shall be even and without hot spots.

O. Ease all exposed metal edges.

P. Provide miscellaneous metal items required for completion of the work even though not shown or specified.

Q. Refer to Drawings for sign color specifications.

R. Paint finishes shall be Matthews Acrylic Polyurethane with Matthews Primers and Metal Pre-Treatments or IHS approved equal.

S. Shop painting to be uniform on and around all sign elements to ensure sign elements will withstand all weather conditions.

T. Mounting: Mounting plates shall be in conformance with manufacturer's written recommendations.

2.2 MATERIALS

A. All Specified Metals
   1. Aluminum
      a. Aluminum shall be suitable for ornamental, architectural work. Surface finish shall be smooth, free of extrusion marks or imperfections. Alloy shall be selected to meet the structural requirements of the specific application.
   2. Stainless Steel
      a. Stainless steel shall be suitable for ornamental and architectural work. Surface finish shall be smooth, free of all extrusion marks or imperfections. Alloy shall be selected to meet the structural requirements of specific application. Structural metal for concealed framing shall be of galvanized rolled steel or equal as required to satisfy structural requirements.

B. Aluminum exterior cabinets, spacers, backplates and frames shall be constructed from 0.25 inch aluminum, #4 horizontal brushed and clear anodized finish, unless otherwise specified on Drawings.

C. Aluminum interior plaques shall be constructed from 0.125 inch aluminum, #4 horizontal brushed finish with semi-gloss linear polyurethane clear coat, unless otherwise specified on Drawings.

D. Aluminum interior fabricated components shall be constructed from 0.125 inch thickness aluminum sheet.

E. Adhesive used for installing Signs shall be manufactured by Dow Corning or equal. "VHB" tape such as Polyfoam or "Isotac" contact adhesive tape manufactured by 3M shall be used available.

F. Extruded aluminum shapes utilizing 6063-T6 aluminum alloys, unless otherwise specified on Drawings.

G. Concrete Installation of anchoring devices into concrete slab shall be adjusted to avoid penetrating existing reinforcing conduit, etc. contained in the concrete slab. Coordinate with the Architect and Structural Engineer.

H. Stainless steel exterior cabinets, spacers, backplates and frames shall be constructed from 0.125 inch stainless steel, #4 horizontal brushed and clear anodized finish, unless otherwise specified on Drawings.

I. Stainless steel interior plaques shall be constructed from 0.125 inch thickness stainless steel sheet, #4 horizontal brushed finish with semi-gloss linear polyurethane clear coat, unless otherwise specified on Drawings.

J. Stainless steel interior fabricated components shall be constructed from 0.0625 inch stainless steel, unless otherwise specified on Drawings.

K. Stainless steel shall be suitable for ornamental and architectural work. Surface finish shall be smooth, free of all extrusion marks or imperfections. Alloy shall be selected to meet the structural requirements of specific application. Structural metal for concealed framing shall be of galvanized rolled steel or equal as required to satisfy structural requirements.

L. Acrylic intended for non-illuminated use shall be 0.25 inch cast acrylic sheet with non-glare finish, unless otherwise specified on Drawings. Acrylic intended for edge-illuminated use shall be 10mm extruded acrylic sheet with embedded diffuser particles designed specifically for edge-lighting, unless otherwise specified on Drawings.

M. Use Plexiglas II as manufactured by Röhm GmbH, or equal quality. Thickness shall be as indicated on Drawings or not less than 1/8" thick. Signage Contractor shall provide color and finish samples of all plastics for approval before fabrication; no substitution in color, thickness, or finish of plastics will be accepted without written approval from the IHS. All plastics shall be of uniform color, translucence and illumination, as supplied by manufacturer. Any exposed edges of acrylic shall be finished so as no saw marks are visible.

N. Decal or Transfer: Provide special printed paper or vinyl suitable for reproducing the design onto material indicated, as required. Submit sample to the IHS for approval.

O. Aluminum posts shall be constructed from 2-inch square T52 tubes, 0.1875 wall thickness and #4 brushed and clear anodized finish with capped ends, unless otherwise specified on Drawings.

P. Hardware / Hinges: Provide and install all incidental hardware necessary for the proper functioning of the Signs, including, but not restricted to, materials and products covered in this section. Provide stainless steel hinges for all hinged access panels. Provide pin tumbler locks for all access panels requiring locks. Provide stainless steel fasteners for assembling ferrous and non-ferrous metals.

Q. Bolts, nuts, screws, washers, anchors and other devices required to complete the Work. Signage Contractor shall use the same basic metal or alloy as the metal fastened, and finish to match in color and texture. Use stainless steel 300 series alloy where used to join dissimilar materials.

R. All exposed fasteners to be 0.125 inch flathead stainless steel screws painted to match adjoining surfaces unless otherwise specified on drawings.

S. Pin-mount supports shall be 3/16” to 1” diameter painted threaded rods as appropriate.

T. Insulation /Material Isolation: Separate all ferrous and non-ferrous metals with non-conductive gaskets to prevent electrolysis. In addition to gaskets, provide stainless steel fasteners for some cases as required.

U. Welding Electrodes and Filler Metal
   1. Provide the alloy and type of welding electrodes and filler metal required for strength, workability, compatibility and color match after grinding smooth and finishing the fabricated product.

V. Applied interior vinyl graphics to be High Performance Cast Vinyl Sheeting, unless otherwise specified on Drawings. Applied exterior vinyl graphics to be High Performance Reflective Vinyl Sheeting, unless otherwise specified on Drawings.

W. Additional Material/Processes: For materials or processes described in the preceding list, the material and/or process as detailed in the design documents shall be used as the meet or exceed equivalent.

2.3 ELECTRICAL COMPONENTS

A. Electrical components must conform to applicable electrical codes and the following:
   1. All materials must be approved and listed by Underwriters Laboratories, Inc.
   2. Light Emitting Diode (LED) general lighting requirements:
      a. Provide sufficient LED wattage, quantities and spacing to ensure continuous, maximum illumination.
      b. Provide LED lighting prototypes to verify brightness and uniformity of lighting with designer.
   3. LED lighting component, color, and power requirements:
      a. Edge lighting – fabricated linear white LED's 24 VAC
      b. Back lighting – fabricated matrix white LED's 24 VAC
   4. Heavy duty, non-keyed, flush mounted, fused, or un-fused disconnects. Provide NEMA 1 for dry locations and proper enclosure for others.

B. Electrical Wiring and Equipment: Provide and install electrical materials such as ballasts, transformers, lamps, sockets, neon units, connectors, and all other equipment which shall be new and shall be approved by Underwriters Laboratories, Inc. The assembly of all components within the illuminated signs shall conform to all standards of Underwriters Laboratories, Inc. as published in the latest edition of "Standards for Sign Safety" and all illuminated signs shall bear the U.L. label. All wiring and equipment shall be concealed within the Sign structure.

C. Conduit and Devices: Provide rigid steel conduit, junction boxes and associated devices in accordance with applicable codes as required.

D. Wiring: Minimum #12 AWG copper shall be used. High tension wiring shall not be less than GTO 15 wire as manufactured by Carol Cable Company or approved equal. All wiring shall be AWM 90 0 centigrade 1000 volt TW/MTW U.L. file no. 18971. Wiring connectors for wire splicing shall be U.L. approved 1000 volt capacity and shall be Scotch Lock type Y or R or equal. All splices should be easily accessible for inspection and should be shown on Shop Drawings.

E. Disconnect Switch: All Signs or Sign components with electrical service shall be equipped with an approved external disconnect switch, flush mounted on the cabinet / Sign, with circuits and capacity to control all primary wiring within the Sign. Location of switch must be shown on Shop Drawings and is subject to approval.

F. Illumination: All signs with LED fixtures shall provide even, diffused, illumination without light leaks or hotspots. Signage Contractor shall provide any specification information required to verify performance. All fixtures shall be provided by the Signage Contractor. Signage Contractor shall provide waterproof flush access panel(s), which shall be concealed wherever possible. Conduit wiring and electrical equipment from the field electrical connection to any part of the sign and within the sign shall be provided by the Signage Contractor.

G. Ventilation: While maintaining a proper weather seal, Signage Contractor shall provide for sufficient ventilation of Sign components to prevent overheating or warping; allowing for color of sign, mounting surface, climate conditions, etc. In providing for ventilation, Signage Contractor shall protect sign from elements (rain, wind, debris, etc.) that might cause operational or cleaning problems. Signs / cabinets with light leaks will not be accepted. Signage Contractor shall utilize stainless steel bug mesh screen for integration with weep holes or vent / louvers on the Signs to prevent insect migration into illuminated Signs.

H. Exterior LED Display: Electronic Full Color LED Video Displays shall be Optec Displays Model: INF-MOD-2.9-RGB-V-S-S or equal. Electronic Full Color LED Video Displays MUST conform to FCC Title 47, Part 15, Class A. The LED displays MUST have the FCC Compliance statement sticker affixed to the exterior of the product. Upon request, LED display manufacturer MUST provide an accredited Third-party Testing Lab Certificate of Compliance for the LED display model quoted for this project. The LED displays MUST showcase the following statement on the exterior of the LED displays, as required by 47 CFR Section 15.19(a)(3): “This device complies with part 15 of the FCC Rules. Operation is subject to the following two Conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.”

1. Electronic LED Video Display Specifications: Electronic LED Video Displays MUST meet or exceed the minimum specifications described below.
   a. Optec Model: INF-MOD-2.9-RGB-V-S-S (INFINITY-SMD - OUTDOOR LED DISPLAY TECHNOLOGY) or approved equal.
   b. Pixel Pitch (Pixel Spacing): Center-to-Center pixel spacing MUST not exceed 2.9 mm (0.11 inch).
   c. LED Type: LED displays MUST use BLACK LEDs for higher contrast, clearer and more vivid image quality. Displays with White LEDs shall NOT be accepted.
   d. Pixel Configuration / Technology: Each pixel MUST be a 3-in-1 LEDs pixel with SMD / SMT Type Technology.
   e. Pixel Matrix: Each LED display MUST be no less than 840 pixels (High) x 336 pixels (Wide).
   f. Cabinet Design: LED display MUST be an Edge-to-Edge display. The display shall not have any borders. Pixels and LEDs MUST go all the way to the edges to utilize the entire available space for showing content. The cabinet size MUST be same as the actual viewing area or active display area.

2.4 TEMPORARY SIGNAGE

A. Moveable Concrete Sign Base: Provide the following, or other products as acceptable.

1. Telespar Concrete Sign Bases: Unistrut Midwest or approved equal, concrete sign bases with Unistrut Telespar galvanized sleeve and post integration. 2-inch 10 or 12 gauge. Perforated holes 7⁄16" spaced on 1" centers. Provide zinc-electroplated fittings, fasteners and accessories for splicing, extending and reinforcing.

2.5 FINISHING MATERIALS

A. Linear Polyurethane Coatings: Provide the following, or other products as acceptable.

1. Acrylic Linear Polyurethane enamel: Two components, acrylic aliphatic isocyanate /acrylic polyurethane having ultraviolet (UV) inhibitors and engineered for exterior application by Matthews Paint Company or approved equal.
2. Primer for Aluminum: Two-part component primer: One-coat Matthews 74-734 and 74-735 Metal Pretreat at. 25 mils dry film thickness or one-coat Matthews 74-793 Spray Bond at .15 to .25 mils dry film thickness or Wyandotte / AKZO Grip-Guard Wash Primer (2Afy-31284) with Grip-Guard Wash Primer Hardener (10AFK-31285) combined and applied per manufacturer’s specifications or approved equal (primer) for the application of the pre-approved and pre-formulated paint system.
3. Primer for Steel: Two-part component primer: One-coat Matthews 74-734 and 74-735 Metal Pretreat at .25 mils dry film thickness or Wyandotte / AKZO Grip-Guard Wash Primer (2Afy-31284) with Grip-Guard Wash Primer Hardener (10AFK-31285) combined and applied per manufacturer’s specifications or approved equal (primer) for the application of the pre- approved and pre-formulated paint system.
4. Clear Sealers: Crystal clear matte polyurethane sealers By Matthews Paint Co. or approved equal. Sealers are to resist rust and corrosion associated with exposure to salt air. As required and of highest quality available, applied per manufacturer’s specifications.

B. Anodized Aluminum Components / Panels: If required, Signage Contractor shall provide anodized (application of aluminum oxide film coating in clear or colored dye finish) aluminum panels or parts to match Executive Architect's color, grain, finish, and specifications.

C. Silk Screening Materials: Provide photo processed screening, arranged to furnish sharp and solid images without edge build up or bleeding of the coating. Pattern-cut screens may be used for non-repeat copy, provided that final image copy is equal to photoscreen quality. Provide only weather-resistant coating materials, compatible with the intended substrates. All silk-screened graphics are to be done with the finest screen size feasible for sharp, even reproduction.

D. Vinyl Die-Cut and Pattern Cut-out Graphics: Use Scotchcal Opaque and Translucent film and Scotchcal Diamond Grade VIP Reflective film manufactured by 3M where specified. Use pressure-sensitive, non-yellowing, non-peeling and weather resistant vinyl as specified. Use approved fonts and equipment as specified.

2.6 FABRICATION OF SIGNS AND SUPPORTS

A. General: Provide custom manufactured Sign assemblies, components completely fabricated and finished at factory before delivery to Project. Construct to accurate detail

and dimensions as shown and as review on approved Shop Drawings. Fit and assemble the Work at the shop and mark the components as required to facilitate assembly during installation. Exposed fasteners on finished faces will not be allowed, unless specifically indicated. Waviness and oil canning of surfaces is not acceptable. Minimum material thickness is to be 0.090 inches. Conceal wiring, conduct and other electrical items within sign enclosures.

B. Lettering: Cut and rout in a manner to produce true and clean edges and corners of finished letterforms. Letterforms having rounded positive or negative corners, nicked, cut, or ragged edges are not acceptable. Align letter forms to maintain a baseline parallel to the sign format. Maintain margins as indicated on the Drawings.

C. Seams and Joints: The Signage Contractor shall cut walls and floors carefully and neatly repair them in an acceptable manner. Signage Contractor shall consult the Architect of Record in cases where cutting into a structural portion of the building is required so that satisfactory reinforcement may be provided. Added joints shall be ground filled and finished flush and smooth with adjacent work. Such seams shall be invisible after final finish has been applied. Spot welded joints shall not be visible on exterior of signs after final finish has been applied. No gaps, light leaks, waves, or oil canning will be permitted in Work. If any of these are evident, the Signage Contractor will be required to correct its Work or construct a new Sign at its own expense.

D. Metal Signs and Supports: Fabricate exposed surfaces uniformly flat and smooth, without distortion, pitting, or other blemishes. Form exposed metal edges to a smooth radius. Permanently bond the laminated metal components and honeycomb core with adhesive or sealant in accordance with product manufacturer’s recommendations. Grind exposed welds and rough areas to make flush with adjacent smooth surfaces.

E. Welding: Make welds continuous. Comply with American Welding Society, Aluminum Association, and Copper Development Association standards for the type of metal used.

F. Fasteners: Use exposed fasteners only if shown on the Construction Documents. Perform drilling and tapping at shop.

G. Dissimilar Materials: Where metal surfaces will be in contact with dissimilar materials, coat the surfaces with epoxy paint or plate with zinc chromate, or provide other means of dielectric separation as recommended by manufacturer to prevent galvanic corrosion (i.e. Neoprene gasket as an isolation membrane)

H. Castings: Exposed surfaces shall be uniformly free from porosity and roughness. Edges shall be filled and ground smooth. Faces shall be chemically etched and mechanically polished for specified finish.

I. Galvanizing: Provide for steel components in exterior construction, and where noted in Drawings shall be galvanized. Complete the shop fabrication prior to application of the zinc coating. Remove mill scale and rust, clean and pickle the units as required for proper pretreatment of the surfaces.

J. Hardware: Provide all incidental hardware necessary for the proper functioning of signs. External hardware shall conform to the external appearance of the Sign.

K. Supports and Backing in Walls: Signage Contractor shall provide engineered Sign supports anchored to building structure where required and to meet requirements of applicable building codes. Support or backing requiring installation within the building

wall construction shall be immediately relayed to the Architect of Record and IHS for field coordination. Signage Contractor shall meet with the Contractor to review all requirements

L. Access Doors and Frames: Access doors and frames shall be flush with the material in which they occur, unless otherwise specified. Access doors and frames shall be provided upon prior written approval of the Architect. Each trade providing access doors and frames shall verify the need for fire rated doors on the Construction Drawings. Access doors in walls, partitions or ceilings shall bear UL fire rated labels of same fire rating. If access doors and frames are required to be exposed to view, they shall be chrome, brass, stainless steel, or other finish to match other finishes in the spaces in which they are to be installed, unless otherwise specified. Obtain IHS approval for location of each access door prior to placement.

2.7 SHOP APPLICATION OF SIGN FINISHES

A. Sign Graphics: Provide the letters, numerals, symbols, and other graphics markings, using the finish materials shown. Apply the graphics neatly, uniformly proportioned and spaced, and accurate within the dimensions indicated. Prepare the substrate surfaces and apply finish materials in accordance with manufacturers' instructions.

B. Metal Finishes: Remove scratches, abrasions, dents, and other blemishes before applying finish. Apply the following to the fabricated Work, with texture and reflectivity as required to match the Architect's sample.

C. Linear Polyurethane Finishes: Clean the surfaces as required for proper adhesion of coatings. Use 3M Co. "Scotch Brite" pads with cleanser and water, and/or chemically treat as recommended by paint manufacturer to remove deleterious film or residue.

D. Linear Polyurethane Paint: Provide pretreatment and primer in accordance with manufacturer's recommendation. Add ultraviolet inhibitors to paint subject to sunlight exposure.

E. Clear Linear Polyurethane Finish: Provide pretreatment, primer, and matte or semi-gloss finish coatings in accordance with manufacturer's recommendations. Apply 1.5 to 2.0 mils (0.0375 to 0.050 mm) dry film thickness.

2.8 GRAPHIC APPLICATION

A. Preparation: Surfaces to receive the graphic markings shall be clean, dry, and otherwise made ready for application of the materials. Accurately measure and lay out the required marking configurations as indicated on drawings.

B. Vinyl Die-cut and Pattern-cut Graphics: Use pressure sensitive, non-yellowing, non-peeling and weather resistant vinyl adhesive letters or images, custom flood coated as required, die cut from ScotchCal or ScotchLite as manufactured by 3M Company. Apply in strict accordance with manufacturer's instructions. Make uniformly smooth and free from bubbles, wrinkles, stretching and blemishes.

C. Painted or Silk-screened Graphics: All graphics shall be applied using photo processed screens from camera ready art, arranged to furnish sharp and solid images without build-up or bleeding of the coating. Comply with coating manufacturer's application instructions. Provide proper type of primer to suit each substrate and obtain a permanent bond. Verify compatibility of each substrate with the coatings to be used in

the Work. Apply the markings with neat edges, minimum 3 mils (0.075 mm) dry film thickness and as required to obtain solid markings without voids.

D. Acid-Etched Graphics and Typography: Acid-etched typography and graphic imagery must be an average of 1/16” deep, with clean, crisp, sharp edges; ragged or soft (polished out) edges will be rejected. Acid baths used for etching shall be fresh and used in an environment and temperature that will provide the highest quality etched images. Color fill as indicated by the S/P color and finish schedule, keeping inks and fills true to the edges of letterforms / graphics.

PART 3 - EXECUTION

3.1 VERIFICATION OF CONDITIONS

A. Inspect all surfaces to receive signage and report all defects that would interfere with signage installation.

B. Starting Work implies acceptance of surfaces as satisfactory.

C. Verify all conditions and sign dimensions in field. Contractor to review and study architectural, landscape, lighting, electrical and related plans to ensure that all proposed signs can be installed and supported. Verification of conditions and sign dimensions to be completed prior to sign fabrication and reviewed with the architect.

3.2 DEMOLITION

A. Existing signage to be removed and responsibly disposed of.

B. Installation of new signage to be installed immediately after any demolition.

C. Temporary signage, if necessary, is to conform with Contact Drawings for temporary signage.

D. Unused data and/or electrical feeds to be coordinated with IHS for proper terminations.

E. Any surfaces damaged should be repaired and painted/patched to match adjacent surface.

F. Concrete and floor surfaces to be repaired in coordination with the IHS.

3.3 INSTALLATION

A. Install signage upon acceptance by IHS of material and substantial completion of job site area to receive such materials.

B. Special Precautions: Guard against damaging existing pavements and planting where signage is to be installed.

C. Footings beneath topping surface shall be installed and located prior to top surface installation.

D. Prior to installation, check all components, nuts, bolts, and other connections for proper alignment, fit and any damage. Replace damaged or defective components.

E. Prior to installation, confirm all electrical locations and requirements with IHS.

3.4 CLEAN UP

A. Keep areas of work clean, neat, and orderly at all times. Clean surfaces, inside and out. Use approved cleaners, if necessary, to remove dirt.

B. Protective coverings and strippable films shall be removed at a time that will afford the greatest protection of the furniture. Surfaces shall be cleaned to remove excess glazing and sealant compounds, dirt, and other substances.

C. Upon completion of work and before final acceptance, remove tools, surplus materials, apparatus, and debris from the site. Leave the site in a neat, clean condition, acceptable to the Engineer. Wash, clean, and leave paved areas without stains.

3.5 FINAL INSPECTION AND ACCEPTANCE

A. Upon completion of work, IHS will perform a final inspection for acceptance.

B. All unused mock-ups and unused submittals shall be removed from site prior to final acceptance.

C. Submit operation manuals, tools, and keys as specified in this Section.

END OF SECTION

SECTION 101400.01 – IDENTIFYING DEVICES – WWTP

PART 1 - GENERAL

1.1 WORK INCLUDED

A. This section covers the work necessary to furnish and install, complete, the identifying devices. This includes all identification, information, emergency, warning, and hazardous material signs and their mounting requirements for the Hospital WWTP and the Hon-Dah WWTP.

1.2 GENERAL

A. Like items of materials specified hereunder shall be the end products of one manufacturer to achieve standardization for appearance, maintenance, and replacement.

B. See GENERAL CONDITIONS and Division 01, GENERAL REQUIREMENTS, which contain information and requirements that apply to the work specified herein and are mandatory for this project.

C. Signs shall be furnished and erected at the locations shown or specified herein, complete with all hardware and accessories.

D. All signs required by this section shall be provided by manufacturing firms regularly engaged in the production of signs of this type. Lettering and graphics shall be clean, neatly aligned and highly legible. Signs with rough edges, flaws, misaligned letters or other indications of poor workmanship will be rejected.

1.3 SUBMITTALS

A. Submittals shall be made in accordance with Section 013300, SUBMITTAL PROCEDURES. In addition, the following specific information shall be provided:
   1. Shop Drawings: Provide drawings and manufacturer's literature showing layouts, dimensions, letter sizes and styles, colors, and mounting details.
   2. Layout and installation details.

PART 2 - PRODUCTS

2.1 GENERAL

A. The use of a manufacturer's name and model or catalog number is for establishing the standard of quality and general configuration desired only. Products of other manufacturers will be considered in accordance with the General Conditions.

2.2 SIGNS

A. Safety (Warning) Signs (Type A):
   1. Baked enamel finished 20-gauge (minimum) steel or 18-gauge (minimum) aluminum signs, as manufactured by Seton Corporation; Nutheme Safety Signs and Labels; or equal. Provide reflective signs for outdoor locations and non-reflective signs for interior locations.
   2. Text, colors, and sizes as indicated on the Safety Sign Schedule hereinafter and conforming to OSHA requirements.

B. Safety Sign Schedule: See schedule below for sign details. Detail number refers to the Standard Details shown on the Drawings.

SAFETY SIGN TYPE	DETAIL NUMBER	TEXT	QUANTITY
CAUTION	10136	HEARING PROTECTION REQUIRED IN THIS ROOM	1 each WWTP - blower room door
WARNING	10134	THIS EQUIPMENT STARTS AND STOPS AUTOMATICALLY	Min 10 each WWTP - equipment that is started remotely or automatically
WARNING	10134	CONFINED SPACE ENTRY BY PERMIT ONLY	1 each WWTP - access hatche to IPS wet well
WARNING	10134	CONFINED SPACE – CONFINED SPACE ENTRY PROTOCOL APPLIES	10 min each WWTP - access hatches to vaults, basins, tanks
CAUTION	10136	NONPOTABLE WATER - NOT FOR DRINKING	15 min each WWTP - hose valves or hose bibs
CAUTION	10136	EYE PROTECTION REQUIRED	3 min each WWTP - chemical feed storage and pumps, UV system

C. Informational Signs (Type B):
   1. Exterior: Laminated plastic subsurface image type, 3/16-inch thick with high-gloss finish.
   2. Interior: Plastic, 1/8-inch thick with nondirectional matte finish and engraved letters.Red background with white lettering.

D. Informational Sign Schedule: See schedule below for sign details.

QUANTITY AND LOCATION	SIZE	TEXT
1 each WWTP - Wall Mount Above Caustic Fill Line	3” x 6”	SODIUM HYDROXIDE (CAUSTIC) FILL LINE
1 each WWTP - Wall Mount Above Alum Fill Line	3” x 6”	ALUMINUM SULFATE (ALUM) FILL LINE
1 each WWTP - Wall Mount Above Micro C Fill Line	3” x 6”	MICRO C FILL LINE

E. Special Safety and Equipment Signs (Type C): Special safety and equipment signs shall be 14-inch by 10-inch by 1/8-inch aluminum or plastic plate; Seton Corporation; Nutheme Safety Signs and Labels; or equal. Suitable for interior and exterior locations. Signs shall have white engraved lettering on non-fade green background or red engraved lettering on non-fade white background, per manufacturer’s recommendations. The following signs shall be provided, titled as indicated. Letter height shall be a minimum of 3/4-inches.

LOCATION	TEXT	QUANTITY
Above storage cabinet in chemical area	“RESPIRATOR”	As Required
Above personal protective equipment cabinet in chemical area	“PERSONAL PROTECTIVE EQUIPMENT”	As Required
Above all first aid cabinets	“FIRST AID KIT”	As Required
Above all hearing protection cabinets	“EAR PROTECTION”	As Required
Above eyewash station in chemical areas	“EYE WASH STATION, KEEP AREA CLEAR”	As Required
At all combination shower/eyewash stations	“SAFETY SHOWER, KEEP AREA CLEAR”	As Required
Floor mount signs, on floor below shower	“SAFETY SHOWER, KEEP AREA CLEAR”	As Required

F. Hazardous Material Signs (Type D): Hazardous material signs shall be designed and installed to meet all local building and fire code requirements. Hazardous material signs shall meet the requirements of the National Fire Protection Association (NFPA) Standard 704. Signs shall be designed for exterior use. Signs shall be self-adhesive vinyl for application on any tanks or shall be mechanically attached aluminum or plastic for use on doors or walls, with NFPA colored background and black numerals. They shall be minimum 5-inch square diamond style with 2-inch high numerals. Signs shall be Seton Corporation “Custom NFPA Signs”, Style No. TB0013; or approved equal. Also provide two hazardous material information signs with NFPA diamond explaining the NFPA rating and color bar system graphically, 10-inch by 14-inch minimum size aluminum, Seton Corporation Style 62654, or approved equal. Custom NFPA hazardous material signs shall be as follows

DESCRIPTION	HAZARD RATING NUMBER	LOCATION
Sodium Hydroxide (Caustic)	Health “3" Fire “0" Instability “0"	Hospital WWTP: (1) NAOH Storage Tank, (3) NAOH Chemical Feed Skids, (1) on Chemical Room door. Hon-Dah WWTP: (1) NAOH Storage Tank, (2) NAOH Chemical Feed Skids, (1) on Chemical Room door.

DESCRIPTION	HAZARD RATING NUMBER	LOCATION
Sodium Hypochlorite (Hypo)	Health “3” Fire “0” Instability “1”	Hospital WWTP: (3) NAOCL Chemical Feed Skids, (1) on Chemical Room door. Hon-Dah WWTP: (3) NAOCL Chemical Feed Skids, (1) on Chemical Room door.
Aluminum Sulfate (Alum)	Health “1” Fire “0” Instability “0”	Hospital WWTP: (1) AL Storage Tank, (3) AL Chemical Feed Skids, (1) on Chemical Room door. Hon-Dah WWTP: (1) AL Storage Tank, (2) AL Chemical Feed Skids, (1) on Chemical Room door.

2.3 IDENTIFICATION LABELS

A. Piping identification labels shall be provided as specified in Section 400205, PIPING SCHEDULE-WWTP.

B. Equipment Labels: Equipment labels shall contain black lettering on a yellow or orange background. The labels shall be 2 inches minimum and 4 inches maximum high by 8 inches minimum and 12 inches maximum long. The lettering shall be bold face and 3/4-inch minimum high. The label shall be plastic or aluminum material, minimum 1/16-inch thickness, that is suitable for use on wet, oily, exposed, abrasive, and corrosive areas. Alternatively, the labels may be fiberglass with fiberglass encased lettering. Leave a 1-inch margin on each end of the label for mounting. Fiberglass labels shall be grommeted at each end for mounting. All labels shall have the same size base dimensions. The label wording shall be as shown hereinafter. The labels shall be Style No. AV0175 by Seton Corporation; equivalent as manufactured by Brady Worldwide Inc.; or equal.

C. Identification Label Schedule (Equipment Labels): All equipment shall be labelled according to the P&ID name call-outs on the Drawings.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store materials in manufacturer's original, unopened, undamaged containers. Protect materials from moisture and dust by storing in clean, dry, location remote from construction operations area.

B. Handle materials in such a manner as to prevent damage to products or finishes.

3.2 INSTALLATION

A. Installation of identifying devices shall be as recommended by the manufacturer and located in accordance with the Drawings, as specified herein, or as directed by the Engineer and/or the Owner’s representative. Contractor shall furnish such incidental materials and labor as required for proper, secure mounting that is level and plumb.

B. Use manufacturer's installation templates and attachment devices. Install signs after doors and other substrate surfaces are finished.

C. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer. Maintain this minimum temperature during and after installation of signs using adhesive.

3.3 SIGNS

A. General: Locate and securely mount signs where indicated on Drawings, or specified hereinbefore and/or hereinafter. Fasten to walls or posts with stainless steel screws or other fasteners.

B. Safety Signs:

1. Install safety signs on steel or aluminum posts, walls, doors, piping, or equipment in a location that will allow high visibility but a minimum restriction of the working area around walkways and equipment. Signs shall be installed without damaging structures or equipment such that they are removable with ordinary hand tools without leaving scars on the structure or equipment. Fasteners shall be stainless steel.
2. Install signs with the legend STARTS AND STOPS AUTOMATICALLY near equipment and motors that are remote or automatically controlled. Install NONPOTABLE WATER - NOT FOR DRINKING signs near each indoor and outdoor hose valve or hose bibb. Install other safety signs as directed by the Engineer or Owner's representative. Obtain the approval of the Engineer for the location of each sign and the mounting method to be used before installation.
3. Where appropriate, mount each sign on a 2-inch diameter galvanized steel pipe post using two 1/4-inch aluminum or stainless steel bolts. Install facing foot traffic at locations and in manner indicated on Drawings or in ANSI D6.1.

3.4 EQUIPMENT LABELS

A. Install the equipment labels on the equipment or concrete equipment base. The labels shall be securely fastened to the equipment or base with 1/8- to 1/4-inch diameter stainless steel bolts or anchor bolts. The nameplate anchors shall be readily removable and replaceable with a wrench, pliers, or screwdriver.

3.5 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to the manufacturer's written instructions. Protect signs from damage until final acceptance by the Owner.

END OF SECTION

SECTION 102113.14 - STAINLESS STEEL TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Stainless steel toilet compartments.

1.2 COORDINATION

A. Coordinate requirements for blocking, reinforcing, and other supports concealed within wall to ensure that toilet compartments can be supported and installed as indicated.

1.3 ACTION SUBMITTALS

A. Product Data: Stainless steel toilet compartments.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

B. Shop Drawings:
   1. Include plans, elevations, sections, details, and attachment details.
   2. Show locations of cutouts for compartment-mounted toilet accessories.
   3. Show locations of reinforcements for compartment-mounted grab bars and locations of blocking for surface-mounted toilet accessories.
   4. Show locations of centerlines of toilet fixtures.
   5. Show locations of floor drains.

C. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available finishes for each type of toilet compartment.
   1. Include Samples of hardware and accessories involving material and color selection.

D. Samples for Verification: Actual sample of finished products for each type of toilet compartment, hardware, and accessory.
   1. Size: Manufacturers' standard size.

E. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.

F. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For toilet compartments.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Door Hinges: One hinge(s) with associated fasteners.
   2. Latch and Keeper: One latch(es) and keeper(s) with associated fasteners.
   3. Door Bumper: One door bumper(s) with associated fasteners.
   4. Door Pull: One door pull(s) with associated fasteners.
   5. Fasteners: 10 fasteners of each size and type.

1.6 FIELD CONDITIONS

A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements, and coordinate before fabrication.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain stainless steel toilet compartments from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: 25 or less.
   2. Smoke-Developed Index: 450 or less.

C. Structural Performance: Where grab bars are mounted on toilet compartments, design panels to comply with the following requirements:
   1. Panels are able to withstand a concentrated load on grab bar of at least 250 lbf applied at any direction and at any point, without deformation of panel.

D. Regulatory Requirements: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1 for toilet compartments designated as accessible.

2.3 STAINLESS STEEL TOILET COMPARTMENTS

A. Toilet-Enclosure Style: Overhead braced, floor anchored.

B. Urinal-Screen Style: Wall hung with integral flanges.

C. Door, Panel, and Pilaster Construction: Seamless, metal facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed welds ground smooth. Provide with no-sightline system consisting of a full-height continuous stop on latch side of door and full-height continuous filler strip on hinge side of door (unless continuous hinge is used). Exposed surfaces shall be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.
   1. Core Material: Manufacturer's standard sound-deadening honeycomb of resin-impregnated kraft paper in thickness required to provide finished thickness of 1 inch for doors and panels and 1-1/4 inches for pilasters.
   2. Grab-Bar Reinforcement: Provide concealed internal reinforcement for grab bars mounted on units of size and material adequate for panel to withstand specified structural performance requirements.
   3. Tapping Reinforcement: Provide concealed reinforcement for tapping (threading) at locations where machine screws are used for attaching items to units.
   4. Metal Facing Sheets: Type 304, No. 4 brushed stainless steel.

D. Urinal-Screen Construction:
   1. Integral-Flange, Wall-Hung Urinal Screen: Similar to panel construction, with integral full-height flanges for wall attachment, and maximum 1-1/4 inches thick.

E. Facing Sheets and Closures: Stainless steel sheet of nominal thicknesses as follows:
   1. Pilasters, Braced at Both Ends: Manufacturer's standard thickness, but not less than 0.038 inch.
   2. Panels: Manufacturer's standard thickness, but not less than 0.031 inch.
   3. Doors: Manufacturer's standard thickness, but not less than 0.031 inch.
   4. Integral-Flange, Wall-Hung Urinal Screens: Manufacturer's standard thickness, but not less than 0.031 inch.

F. Pilaster Shoes: Formed from stainless steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finished to match hardware.

G. Pilaster Sleeves (Caps): Formed from stainless steel sheet, not less than 0.031-inch nominal thickness and 3 inches high, finished to match hardware.

H. Brackets (Fittings):
   1. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

I. Stainless Steel Finish: Directional Satin Finish: ASTM A480/A480M, No. 4 on exposed faces. Protect exposed surfaces from damage by application of strippable, temporary protective covering before shipment.

2.4 HARDWARE AND ACCESSORIES

A. Door Hardware and Accessories, Heavy Duty: Manufacturer's heavy-duty institutional operating hardware and accessories.
   1. Hinges: Manufacturer's minimum 0.062-inch- thick, stainless steel continuous, spring-loaded type, allowing emergency access by lifting door. Mount with through bolts.
   2. Latch and Keeper: Manufacturer's heavy-duty, surface-mounted, cast stainless steel latch unit designed to resist damage due to slamming, with combination rubber-faced door strike and keeper, and with provision for emergency access. Provide units that comply with regulatory requirements for accessibility at toilet enclosures designated as accessible. Mount with through bolts.
   3. Coat Hook: Manufacturer's heavy-duty, combination cast stainless steel hook and rubber-tipped bumper, sized to prevent inswinging door from hitting compartment-mounted accessories. Mount with through bolts.
   4. Door Bumper: Manufacturer's heavy-duty, rubber-tipped, cast stainless steel bumper at outswinging doors. Mount with through bolts.
   5. Door Pull: Manufacturer's heavy-duty, cast stainless steel pull at outswinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at toilet enclosures designated as accessible. Mount with through bolts.

B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.

C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel anchors compatible with related materials.

2.5 MATERIALS

A. Aluminum Castings: ASTM B26/B26M.

B. Aluminum Extrusions: ASTM B221.

C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.

D. Stainless Steel Castings: ASTM A743/A743M.

2.6 FABRICATION

A. Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories and solid blocking within panel where required for attachment of toilet accessories.

B. Overhead-Braced Units: Manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

C. Door Size and Swings: Unless otherwise indicated, provide 24-inch- wide inswinging doors for standard toilet enclosures and 36-inch- wide outswinging doors with a minimum 32-inch- wide clear opening for toilet enclosures designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
   1. Confirm location and adequacy of blocking and supports required for installation.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
   1. Maximum Clearances:
      a. Pilasters and Panels or Screens: 1/2 inch.
      b. Panels or Screens and Walls: 1 inch.
   2. Full-Height (Continuous) Brackets: Secure panels or screens to walls and to pilasters with full-height brackets.
      a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
      b. Align brackets at pilasters with brackets at walls.

B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware in accordance with hardware manufacturer's written instructions for proper operation. Set hinges on inswinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors to return doors to fully closed position.

END OF SECTION

SECTION 102123 - CUBICLE CURTAINS AND TRACK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cubicle-curtain support systems.
   2. Cubicle curtains.

1.2 ACTION SUBMITTALS

A. Product Data Submittals: For each product.
   1. For each type of curtain fabric indicated, include durability, laundry temperature limits, fade resistance, applied curtain treatments, and fire-test-response characteristics.

B. Shop Drawings: For curtains and tracks.
   1. Show layout and types of cubicles, sizes of curtains, number of carriers, anchorage details, and conditions requiring accessories. Indicate dimensions taken from field measurements.
   2. Include details of blocking for track support.

C. Samples for Initial Selection: For each type of curtain material indicated.

D. Samples for Verification: For each type of product required, prepared on Samples of size indicated below:
   1. Curtain Fabric: Not less than 10 inches square and showing complete pattern repeat, from dye lot used for the Work, with specified treatments applied. Mark top and face of material.
   2. Mesh Top: Not less than 10 inches square.
   3. Curtain Track: Not less than 10 inches long.
   4. Curtain Carrier: Full-size unit.

E. Product Schedule: For curtains and tracks. Use same designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For curtains, tracks, and hardware to include in operation and maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Curtain Carriers and Track End Caps: Full-size units equal to 3 percent of amount installed for each size indicated, but no fewer than 10 units.
   2. Curtains: Full-size units equal to 10 percent of amount installed for each size indicated, but no fewer than two units.

1.5 MOCKUPS

A. Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Build mockup of typical cubicle.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Cubicle Curtains: Provide curtain fabrics with the following characteristics:
   1. Flame Resistance: Provide fabrics identical to those that have passed NFPA 701 when tested by a qualified testing agency acceptable to authorities having jurisdiction.
      a. Identify fabrics with appropriate markings of a qualified testing agency.

2.2 CUBICLE-CURTAIN SUPPORT SYSTEMS

A. Extruded-Aluminum Curtain Track: Not less than 1-1/4 inches wide by 3/4 inch high.
   1. Track Minimum Wall Thickness: Manufacturer's standard.
   2. Curved Track: Factory-fabricated, 12-inch- radius bends.
   3. Finish: Clear anodized.

B. Curtain-Track Mounting: As indicated on Drawings.

C. Curtain-Track Accessories: Fabricate splices, end caps, connectors, end stops, coupling and joining sleeves, wall flanges, brackets, ceiling clips, and other accessories from same material and with same finish as track.
   1. End Stop: Removable with carrier hook.
   2. Switch Unit: Shuttle and coupling device for rerouting and securing cubicle curtain, with pull chain for switching track.

D. Curtain Roller Carriers: Two nylon rollers and nylon axle with aluminum hook.

E. Exposed Fasteners: Stainless steel.

F. Concealed Fasteners: Stainless steel.

2.3 CUBICLE CURTAINS

A. Fabric: Curtain manufacturer's standard, 100 percent polyester; inherently and permanently flame resistant, stain resistant, and antimicrobial.

B. Curtain Grommets: Two-piece, rolled-edge, rustproof, nickel-plated brass; spaced not more than 6 inches o.c.; machined into top hem.

C. Mesh Top: Not less than 22-inch- high mesh top.
   1. Mesh: No. 50 nylon mesh.

D. Snap Attachments: Provide manufacturer's standard nickel-plated brass snap attachments for modular panels.

E. Curtain Tieback: Nickel-plated brass chain; one at each curtain termination.

2.4 CURTAIN FABRICATION

A. Modular Curtain Panels:

1. Fabric Panels: 48 inches wide. Fabricate panels in quantity required to provide assembled curtains equal to track lengths plus 10 percent added fullness, but not less than 12 inches added fullness.
   a. Top Hem: Not less than 1 inch and not more than 1-1/2 inches wide, triple thickness, reinforced with integral web, double lockstitched, and with snap attachments to attach panels to mesh top.
   b. Side Hems: Not less than 1/2 inch and not more than 1-1/4 inches wide, with double turned edges, single lockstitched, and with snap attachments to attach one panel to another.
2. Length: Equal to floor-to-ceiling height, minus depth of track and carrier at top, and minus clearance above the finished floor of As indicated on Drawings.
3. Mesh Top: Top hem of mesh not less than 1 inch and not more than 1-1/2 inches wide, triple thickness, reinforced with integral web, and double lockstitched.
   a. Type: Modular, matching width of modular fabric panels with snap attachments at side hems of mesh-top panels.
4. Vertical Seams: Not less than 1/2 inch wide, double turned and double stitched.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install tracks level and plumb, according to manufacturer's written instructions.

B. For tracks of up to 20 feet in length, provide track fabricated from single, continuous length.
   1. Curtain-Track Mounting: As indicated on Drawings.

C. Surface-Track Mounting: Fasten tracks to ceilings at intervals recommended by manufacturer. Fasten tracks to structure at each splice and tangent point of each corner. Center fasteners in track to ensure unencumbered carrier operation. Attach track to ceiling as follows:
   1. Unless otherwise indicated, mechanically fasten to furring through suspended ceiling with screw and tube spacer.

D. Track Accessories: Install splices, end caps, connectors, end stops, coupling and joining sleeves, and other accessories as required for a secure and operational installation.
   1. Provide one locking switch unit for each pair of beds.
   2. Provide one hinged loading unit for each bed.

E. Curtain Carriers: Provide curtain carriers adequate for 6-inch spacing along full length of curtain plus an additional carrier.

F. Cubicle Curtains: Hang curtains on each curtain track. Secure with curtain tieback.

END OF SECTION

SECTION 102239 - FOLDING PANEL PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Operable acoustical panel partitions.

B. Related Sections:
   1. Section 013573 - Delegated Design Requirements and Procedures.

1.2 DEFINITIONS

A. NIC: Noise Isolation Class.

B. NRC: Noise Reduction Coefficient.

C. STC: Sound Transmission Class.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data:
   1. Operable acoustical panel partitions.

B. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and pre-consumer recycled content and cost.
   2. Product Data: Product Data: Environmental Product Declaration (EPD).
   3. Product Data: Material Ingredient Documentation.
   4. Product Data: for wall panel products indicating compliance with General Emissions Evaluation.
   5. Product Data: For insulation products indicating compliance with General Emissions Evaluation.
   6. Product Data: For adhesives, sealants, and coatings indicating compliance with General Emissions Evaluation and VOC content requirements.
   7. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For operable panel partitions.
   1. Include plans, elevations, sections, attachment details, and numbered panel installation sequence.
   2. Indicate stacking and operating clearances. Indicate location and installation requirements for hardware and track, blocking, and direction of travel.

D. Samples for Initial Selection: For each type of exposed material, finish, covering, or facing.
   1. Include Samples of accessories involving color selection.

E. Samples for Verification: For each type of exposed material, finish, covering, or facing, prepared on Samples of size indicated below:

1. Textile Facing Material: Full width by not less than 36-inch- long section of fabric from dye lot to be used for the Work, with specified treatments applied. Show complete pattern repeat.
2. Panel Edge Material: Not less than 3 inches long.
3. Hardware: One of each exposed door-operating device.

F. Delegated Design Submittals: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
1. Provide delegated design submittals for:
a. Operable panel partitions.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Partition track, track supports and bracing, switches, turning space, and storage layout.
2. Suspended ceiling components.
3. Structural members to which suspension systems will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Items penetrating finished ceiling including the following:
a. Lighting fixtures.
b. HVAC ductwork, outlets, and inlets.
c. Speakers.
d. Sprinklers.
e. Smoke detectors.
f. Access panels.
6. Plenum fire, smoke, and acoustical barriers.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For operable panel partitions to include in maintenance manuals.
1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
a. Panel finish facings and finishes for exposed trim and accessories. Include precautions for cleaning materials and methods that could be detrimental to finishes and performance.
b. Seals, hardware, track, track switches, carriers, and other operating components.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same production run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Panel Finish-Facing Material: Furnish full width in quantity to cover both sides of two panels when installed.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Provide the following upon request:
   1. Setting Drawings: For embedded items and cutouts required in other work, including support-beam, mounting-hole template.
   2. Qualification Data: For Installerand testing agency.
   3. Product Certificates: For each type of operable panel partition.
      a. Include approval letter signed by manufacturer acknowledging Owner-furnished panel facing material complies with requirements.
   4. Product Test Reports: For each operable panel partition, for tests performed by a qualified testing agency.
   5. Field quality-control reports.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Protectively package and sequence panels in order for installation. Clearly mark packages and panels with numbering system used on Shop Drawings. Do not use permanent markings on panels.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of operable panel partitions that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Faulty operation of operable panel partitions.
      b. Deterioration of metals, metal finishes, and other materials beyond normal use.
   2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design seismic bracing of tracks to structure above.
   1. Material properties indicated in this Section shall be considered as minimum properties.

B. Seismic Performance: Operable panel partitions are to withstand the effects of earthquake motions determined in accordance with ASCE/SEI 7.
   1. The term "withstand" means "the partition panels will remain in place without separation of any parts when subjected to the seismic forces specified."

C. Acoustical Performance: Provide operable panel partitions tested by a qualified testing agency for the following acoustical properties in accordance with test methods indicated:
   1. Sound-Transmission Requirements: Operable panel partition assembly tested for laboratory sound-transmission loss performance in accordance with ASTM E90, determined by ASTM E413, and rated for not less than the STC indicated.

2. Noise-Reduction Requirements: Operable panel partition assembly, identical to partition tested for STC, tested for sound-absorption performance in accordance with ASTM C423, and rated for not less than the NRC indicated.
3. Noise-Isolation Requirements: Installed operable panel partition assembly, identical to partition tested for STC, tested for NIC in accordance with ASTM E336, determined by ASTM E413, and rated for 10 dB less than STC value indicated.

D. Fire-Test-Response Characteristics: Provide panels with finishes complying with one of the following as determined by testing identical products by a testing and inspecting agency acceptable to authorities having jurisdiction:
1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 450 or less.
2. Fire Growth Contribution: Complying with acceptance criteria of local code and authorities having jurisdiction when tested in accordance with NFPA 265 Method B Protocol or NFPA 286.

2.2 OPERABLE ACOUSTICAL PANEL PARTITIONS

A. Operable Acoustical Panel Partitions : Partition system, including panels, seals, finish facing, suspension system, operators, and accessories.

B. Panel Operation: Manually operated, continuously hinged panels.

C. Panel Construction: As required to support panel from suspension components and with reinforcement for hardware attachment. Fabricate panels with tight hairline joints and concealed fasteners. Fabricate panels so finished in-place partition is rigid; level; plumb; aligned, with tight joints and uniform appearance; and free of bow, warp, twist, deformation, and surface and finish irregularities.

D. Dimensions: Fabricate operable acoustical panel partitions to form an assembled system of dimensions indicated and verified by field measurements.
1. Panel Width: Standard widths.

E. STC: Not less than 38.

F. NRC: Not less than 0.50.

G. Panel Materials:
1. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
2. Environmental Product Declaration: Provide Type III Industry-Wide Environmental Product Declaration with external verification in the manufacture is recognized as a participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that has a cradle to gate scope.
3. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

4. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
5. Adhesives: Do not use adhesives that contain urea formaldehyde.
6. Steel Frame: Steel sheet, manufacturer's standard nominal minimum thickness for uncoated steel.
7. Steel Face/Liner Sheets: Tension-leveled steel sheet, manufacturer's standard minimum nominal thickness for uncoated steel.
8. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use, corrosion resistance, and finish indicated; ASTM B221 for extrusions; manufacturer's standard strengths and thicknesses for type of use.
   a. Frame Reinforcement: Manufacturer's standard steel or aluminum.

H. Panel Closure: Manufacturer's standard unless otherwise indicated.
1. Initial Closure: Resilient, bulb-shaped acoustical seal.
2. Final Closure: Constant-force, lever-operated mechanical closure expanding from panel edge to create a constant-pressure acoustical seal.

I. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.
1. Hinges: Manufacturer's standard.

J. Finish Facing: Fabric wall covering.

2.3 SEALS

A. Description: Seals that produce operable panel partitions complying with performance requirements and the following:
1. Manufacturer's standard seals unless otherwise indicated.
2. Seals made from materials and in profiles that minimize sound leakage.
3. Seals fitting tight at contact surfaces and sealing continuously between adjacent panels and between operable panel partition perimeter and adjacent surfaces, when operable panel partition is extended and closed.

B. Vertical Seals: Deep-nesting, interlocking astragals mounted on each edge of panel, with continuous, resilient acoustical seal.

C. Horizontal Top Seals: Continuous-contact, resilient seal exerting uniform constant pressure on track.

D. Horizontal Bottom Seals:
1. Resilient, mechanical, retractable, constant-force-contact seal exerting uniform constant pressure on floor when extended, ensuring horizontal and vertical sealing and resisting panel movement.
   a. Mechanically Operated for Acoustical Panels: Extension and retraction of bottom seal by operating handle or built-in operating mechanism, with operating range not less than 2 inches between retracted seal and floor finish.

2.4 PANEL FINISH FACINGS

A. Description: Finish facings for panels that comply with indicated fire-test-response characteristics and that are factory applied to operable panel partitions with appropriate backing, using mildew-resistant nonstaining adhesive as recommended by facing manufacturer's written instructions.
   1. Apply one-piece, seamless facings free of air bubbles, wrinkles, blisters, and other defects, with no gaps or overlaps. Horizontal seams are not permitted. Tightly secure and conceal raw and selvage edges of facing for finished appearance.
   2. Where facings with directional or repeating patterns or directional weave are indicated, mark facing top and attach facing in same direction.
   3. Match facing pattern 72 inches above finished floor.

B. Fabric Wall Covering: Manufacturer's standard fabric, from same dye lot, treated to resist stains.
   1. Color/Pattern: Match Architect's samples.

C. Cap-Trimmed Edges: Protective perimeter-edge trim with tight hairline joints concealing edges of panel and finish facing, finished as follows:
   1. Aluminum: Finished with manufacturer's standard clear anodic finish.

2.5 SUSPENSION SYSTEMS

A. Tracks: Steel or aluminum mounted directly to overhead structural support, designed for operation, size, and weight of operable panel partition indicated. Size track to support partition operation and storage without damage to suspension system, operable panel partitions, or adjacent construction. Limit track deflection to no more than 0.10 inch between bracket supports. Provide a continuous system of track sections and accessories to accommodate configuration and layout indicated for partition operation and storage.
   1. Panel Guide: Aluminum guide on both sides of the track to facilitate straightening of the panels; finished with factory-applied, decorative, protective finish.
   2. Head Closure Trim: As required for acoustical performance; with factory-applied, decorative, protective finish.

B. Carriers: Trolley system as required for configuration type, size, and weight of partition and for easy operation; with ball-bearing wheels.

C. Track Intersections, Switches, and Accessories: As required for operation, storage, track configuration, and layout indicated for operable panel partitions, and compatible with partition assembly specified. Fabricate track intersections and switches from steel or aluminum.
   1. Center carrier stop.

D. Aluminum Finish: Mill finish or manufacturer's standard, factory-applied, decorative finish unless otherwise indicated.

E. Steel Finish: Manufacturer's standard, factory-applied, corrosion-resistant, protective coating unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine flooring, floor levelness, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable panel partitions.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF OPERABLE PANEL PARTITIONS

A. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed in area of partition installation.

B. Install panels in numbered sequence indicated on Shop Drawings.

C. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.

D. Broken, cracked, deformed, or unmatched gasketing or gasketing with gaps at butted ends is not acceptable.

E. Light-Leakage Test: Illuminate one side of partition installation and observe vertical joints and top and bottom seals for voids. Adjust partitions for alignment and full closure of vertical joints and full closure along top and bottom seals. Perform test and make adjustments before NIC testing.

3.3 FIELD QUALITY CONTROL

A. NIC Testing: Owner will engage through the Contractor a qualified testing agency to perform tests and inspections.
   1. Testing Extent: Testing agency is to randomly select one operable panel partition installation(s) for testing.
   2. Testing Methodology: Perform testing of installed operable panel partition for noise isolation in accordance with ASTM E336, determined by ASTM E413, and rated for not less than NIC indicated. Adjust and fit partitions to comply with NIC test method requirements.

B. An operable panel partition installation will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjust operable panel partitions, hardware, and other moving parts to function smoothly, and lubricate as recommended by manufacturer.

B. Adjust to operate smoothly and easily, without binding or warping.

C. Verify that safety devices are properly functioning.

3.5 MAINTENANCE SERVICE

A. Maintenance Service: Beginning at Substantial Completion, maintenance service is to include 12 months' full maintenance by manufacturer's authorized service representative. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operable-partition operation. Parts and supplies are to be manufacturer's authorized replacement parts and supplies.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain operable panel partitions.

END OF SECTION

SECTION 102600 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wall guards.
   2. Impact-resistant handrails.
   3. Corner guards.
   4. End-wall guards.
   5. Abuse-resistant wall coverings.
   6. Flexible Wallcovering Sheet Protection

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.

B. Sustainable Design Submittals:
   1. Product Data: Environmental Product Declaration (EPD).
   2. Product Data: Material Ingredient Documentation.
   3. Product Data: For adhesives, indicating VOC content.
   4. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
   5. Laboratory Test Reports:Indicating compliance with General Emissions Evaluation

C. Shop Drawings: For each type of wall and door protection showing locations and extent.
   1. Include plans, elevations, sections, and attachment details. Show handrail design and support spacing required to withstand structural loads.
   2. Include drawing and locations for each custom graphic wall protection

D. Samples for Verification: For each type of exposed finish on the following products, prepared on Samples of size indicated below:
   1. Wall Guards: 12 inches long. Include examples of joinery, corners, end caps,top caps, and field splices.
   2. Handrails: 12 inches long. Include examples of joinery, corners, and field splices.
   3. Corner and End-Wall Guards: 12 inches long. Include example top caps.
   4. Abuse-Resistant Wall Covering: 6 by 6 inches square.
   5. Flexible Wall Covering Sheet Protection: 6 by 6 inches square
   6. Custom graphic: 2'-0" x 4'-0"

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.
   1. Include recommended methods and frequency of maintenance for maintaining best condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Wall-Guard Handrail Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of cover installed, but no fewer than two, 96-inch- long units.
   2. Corner-Guard Covers: Full-size plastic covers of maximum length equal to 2 percent of each type, color, and texture of cover installed, but no fewer than two, 48-inch- long units.
   3. Mounting and Accessory Components: Amounts proportional to the quantities of extra materials. Package mounting and accessory components with each extra material.

1.5 QUALITY ASSURANCE

A. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

B. Work of shall be fabricated and installed by an experienced architectural graphics fabricator or manufacturer who has continuously been engaged in work of equivalent scope, quality level, and fabrication standards for a minimum of seven (7) years.

C. Provide the following upon request:
   1. Product Certificates: For each type of handrail.
   2. Material Certificates: For each type of exposed plastic material.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
   1. Maintain room temperature within storage area at not less than 70 deg F during the period plastic materials are stored.
   2. Keep plastic materials out of direct sunlight.
   3. Store plastic wall- and door-protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F.
      a. Store corner-guard covers in a vertical position.
      b. Store wall-guard and handrail covers in a horizontal position.

1.7 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
      b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.
   2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Source Limitations: Obtain wall- and door-protection products of each type from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: 25 or less.
   2. Smoke-Developed Index: 450 or less.

B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1.

C. Environmental Product Declaration: Provide Type Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN 15804 or ISO 21930 and have at least a cradle to gate scope.

D. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

E. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range.

2.3 WALL GUARDS

A. Crash Rail : Heavy-duty, PVC-free assembly consisting of continuous snap-on plastic cover installed over concealed retainer; designed to withstand impacts.
   1. Cover: Extruded rigid plastic, minimum 0.100-inch wall thickness; in dimensions and profiles indicated on Drawings.
      a. Profile: Flat.
         1) Surface: Uniform.
      b. Color and Texture: Match Architect's sample.
   2. Continuous Retainer: Minimum 0.080-inch- thick, one-piece, extruded aluminum.
   3. End Caps and Corners: Prefabricated, injection-molded plastic; matching color cover; field adjustable for close alignment with snap-on cover.
   4. Accessories: Concealed splices and mounting hardware.
   5. Mounting: Surface mounted directly to wall.

B. Bumper Rail: Standard-duty, PVC-free assembly consisting of continuous snap-on plastic cover installed over concealed retainer; designed to withstand impacts.

1. Cover: Extruded rigid plastic, minimum 0.078-inch wall thickness; in dimensions and profiles indicated on Drawings.
   a. Profile: Flat profile, nominal 4 inches high by 1 inch deep.
   b. Color and Texture: Match Architect's sample.
2. Continuous Retainer: Minimum 0.080-inch- thick, one-piece, extruded aluminum.
3. End Caps and Corners: Prefabricated, injection-molded plastic; matching color cover; field adjustable for close alignment with snap-on cover.
4. Accessories: Concealed splices and mounting hardware.
5. Mounting: Surface mounted directly to wall.

2.4 IMPACT-RESISTANT HANDRAILS

A. Structural Performance: Handrails, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Uniform load of 50 lbf/ft. applied in any direction.
   2. Concentrated load of 200 lbf applied in any direction.
   3. Uniform and concentrated loads need not be assumed to act concurrently.

B. Plastic, Impact-Resistant Handrails: Manufacturer's standard, PVC-free assembly consisting of snap-on plastic cover installed over continuous retainer.
   1. Cover: Minimum 0.100-inch- thick, extruded rigid plastic; in dimensions and profiles indicated on Drawings.
      a. Single Handrail: Cylindrical tube profile cover with continuous retainer; with mounting brackets supporting bottom of rail.
      b. Bumper Rail: Cover with flat front side; with 1-1/2-inch- diameter gripping surface and finger recess on back side; supported by concealed, continuous retainer and extended mounting brackets.
         1) Bumper Surface: Smooth.
      c. Color and Texture: Match Architect's sample.
   2. Retainer: Minimum 0.080-inch- thick, one-piece, extruded aluminum.
   3. Mounting Bracket: Extended mounting on anodized-aluminum mounting brackets.
   4. End Caps and Corners: Prefabricated, injection-molded plastic; matching color cover; field adjustable for close alignment with snap-on cover.
   5. Accessories: Concealed splices, cushions, and mounting hardware.

2.5 CORNER GUARDS

A. Surface-Mounted, Plastic-Cover Corner Guards : Manufacturer's standard, PVC-free assembly consisting of snap-on, resilient plastic cover installed over retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.

B. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Cover: Extruded rigid plastic, minimum 0.100-inch wall thickness; in dimensions and profiles indicated on Drawings.
      a. Profile: Nominal 2-inch- long leg and 1/4-inch corner radius .
      b. Height: 4 feet.
      c. Color and Texture: Match Architect's sample.

2. Continuous Retainer: Minimum 0.060-inch- thick, one-piece, extruded aluminum.
3. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

C. Surface-Mounted, Metal Corner Guards : Fabricated as one piece from formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.
1. Material: Stainless-steel sheet, Type 304.
   a. Thickness: Minimum 0.0625 inch.
   b. Finish: Directional satin, No. 4.
2. Wing Size: Nominal 1-1/2 by 1-1/2 inches .
3. Corner Radius: 1/8 inch.
4. Mounting: Flat-head, countersunk screws through factory-drilled mounting holes .

2.6 END-WALL GUARDS

A. Surface-Mounted, Plastic-Cover, End-Wall Guard : Manufacturer's standard, PVC-free assembly consisting of snap-on, resilient plastic cover installed over continuous retainer; including mounting hardware.
1. Cover: Extruded rigid plastic, minimum 0.100-inch wall thickness; in dimensions and profiles indicated on Drawings.
2. Retainer: Minimum 0.060-inch- thick, one-piece, extruded aluminum.
3. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

2.7 ABUSE-RESISTANT WALL COVERINGS

A. Abuse-Resistant Sheet Wall Covering: Fabricated from semirigid, plastic sheet wall-covering material.
1. Size: 48 by 96 inches for sheet.
2. Sheet Thickness: 0.093 inch.
3. Color and Texture: Match Architect's sample.
4. Height: As indicated.
5. Trim and Joint Moldings: Extruded rigid plastic that matches wall-covering color.
6. Mounting: Adhesive.

2.8 IMPACT-RESISTANT WALL COVERINGS

1. Impact-Resistant Sheet Wall Covering : Fabricated from plastic sheet wall-covering material.Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.Sheet Thickness: 0.04 inch - .06 inch thick
2. Color and Texture: As selected by Architect from manufacturer's full range.
3. Trim and Joint Moldings: Extruded rigid plastic that matches sheet wall covering color.
4. Mounting: Adhesive.

5. Flexible Wallcovering Sheet Wall Protection : Fabricated from plastic sheet wall-covering material.Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
6. Sheet Thickness: per manufacturer standards
7. Color and Texture: As selected by Architect from manufacturer's full range.
8. Trim and Joint Moldings: Extruded rigid plastic that matches sheet wall covering color.
9. Mounting: Wall to have a level 5 finish- mount with adhesive.
10. Seams:
    a. Install wall covering seams vertical, with tight fit.
    b. Install wall covering seams free from air and paste bubbles.
    c. Do not locate seams closer than 6 inches to corners.
    d. Obtain uniform color match associated with patterns across seams.

B. Wall Protection Plates:
1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
    a. Construction Specialties, Inc.
    b. Inpro
    c. Koroguard
2. Sheet Thickness: 5mm
3. Material: Medium Density Polyethylene
4. Color and Texture: As indicated on drawings A
5. Mounting: Adhesive
    a. Mounting: Adhesive.

2.9 MATERIALS

A. Plastic Materials: Chemical- and stain-resistant, high-impact-resistant plastic with integral color throughout; extruded and sheet material as required, thickness as indicated.

B. PVC-Free Plastic: An engineered PETG or proprietary blend of high-performance materials that is free of PVC, phthalates, persistent bioaccumulative toxins (PBT) and bisphenol A (BPA) with UL Class A/1 fire rating; extruded and sheet material, thickness as indicated.

C. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

D. Adhesive: As recommended by protection product manufacturer.
1. Adhesives shall have a VOC content of 70 g/L or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.10 FABRICATION

A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.

B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.11 FINISHES

A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
   1. For wall protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Complete finishing operations, including painting, before installing wall and door protection.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

B. Mounting Heights: Install wall and door protection in locations and at mounting heights indicated on Drawings.

C. Accessories: Provide splices, mounting hardware, anchors, trim, joint moldings, and other accessories required for a complete installation.
   1. Provide anchoring devices and suitable locations to withstand imposed loads.

2. Where splices occur in horizontal runs of more than 20 feet, splice aluminum retainers and plastic covers at different locations along the run, but no closer than 12 inches apart.
3. Adjust end and top caps as required to ensure tight seams.

D. Abuse-Resistant Wall Covering: Install top and edge moldings, corners, and divider bars as required for a complete installation.

3.4 CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a quaternary ammonia-based household cleaning agent acceptable to the manufacturer.

B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Public-use washroom accessories.
   2. Public-use shower room accessories.
   3. Private-use bathroom accessories.
   4. Childcare accessories.
   5. Underlavatory guards.
   6. Custodial accessories.

1.2 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

A. Product Data Submittals: For each product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
   2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
   3. Include electrical characteristics.

B. Samples: For each exposed product and for each finish specified, full size.
   1. Approved full-size Samples will be returned and may be used in the Work.

C. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
   1. Identify locations using room designations indicated.
   2. Identify accessories using designations indicated.

D. Delegated Design Submittals: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
   1. Provide delegated-design submittals including structural design calculations indicating compliance with specified structural-performance requirements for the following:
      a. Grab bars.
      b. Shower seats.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.5 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty for Toilet-Compartment Occupancy-Indicator Systems: Manufacturer agrees to repair or replace toilet-compartment occupancy-indicator systems that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Five years from date of Substantial Completion.

C. Manufacturer's Special Warranty for Hand Dryers: Manufacturer agrees to repair or replace hand dryers that fail in materials or workmanship within specified warranty period.
1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design structural connections for grab bars and shower seats.
1. Material properties indicated in this Section shall be considered as minimum properties.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. Structural Performance: Design accessories and fasteners to comply with the following requirements:
1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.
2. Shower Seats: Installed units are able to resist 360 lbf concentrated load applied in any direction and at any point.

2.2 MANUFACTURERS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

2.3 WASHROOM ACCESSORIES

A. Source Limitations: Obtain each type of washroom accessory from single source from single manufacturer.

B. Toilet Tissue (Roll) Dispenser :
1. Description: Roll-in-reserve dispenser with hinged front secured with tumbler lockset.
2. Mounting: Surface mounted.
3. Operation: Noncontrol delivery with theft-resistant spindle .
4. Capacity: Designed for 4-1/2- or 5-inch- diameter tissue rolls.
5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

C. Combination Toilet Tissue Dispenser :
   1. Description: Combination unit with double-roll toilet tissue dispenser and the following:
      a. Removable sanitary-napkin waste receptacle with self-closing, disposal-opening cover.
      b. Seat-cover dispenser with minimum capacity of 500 single or half-fold seat covers.
   2. Mounting: Surface mounted.
   3. Toilet Tissue Dispenser Capacity: 4-1/2- or 5-inch- diameter tissue rolls.
   4. Toilet Tissue Dispenser Operation: Noncontrol delivery with theft-resistant spindles.
   5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
   6. Lockset: Tumbler type.

D. Combination Towel (Roll) Dispenser/Waste Receptacle:
   1. Description: Combination unit for dispensing preset length of roll paper towels, with removable waste receptacle.
   2. Towel Mechanism: Automatic, electric sensor; with adapter for 110 to 240 V ac power supply.
   3. Mounting: Semirecessed.
   4. Minimum Waste Receptacle Capacity: 12 gal..
   5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
   6. Lockset: Tumbler type for towel dispenser compartment and waste receptacle.

E. Grab Bar:
   1. Mounting: Flanges with concealed fasteners.
   2. Material: Stainless steel, 0.05 inch thick.
      a. Finish: Smooth, ASTM A480/A480M No. 4 finish (satin).
   3. OD: 1-1/4 inches.
   4. Configuration and Length: As indicated on Drawings.

F. Bariatric Swing-Up Grab Bar with Integral Toilet Paper Holder:
   1. Tubing - Fabricated of type 304 stainless steel and assembled into a swivel hinge. Exposed surfaces polished to a #4 satin-finish and knurled grip. Detent holds bar in vertical position.
   2. Wall Retaining Clip - Stainless steel.
   3. Back Plate - 3/16" thick, one piece stainless steel.
   4. Capacity: 500 lbs. concentrated load.
   5. Basis-of-Design: Gamco, "125-Swing-Up-PH".

G. Sanitary-Napkin and Tampon Vendor :
   1. Mounting: Semirecessed.
   2. Operation: No coin (free); dispenses one unit at a time.
   3. Exposed Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
   4. Lockset: Tumbler type with separate lock and key for coin box.

H. Sanitary-Napkin Disposal Unit:
   1. Mounting: Surface mounted.
   2. Door or Cover: Self-closing, disposal-opening cover.
   3. Receptacle: Removable.
   4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

I. Frameless Mirror Unit:
   1. Edges and Corners: Ground smooth.
   2. Size: As indicated on Drawings.

J. 2-Edge LED Mirror: Hardwired, LED lighted 6000K cool daylight, 1/4 inch mirror with polished edges.
   1. Basis-of-Design: Sloan, "ML2 Edge-24x36-6000K".

K. Back Lit LED Mirror: Hardwired, LED lighted 6000K cool daylight, 1/4 inch mirror with polished edges.
   1. Basis-of-Design: Sloan, "ML Back Lit-24x36-6000K".

L. Hook:
   1. Description: Single-prong unit.
   2. Mounting: Concealed.
   3. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

2.4 SHOWER ROOM ACCESSORIES

A. Source Limitations: Obtain each type of shower room accessory from single source from single manufacturer.

B. Shower Curtain Rod:
   1. Description: 1-inch- OD, straight rod.
   2. Configuration: As indicated on Drawings.
   3. Mounting Flanges: Concealed fasteners; in material and finish matching rod.
   4. Rod Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

C. Folding Shower Seat:
   1. Configuration: L-shaped seat, designed for wheelchair access.
   2. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect .
   3. Mounting Mechanism: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
   4. Dimensions: As shown.

D. Robe Hook:
   1. Description: Double -prong unit.
   2. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

2.5 BATHROOM ACCESSORIES

A. Source Limitations: Obtain each type of bathroom accessory from single source from single manufacturer.

B. Toilet Tissue Dispenser:
   1. Description: Single-roll dispenser with the following features:
      a. Hood.
   2. Mounting: Surface mounted.
   3. Capacity: Designed for 4-1/2- or 5-inch- diameter tissue rolls.
   4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

C. Shower Curtain Rod:
   1. Description: 1-inch- OD, straight rod.
   2. Configuration: As indicated on Drawings.
   3. Mounting Flanges: Concealed fasteners; in material and finish matching rod.
   4. Rod Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

5. Features: Integral chrome-plated brass glide hooks.

D. Folding Shower Seat:
1. Configuration: L-shaped seat, designed for wheelchair access.
2. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect.
3. Mounting Mechanism: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
4. Dimensions: As shown.

E. Robe Hook:
1. Description: Double-prong unit.
2. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

F. Towel Bar:
1. Description: 3/4-inch- round tube with circular end brackets.
2. Mounting: Flanges with concealed fasteners.
3. Length: 18 inches.
4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).

2.6 CHILDCARE ACCESSORIES

A. Source Limitations: Obtain each type of childcare accessory from single source from single manufacturer.

B. Diaper-Changing Station:
1. Description: Horizontal unit that opens by folding down from stored position and with child-protection strap.
   a. Engineered to support minimum of 250 lb static load when opened.
2. Mounting: Surface mounted, with unit projecting not more than 4 inches from wall when closed.
3. Operation: By pneumatic shock-absorbing mechanism.
4. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin), exterior shell with rounded plastic corners; HDPE interior in manufacturer's standard color.
5. Liner Dispenser: Provide built-in dispenser for disposable sanitary liners.

2.7 LIGATURE RESISTANT ACCESSORIES

A. Ligature Resistant Mirror: 400 stainless steel polished to a mirror finish; sloped bezels on all four sides of powder coated frame. Color as selected by Architect.
1. Basis-of-Design: Whitehall, "BestCare Ligature-Resistant Stainless Steel Mirror".

B. Ligature Resistant Grab Bars: Security grab bar fabricated of satin finish stainless steel with exposed mounting flanges and 11 gauge stainless steel closure plate in sizes and configurations as indicated. Furnished with torx-head mounting screws.
1. Basis-of-Design: Bradley, "Security Grab Bar, Model SA70".

2.8 STEP STOOLS

A. Step stool shall have side supports (legs) constructed from 14-gauge, type 304 stainless steel and laterally reinforced with stainless steel plate. Steps shall be constructed from 16-gauge type 304 stainless steel and reinforced with 16-gauge stainless steel welded brackets. The stool shall feature marine-grade non-slip rubber tread and ANSI-compliant graphics with text in English, Spanish, and French. The unit operation shall be floor-mounted with self-retracting up and down movement. A concealed gas cylinder shall provide controlled lowering and automatic retraction of the step. Load capacity of 800 lbs.
   1. Basis-of-Design: Step ‘n Wash LLC, "Model SNW-SS 975B".

2.9 UNDERLAVATORY GUARDS

A. Underlavatory Guard :
   1. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
   2. Material and Finish: Antimicrobial, molded plastic, white.

2.10 ACCESSORIES

A. Source Limitations: Obtain each type of accessory from single source from single manufacturer.

B. Shelf:
   1. Description: With exposed edges turned down not less than 1/2 inch and supported by two triangular brackets welded to shelf underside.
   2. Size: 16 inches long by 6 inches deep.
   3. Material and Finish: Not less than nominal 0.05-inch- thick stainless steel, ASTM A480/A480M No. 4 finish (satin).

C. Custodial Mop and Broom Holder:
   1. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
   2. Length: 36 inches.
   3. Hooks: Four.
   4. Mop/Broom Holders: Three, spring-loaded, rubber hat, cam type.
   5. Material and Finish: Stainless steel, ASTM A480/A480M No. 4 finish (satin).
      a. Shelf: Not less than nominal 0.05-inch- thick stainless steel.
      b. Rod: Approximately 1/4-inch- diameter stainless steel.

2.11 MATERIALS

A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch- minimum nominal thickness unless otherwise indicated.

B. Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), 0.036-inch- minimum nominal thickness.

C. Galvanized-Steel Sheet: ASTM A653/A653M, with G60 hot-dip zinc coating.

D. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.

E. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless where concealed.

F. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.12 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
   1. Remove temporary labels and protective coatings.

B. Grab Bars: Install to comply with specified structural-performance requirements.

C. Shower Seats: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Clean and polish exposed surfaces in accordance with manufacturer's written instructions.

END OF SECTION

SECTION 103100 - MANUFACTURED FIREPLACES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Manufactured electric fireplace units.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Require attendance of parties directly affecting Work of this section, including Contractor, Architect, installer, and manufacturer's representative.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include manufacturer’s technical data, and application instructions.

B. Shop Drawings: Show fabrication and installation details of manufactured fireplaces. Include plans, elevations, sections, details, and attachments to other Work.

C. Samples: For each type of product and finish.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For manufactured fireplaces to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain manufactured fireplaces through one source from a single manufacturer.

B. Provide the following upon request:
   1. Qualification Data.
   2. Product Test Reports.
   3. Field quality-control reports.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver manufactured fireplaces to Project site and store in a fully enclosed, conditioned space, protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination and other causes.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install manufactured fireplaces until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of manufactured fireplace installation that fail in materials or workmanship withing specified warranty period.
   1. Warranty Period: Five years from date of Substantial Completion for electrical components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Basis-of-Design Product: Dimplex; Ignite XLF100

2.2 MANUFACTURED FIREPLACES

A. Manufactured Electric Fireplace:
   1. Size: 100-inch linear electric fireplace.
   2. Venting: Non-venting.
   3. Liner: Steel.
   4. Heating: Fan circulation.
   5. Sound: Natural crackling fire sound options.
   6. Timer: Up to 8 hours.
   7. Electrical:
      a. Volts: 120 V or 240 V
      b. Watts: 1500 W at 120 V; 2500 W at 240 V.
   8. Controls:
      a. Built-in power switch.
      b. Multi-function remote control with wall mount.
   9. Rock/Logs: As selected by Architect from manufacturer's full line.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install manufactured fireplaces in accordance with manufacturer's written instructions.

3.3 CLEANING AND PROTECTION

A. Adjust manufactured fireplaces for proper operation.

B. Replace manufactured fireplaces that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

C. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure manufactured fireplaces are without damage or deterioration at time of Substantial Completion.

END OF SECTION

SECTION 104352 – FIRST AID AND SAFETY EQUIPMENT – WWTP

PART 1 - GENERAL

1.1 WORK INCLUDED

A. This section covers the work necessary to furnish and install, complete, first-aid kits, personal protective equipment, and other safety equipment for the Hospital WWTP and the Hon-Dah WWTP.

1.2 GENERAL

A. Like items of materials specified hereunder shall be the end products of one manufacturer to achieve standardization for appearance, maintenance, and replacement.

B. See GENERAL CONDITIONS and Division 01, GENERAL REQUIREMENTS, which contain information and requirements that apply to the work specified herein and are mandatory for this project.

C. Safety equipment shall be furnished and erected at the locations shown or specified herein, complete with all hardware and accessories.

D. All safety equipment required by this section shall be provided by manufacturing firms regularly engaged in the production of equipment of this type.

1.3 SUBMITTALS

A. Submittals shall be made in accordance with Section 013300, SUBMITTAL PROCEDURES. In addition, the following specific information shall be provided:
   1. Manufacturer's Literature: Catalog data for each item including sizes, ratings, UL listings or other certifications, and mounting information.

PART 2 - PRODUCTS

2.1 GENERAL

A. The use of a manufacturer's name and model or catalog number is for establishing the standard of quality and general configuration desired only. Products of other manufacturers will be considered in accordance with the General Conditions.

2.2 FIRST-AID CABINETS AND SUPPLIES

A. General: Meet the requirements of OSHA and applicable state and local requirements.

B. Manufacturers: Afassco, Inc.; Johnson & Johnson; Zee Medical Services; or equal.

C. Cases:
   1. Enameled metal or break-resistant plastic.
   2. Carrying handles.
   3. Made to hang on wall.

D. Supplies: Quantities to serve 10 people (each).

E. Minimum Quantity to be Provided at each wastewater treatment plant:
   1. Laboratory (1)
   2. Chemical Storage Area (1)

2.3 CHEMICAL SAFETY PERSONAL PROTECTIVE EQUIPMENT

A. General: Meet the requirements of OSHA and applicable state and local requirements.

B. The chemical storage area locations at each WWTP shall have the following safety equipment provided with storage in a corrosion resistant cabinet:

1. Rubber Gloves (2 sets)
2. Safety Goggles (2 sets)
3. Full Length Face Shield (2)
4. Apron (2)
5. Dry Spill Absorbant (20 lb); compatible with liquid aluminum sulfate, sodium hydroxide, and sodium hypochlorite.
6. Available suppliers of protective clothing and accessories from a variety of manufacturers include Enviro Safety Products, W. W. Grainger, and G and S Safety Products

C. Provide one corrosion resistant wall case storage cabinet at each WWTP, approximately 14 inches wide by 9.5 inches deep by 21 inches high, USA Bluebook Stock MD-71506, or equal.

D. Provide two NIOSH respirators with a full face mask suitable for use in the chemical feed area and for confined spaces at each WWTP. Manufacturer shall be MSA Advantage, or equal.

A. The protective clothing shall be suitable for protection from the following chemicals in the listed concentrations:

CHEMICAL	CONCENTRATION
Sodium Hydroxide	25%
Sodium Hypochlorite	12.5%
Aluminum Sulfate (Alum)	48%

B. Personal Protective Equipment Cabinets: One cabinet shall be provided and installed outside the Chemical Storage Room where directed by the Engineer for storage of the personal protective equipment at each wastewater treatment plant.

1. The cabinet shall be industrial dust-tight and drip-tight enclosure constructed of corrosion resistant ABS plastic or fiberglass with a safety yellow color, approximately 36 inches high, 36 inches wide, and 12 to 18 inches deep.
2. Enclosure doors shall have stainless steel or thermoplastic hinges and shall be secured by a three-point latching system and nonlocking, corrosion resistant handle.
3. The cabinet shall be completely assembled and shall meet the functional requirements of NEMA Type 12 enclosures. The cabinet shall be provided with manufacturer's recommended mounting brackets and shall be installed with suitable corrosion-resistant anchors.

2.4 SELF-CONTAINED EYEWASH STATION

A. Provide two (2) self-contained eyewash stations for each WWTP.

B. Eyewash station shall provide a 12-gallong tank for 15 minutes of continuous flow without requirement of plumbing.
   1. Pull down handle shall activate flow.
   2. Tank shall be of clear material or have visual indication of water level.

C. Station shall be supplied with water preservative for 6 tank fills.

D. Station shall include a stand made of coated steel tubing that does not require wall or floor mounting. Alternatively, eyewash station may rest on waste cart.

E. Station shall be supplied with a hand cart specifically designed to move a full eyewash station or separate tank.

F. Station shall be supplied with a waste cart.

G. Eye wash station shall be manufactured by U-Line, Honeywell, Bradley, or approved equal.

2.5 HEARING PROTECTORS

A. Provide one set with two earmuffs each designed to provide noise attenuation above 3000 Hz at each wastewater treatment plant. Earmuffs shall have slack-free telescopic, adjustable, padded headband with pivot joints to ensure a snug fit and large earcups with soft foam filled cushions to maintain seal. Earmuffs shall be Howard Leight/Bilsom Thunder T3 Earmuff with NRR 30 db rating; equivalent 3M Peltor Model; or equal.

B. Provide one wall mounted cabinet for each set of two earmuffs, for a total of one cabinet at each wastewater treatment plant. Cabinets shall be constructed of corrosion resistant ABS plastic or fiberglass.

C. Provide disposable low pressure foam ear plugs, rated NRR 33 db minimum, Moldex Pura-Fit 6800; Howard Leight Max-1; or equal. Provide one wall mounted ear plug dispenser at each wastewater treatment plant, including manufacturer supplied mounting hardware, capable of holding 500 pairs of ear plugs, Moldex Plug Station 6845; Howard Leight Source 500; or equal. Dispensers shall be located at interior doors to blower rooms.

2.6 PORTABLE CONFINED SPACE MULTI-GAS MONITOR

A. Provide two personal multi-gas confined space entry monitors complete with monitor, sensors, rechargeable battery, charger, electric pump, probe assembly, carrying holster, and carrying case.

B. Monitor display shall be ultra-clear alphanumeric with back light. Values and units for up to four gases shall be displayed simultaneously. Unit shall provide full function self-test of sensors, battery status, circuit integrity, and audio/visual alarms on startup and for continuous testing of sensors. Monitor shall be rated to operate between -4 degrees F to 122 degrees F and 10 to 100 percent RH non-condensing humidity. Unit shall be impact resistant plastic with Ingress Protection (IP) Rating 66/67 (NEMA 4 and 6). Unit shall also be rated UL Class 1, Division 1, Groups A, B, C, D.

C. Adjustable alarms shall be provided with factory settings to OSHA limits. Differing dual alarm tones with 90 to 95 dB at 1-foot with ultra-bright flashing red LED in gas hazard shall be provided. Selectable confidence blip with slow flashing green LED shall indicate instrument is working.

D. Sensors shall be provided for Oxygen (0 to 25 percent), Lower Explosive Limit (LEL: 0 to 100 percent), Hydrogen Sulfide (H2S: 0 to 50 ppm), and Carbon Monoxide (CO: 0 to 500 ppm).

E. Battery shall be rechargeable, interchangeable battery pack lasting 8-10 hours for pumped instrument. Battery charger shall be provided.

F. Electric pump shall be built-in internal pump with On/Off button.

G. Probe assembly for obtaining an air sample shall be provided with extension capability to 10 feet depth.

H. The portable multi-gas monitor shall be HoneywellGasAlert Quattro, Lumidor Impact Pro, or approved equal.

2.7 MAINTENANCE VENTILATION EQUIPMENT

A. General: Provide portable ventilation equipment for use with the confined space entry plan for the Owner.

B. Provide one maintenance ventilation system to be stored at each WWTP (two total) including the following components:
   1. Portable ventilation fan, minimum 3,700 cfm, minimum 18-inch blades, 115 Volt, 1/3 Horsepower, direct drive, ETL listed and OSHA and UL 507 compliant. Maximum weight of fan and hose specified hereinafter shall be 57 pounds. Dimensions shall be 14 3/8”x21”x21” (Depth x Width x Height) Fan shall be Canarm FANTRAXX LFI-U18-4, or approved equal.
   2. Fan collar adapters from fan housing to flexible hose with spring clips included, Canarm FANTRAXX CA18 Collar Adapter, or equal.
   3. Flexible ventilation hoses, 20-foot extended length, with connection end to fan collar adapter, PVC fabric sewn around a spring wire helix, flame-resistant, compressible to 1/5 extended length, quick release buckle on one end and outlet ring on other end, temperature range 200 to 2000F, Canarm FANTRAXX Model H18BC, or equal.

2.8 LIFE HOOK

A. General: Meet the requirements of OSHA and applicable state and local requirements.

B. Provide a heavy duty fiberglass life hook with a heavy duty fiberglass, telescoping pole. The telescoping pole shall be 8 to 16 feet long, 2 inches in diameter, and be equipped with a positive locking cam system.

C. Provide aluminum mounting system suitable for life hook mounting or hanging on handrail. Mounting system shall allow for quick release of the life hook.

D. Manufacturers shall be Adolph Kiefer and Associates; The Lifeguard Store; or equal.

E. Minimum quantity to be provided at following locations at each wastewater treatment plant:
   1. EQ Basin and Aerobic Digester Walkway (2 at each WWTP)
   2. Process Tanks (3 at Hospital WWTP, 2 at Hon-Dah WWTP

2.9 LIFE RING BUOY

A. General: Meet the requirements of OSHA and applicable state and local requirements.

B. Life ring buoys shall be 30-inches outside diameter with web straps or rope molded into core, and shall have 40 feet of hollow braided polypropylene line attached; color white.

C. Provide aluminum mounting system suitable for life ring buoy mounting or hanging on handrail. Mounting system shall allow for quick release of the life ring buoy.

D. Manufacturers: Jim-Buoy GW-30 or GW-X-30; equivalent by Stearns; or equal.

E. Minimum Quantity to be Provided at each wastewater treatment plant:
   1. EQ Basin and Aerobic Digester Walkway (2 at each WWTP)
   2. Process Tanks (3 at Hospital WWTP, 2 at Hon-Dah WWTP

2.10 FASTENINGS

A. Provide necessary stainless steel screws, bolts, and other corrosion resistant fastenings of suitable type and size to secure items of fire and safety equipment in position.

B. Provide metal expansion shields for machine screws at concrete and masonry.

PART 3 - EXECUTION

3.1 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original, unopened protective packaging.

B. Store and handle products in accordance with manufacturer's instructions to protect them from damage.

3.2 INSTALLATION

A. Install where indicated and in accordance with the manufacturer's recommendations.

B. Plumb and level equipment.

C. Rigidly attach cabinets and brackets to structure.

D. Provide adequate backing for mounting surfaces.

3.3 FIRST AID CABINETS

A. Assemble following manufacturer's instructions and locate in the Lab/Control Room.

3.4 LIFE HOOKS OR RING BUOYS

A. Life hooks and/or life ring buoys shall be mounted near basins or as directed by the Engineer.

3.5 PORTABLE CONFINED SPACE MULTI-GAS MONITORS

A. Personal multi-gas confined space entry monitors shall be stored at the direction of the Owner.

3.6 MAINTENANCE VENTILATION EQUIPMENT

A. Maintenance ventilation equipment packages shall be stored in each WWTP at the direction of the Owner.

3.7 CHEMICAL SAFETY PERSONAL PROTECTIVE EQUIPMENT

A. The Contractor shall store chemical safety equipment in cabinets with locations of cabinets as listed above and at the direction of the Owner and Engineer.

END OF SECTION

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fire-protection cabinets for the following:
      a. Portable fire extinguisher.

B. Related Requirements:
   1. Section 104416 "Fire Extinguishers" for portable, hand-carried fire extinguishers accommodated by fire-protection cabinets.

1.2 PREINSTALLATION CONFERENCE

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to fire-protection cabinets, including, but not limited to, the following:
      a. Schedules and coordination requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing semirecessed--mounting method and relationships of box and trim to surrounding construction.

B. Shop Drawings: For fire-protection cabinets.
   1. Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Initial Selection: For each type of exposed finish required.

D. Samples for Verification: For each type of exposed finish required, prepared on samples 6 by 6 inches square.

E. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semirecessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.5 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 FIRE-PROTECTION CABINET

A. Fire-Protection Cabinet Type: Suitable for fire extinguisher.

B. Cabinet Construction: Nonrated.

C. Cabinet Material: Stainless steel sheet.

D. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
   1. Rolled-Edge Trim: 2-1/2-inch backbend depth.

E. Cabinet Trim Material: Stainless steel sheet.

F. Door Material: Stainless steel sheet.

G. Door Style: Solid opaque panel with frame.

H. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
   1. Provide recessed door pull and friction latch.
   2. Provide continuous hinge, of same material and finish as trim, , permitting door to open 180 degrees.

I. Accessories:
   1. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
   2. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location.
      a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
         1) Location: Applied to cabinet door.
         2) Application Process: Silk-screened.
         3) Lettering Color: Red.
         4) Orientation: Vertical.
   3. Alarm: Manufacturer's standard alarm that actuates when fire-protection cabinet door is opened and that is powered by low voltage, complete with transformer.

J. Materials:
   1. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304.
      a. Finish: ASTM A480/A480M No. 4 directional satin finish,.

2.4 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
   1. Weld joints and grind smooth.
   2. Miter corners and grind smooth.
   3. Provide factory-drilled mounting holes.

4. Prepare doors and frames to receive locks.
5. Install door locks at factory.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2 inch thick.
2. Fabricate door frames of one-piece construction with edges flanged.
3. Miter and weld perimeter door frames and grind smooth.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.

C. Finish fire-protection cabinets after assembly.

D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION OF FIRE-PROTECTION CABINETS

A. General: Install fire-protection cabinets in locations and at mounting heights indicated

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 104416 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers.

B. Related Requirements:
   1. Section 104413 "Fire Protection Cabinets."

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site in conjunction with preinstallation meeting regarding fire protection cabinets. Include representatives of the Owner, Architect and governing fire authority.
   1. Review methods and procedures related to fire extinguishers including, but not limited to, the following:
      a. Schedules and coordination requirements.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher.

B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.5 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure of hydrostatic test according to NFPA 10 when testing interval required by NFPA 10 is within the warranty period.
      b. Faulty operation of valves or release levers.
   2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet indicated.
   1. Source Limitations: Obtain fire extinguishers, fire-protection cabinets, and accessories, from single source from single manufacturer.
   2. Valves: Manufacturer's standard.
   3. Handles and Levers: Manufacturer's standard.
   4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

B. Wet-Chemical Type : UL-rated 2-A:1-B:C:K, 2.5-gal. nominal capacity, with potassium carbonate-based chemical in stainless steel container; with pressure-indicating gage.

C. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.3 AUTOMATIC FIRE EXTINGUISHER MONITORING AND INSPECTION

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Hexmodal, "Fire Extinguisher Monitor".

B. Provide monitoring system which is wireless and NFPA 101 compliant.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.
   1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers in locations indicated and in compliance with requirements of authorities having jurisdiction.

END OF SECTION

SECTION 105113 - METAL LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Welded corridor lockers.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal locker.

B. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.

C. Shop Drawings: For metal lockers.
   1. Include plans, elevations, sections, and attachment details.
   2. Show locker trim and accessories.
   3. Include locker identification system and numbering sequence.

D. Samples for Initial Selection: Manufacturer's color charts showing the full range of colors available.

E. Samples for Verification: For the following products, in manufacturer's standard size:
   1. Lockers and equipment.

F. Product Schedule: For lockers. Use same designations indicated on Drawings.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For adjusting, repairing, and replacing locker doors and latching mechanisms to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Provide the following upon request:
   1. Qualification Data: For Installer.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. The following metal locker hardware items equal to 10 percent of amount installed for each type and finish installed, but no fewer than five units:
      a. Locks.
      b. Blank identification plates.
      c. Hooks.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver metal lockers until spaces to receive them are clean, dry, and ready for their installation.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions of recessed openings by field measurements before fabrication.

1.9 COORDINATION

A. Coordinate sizes and locations of bases for metal lockers.

B. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that metal lockers can be supported and installed as indicated.

1.10 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures.
      b. Faulty operation of latches and other door hardware.
   2. Damage from deliberate destruction and vandalism is excluded.
   3. Warranty Period for Welded Metal Lockers: Lifetime from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain metal lockers and accessories from single source from single locker manufacturer.
   1. Obtain locks from single lock manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: For lockers indicated to be accessible, comply with applicable provisions in the DOJ's "2010 ADA Standards for Accessible Design", the ABA standards of the Federal agency having jurisdiction, and ICC A117.1.

2.3 WELDED CORRIDOR LOCKERS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Doors: One piece; fabricated from 0.075-inch nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.
   1. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches wide; welded to inner face of doors.

C. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
   1. Tops, Bottoms, and Sides: 0.060-inch nominal thickness.
   2. Backs: 0.048-inch nominal thickness.
   3. Shelves: 0.060-inch nominal thickness, with double bend at front and single bend at sides and back.

D. Frames: Channel formed; fabricated from 0.060-inch nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.
   1. Cross Frames between Tiers: Channel formed and fabricated from same material as main frames; welded to vertical main frames.

E. Hinges: Welded to door and attached to door frame with no fewer than two factory-installed rivets per hinge that are completely concealed and tamper resistant when door is closed; fabricated to swing 180 degrees; self-closing.
   1. Continuous Hinges: Manufacturer's standard, steel, full height.

F. Recessed Door Handle and Latch: Stainless steel cup with integral door pull, recessed so locking device does not protrude beyond door face; pry and vandal resistant.
   1. Single-Point Latching: Nonmoving latch hook designed to engage bolt of built-in combination or cylinder lock.
      a. Latch Hook: Equip each door with one latch hook, fabricated from 0.120-inch nominal-thickness steel sheet; welded midway up full-height door strike; with resilient silencer.

G. Locks: Digital keypad locks.

H. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8 inch high.

I. Hooks: Manufacturer's standard ball-pointed, aluminum .

J. Coat Rods: 1-inch- diameter steel, chrome finished.

K. Continuous Zee Base: Fabricated from, manufacturer's standard thickness, but not less than 0.060-inch nominal-thickness steel sheet.
   1. Height: 4 inches.

L. Continuous Sloping Tops: Fabricated from 0.048-inch nominal-thickness steel sheet, with a pitch of approximately 20 degrees.
   1. Closures: Hipped-end type.

M. Recess Trim: Fabricated from 0.048-inch nominal-thickness steel sheet.

N. Filler Panels: Fabricated from 0.048-inch nominal-thickness steel sheet.

O. Finished End Panels: Fabricated from 0.024-inch nominal-thickness steel sheet to cover unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.

P. Materials:
   1. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with A60 zinc-iron, alloy (galvannealed) coating designation.

2. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

Q. Finish: Baked enamel or powder coat.
1. Color: Match Architect's sample.

2.4 LOCKS

A. Digital Keypad Lock: Battery-powered electronic keypad with reprogrammable manager and owner codes that override access. Three consecutive incorrect code entries will disable lock for three minutes.
1. Designed for shared or temporary access by multiple users, with user-defined code to lock and unlock. Provide LED indicator to show when lock is in use.

2.5 FABRICATION

A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
1. Form body panels, doors, shelves, and accessories from one-piece steel sheet unless otherwise indicated.
2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.

B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.

C. Equipment: Provide each locker with an identification plate and the following equipment:
1. Single-Tier Units: Shelf, one double-prong ceiling hook, and two single-prong wall hooks.
2. Double-Tier Units: One double-prong ceiling hook and two single-prong wall hooks.
3. Triple-Tier Units: One double-prong ceiling hook.
4. Coat Rods: For each compartment of each locker.

D. Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds smooth and flush.

E. Accessible Lockers: Fabricate as follows:
1. Locate bottom shelf no lower than 15 inches above the floor.
2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches above the floor.

F. Continuous Zee Base: Fabricated in lengths as long as practical to enclose base and base ends; finished to match lockers.

G. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.
1. Sloping-top corner fillers, mitered.

H. Recess Trim: Fabricated with minimum 2-1/2-inch face width and in lengths as long as practical; finished to match lockers.

I. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.

J. Finished End Panels: Fabricated to conceal unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.
   1. Provide one-piece panels for double-row (back-to-back) locker ends.

K. Center Dividers: Full-depth, vertical partitions between bottom and shelf; finished to match lockers.

2.6 ACCESSORIES

A. Fasteners: Zinc- or nickel-plated steel, slotless-type, exposed bolt heads; with self-locking nuts or lock washers for nuts on moving parts.

B. Anchors: Material, type, and size required for secure anchorage to each substrate.
   1. Provide nonferrous-metal or hot-dip galvanized anchors and inserts.
   2. Provide toothed-steel expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and floors or support bases, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install lockers level, plumb, and true; shim as required, using concealed shims.
   1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
   2. Anchor single rows of metal lockers to walls near top and bottom of lockers.
   3. Anchor back-to-back metal lockers to floor.

B. Welded Lockers: Connect groups together with manufacturer's standard fasteners, with no exposed fasteners on face frames.

C. Equipment:
   1. Attach hooks with at least two fasteners.
   2. Attach door locks on doors using security-type fasteners.
   3. Identification Plates: Identify metal lockers with identification indicated on Drawings.
      a. Attach plates to each locker door, near top, centered, with at least two aluminum rivets.

D. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.

1. Attach recess trim to recessed metal lockers with concealed clips.
2. Attach filler panels with concealed fasteners. Locate filler panels where indicated on Drawings.
3. Attach sloping-top units to metal lockers, with closures at exposed ends.
4. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.

3.3 ADJUSTING

A. Clean, lubricate, and adjust hardware. Adjust doors and latches to operate easily without binding. Verify that integral locking devices operate properly.

3.4 PROTECTION

A. Protect metal lockers from damage, abuse, dust, dirt, stain, or paint. Do not permit use during construction.

B. Touch up marred finishes, or replace metal lockers that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by locker manufacturer.

END OF SECTION

SECTION 107516 - GROUND-SET FLAGPOLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes ground-set flagpoles made from aluminum.

B. Related Requirements:
   1. Section 013573 "Delegated Design Requirements and Procedures" for definitions, submittal procedures, responsibilities, and scheduling requirements associated with delegated design assignment indicated in this Section.

C. Owner-Furnished Material: Flags.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, operating characteristics, fittings, accessories, and finishes for flagpoles.

B. Shop Drawings: For each flagpole.
   1. Include the following
      a. Plans, elevations, and attachment details. Show general arrangement, jointing, fittings, accessories, grounding, anchoring, and support.
      b. Section, and details of foundation system.

C. Samples for Verification: For each type of exposed finish, in manufacturer's standard sizes.

D. Delegated-Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
   1. Provide delegated-design submittals for flagpoles.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For flagpoles to include in operation and maintenance manuals.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Spiral wrap flagpoles with heavy paper and enclose in a hard fiber tube or other protective container.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain flagpoles as complete units, including fittings, accessories, bases, and anchorage devices, from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design flagpole assemblies.

1. Material properties indicated in this Section shall be considered as minimum properties.

B. Seismic Performance: Flagpole assemblies to withstand the effects of earthquake motions determined according to ASCE/SEI 7.

C. Structural Performance: Flagpole assemblies, including anchorages and supports, to withstand design loads indicated within limits and under conditions indicated.
1. Wind Design Criteria: As indicated on Drawings.
2. Base flagpole design on polyester flags of maximum standard size suitable for use with flagpole or flag size indicated, whichever is more stringent.

2.3 ALUMINUM FLAGPOLES

A. Aluminum Flagpoles: Entasis-tapered flagpoles fabricated from seamless extruded tubing complying with ASTM B241/B241M, Alloy 6063, with a minimum wall thickness of 3/16 inch.

B. Exposed Height: As indicated.

C. Construct flagpoles in one piece if possible. If more than one piece is necessary, comply with the following:
1. Fabricate shop and field joints without using fasteners, screw collars, or lead calking.
2. Provide flush hairline joints using self-aligning, snug-fitting, internal sleeves.

D. Metal Foundation Tube: Manufacturer's standard corrugated-steel foundation tube, 0.060-inch wall thickness with 3/16-inch steel bottom plate and support plate; 3/4-inch-diameter, steel ground spike; and steel centering wedges welded together. Galvanize foundation tube after assembly. Furnish loose hardwood wedges at top of foundation tube for plumbing pole.
1. Flashing Collar: Same material and finish as flagpole.

E. Sleeve for Aluminum Flagpole: Fiberglass foundation sleeve, made to fit flagpole, for casting into concrete foundation.
1. Flashing Collar: Same material and finish as flagpole.

F. Cast-Metal Shoe Base: Made from aluminum with same finish and color as flagpoles for anchor-bolt mounting; furnish with anchor bolts.
1. Furnish ground spike.

G. Hinged Baseplate: Cast-metal tilting hinged base and anchor plate joined by permanently secured pivot rod. Furnish with stainless steel screws for securing tilting base to anchor plate when not tilted; furnish with anchor bolts.
1. Finish: Same as flagpole.
2. Furnish aluminum base or aluminum flashing collar finished to match flagpole.
3. Furnish ground spike.

2.4 FITTINGS

A. Finial Ball: Flush-seam ball, sized as indicated or, if not indicated, to match flagpole-butt diameter.
1. 0.063-inch spun aluminum, finished to match flagpole.

B. Finial Eagle: Sized as standard with manufacturer for flagpole size indicated.
1. Cast aluminum, finished to match flagpole.

C. Internal Halyard, Winch System: Manually operated winch with control stop device and removable handle, stainless steel cable halyard, and concealed revolving truck assembly with plastic-coated counterweight and sling. Furnish flush access door secured with cylinder lock. Finish truck assembly to match flagpole.
   1. Halyard Flag Snaps: Stainless steel swivel snap hooks with neoprene or vinyl covers. Furnish two per halyard.

D. Lighting: Internal Halyard Beacon Plus Quad Light: Winch System - Wire Halyard
   1. Manufacturer: Concord American Flagpole
      a. Model Number:
         1) ABW4-354P-SAT
         2) ABW4-304P-SAT

2.5 MISCELLANEOUS MATERIALS

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M.

B. Drainage Material: Crushed stone, or crushed or uncrushed gravel; coarse aggregate.

C. Sand: ASTM C33/C33M, fine aggregate.

D. Elastomeric Joint Sealant: Single-component neutral-curing silicone joint sealant complying with requirements in Section 079200 "Joint Sealants."

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

2.6 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prepare uncoated metal flagpoles that are set in foundation tubes by painting below-grade portions with a heavy coat of bituminous paint.

B. Foundation Excavation: Excavate to neat clean lines in undisturbed soil. Remove loose soil and foreign matter from excavation and moisten earth before placing concrete. Place and compact drainage material at excavation bottom.

C. Provide forms where required due to unstable soil conditions and for perimeter of flagpole base at grade. Secure and brace forms to prevent displacement during concreting.

D. Foundation Tube: Place foundation tube, center, and brace to prevent displacement during concreting. Place concrete. Plumb and level foundation tube and allow concrete to cure.

E. Sleeves: Locate and secure sleeves in forms by bracing to reinforcement and forms.

F. Anchor Bolts: Locate and secure anchor bolts in forms with templates and by tying to reinforcement.

G. Place concrete, as specified in Section 033000 "Cast-in-Place Concrete." Compact concrete in place by using vibrators. Moist-cure exposed concrete for no fewer than seven days or use nonstaining curing compound.

H. Trowel exposed concrete surfaces to a smooth, dense finish, free of trowel marks, and uniform in texture and appearance. Provide positive slope for water runoff to perimeter of concrete base.

3.2 FLAGPOLE INSTALLATION

A. General: Install flagpoles where indicated and according to manufacturer's written instructions.

B. Foundation Tube: Place flagpole in tube, seated on bottom plate between steel centering wedges, and install hardwood wedges to secure flagpole in place. Place and compact sand in foundation tube and remove hardwood wedges. Seal top of foundation tube with a 2-inch layer of elastomeric joint sealant and cover with flashing collar.

C. Baseplate: Cast anchor bolts in concrete foundation. Install baseplate on washers placed over leveling nuts on anchor bolts and adjust until flagpole is plumb. After flagpole is plumb, tighten retaining nuts and fill space under baseplate solidly with nonshrink, nonmetallic grout. Finish exposed grout surfaces smooth and slope 45 degrees away from edges of baseplate.

END OF SECTION

SECTION 108219 - EXTERIOR SOUND PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes shop-fabricated, acoustical panel units tested for acoustical performance, including the following:
   1. Exterior sound panels.

1.2 DEFINITIONS

A. NRC: Noise Reduction Coefficient.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Submittal Compliance Form: If Basis-of-Design products are provided, Submittal Compliance Form may be submitted in lieu of required Samples submittal. Ensure compliance with requirements included in Section 013300 "Submittal Procedures."

B. Product Data: For each type of product.
   1. Include fabric facing, panel edge, core material, and mounting indicated.

C. Sustainable Design Submittals:
   1. Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
   2. Environmental Product Declaration (EPD): For each product.
   3. Product Data: For adhesives, indicating VOC content.
   4. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
   5. Laboratory Test Reports: For wall materials, indicating compliance with requirements for low-emitting materials.

D. Shop Drawings: For unit assembly and installation.
   1. Include plans, elevations, sections, and mounting devices and details.
   2. Include details at panel head, base, joints, and cornersIndicate panel edge profile and core materials.
   3. Include details at cutouts and penetrations for other work.

E. Samples for Initial Selection: For each type of fabric facing.
   1. Include Samples of hardware and accessories involving color or finish selection.

F. Samples for Verification: For the following products:
   1. Fabric: Full-width by approximately 36-inch- long Sample, but not smaller than required to show complete pattern repeat, from dye lot to be used for the Work, and with specified treatments applied. Mark top and face of fabric.
   2. Panel Edge: 12-inch- long Sample(s) showing each edge profile, corner, and finish.
   3. Core Material: 12-inch- square Sample at corner.
   4. Mounting Devices: Full-size Samples.
   5. Assembled Panels: Approximately 36 by 36 inches, including joints and mounting methods.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Elevations and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Items penetrating or covered by units.
   2. Show operation of hinged and sliding components covered by or adjacent to units.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of unit to include in maintenance manuals. Include fabric manufacturers' written cleaning and stain-removal instructions.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials from same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Fabric: For each fabric, color, and pattern installed, provide length equal to 10 percent of amount installed, but no fewer than 10 sq. yd., full width of bolt.
   2. Mounting Devices: Full-size units equal to 5 percent of amount installed, but no fewer than five devices, including unopened adhesives.

1.8 QUALITY ASSURANCE

A. Provide the following upon request:
   1. Product Certificates: For each type of unit.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials, fabrication, and installation.
   1. Build mockup of typical wall area 48 inches wide by full height. Include intersection of wall corners, and perimeters.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with unit manufacturers' written instructions for minimum and maximum temperature and humidity requirements for shipment, storage, and handling.

B. Deliver materials and units in unopened bundles and store in a temperature-controlled dry place with adequate air circulation.

1.10 FIELD CONDITIONS

A. Field Measurements: Verify unit locations and actual dimensions of openings and penetrations by field measurements before fabrication, and indicate them on Shop Drawings.

1.11 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace units and components that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to the following:
      a. Acoustical performance.
      b. Fabric sagging, distorting, or releasing from panel edge.
      c. Warping of core.
   2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Sound Seal, "QFA-EXT-2"S Exterior Grade Quited Fiberglass Absorber".

B. Source Limitations: Obtain units specified in this Section from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: Units shall comply with "Surface-Burning Characteristics" or "Fire Growth Contribution" Subparagraph below, or both, as determined by testing identical products by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:
   1. Surface-Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
      a. Flame-Spread Index: 25 or less.
      b. Smoke-Developed Index: 450 or less.
   2. Fire Growth Contribution: Comply with acceptance criteria of local code and authorities having jurisdiction when tested according to NFPA 265 Method B Protocol or NFPA 286.
   3. Noise Reduction Coefficient (NRC): .75

2.3 MATERIALS

A. Core Materials: Manufacturer's standard 2 inch thick quilted fiberglass with a scrim backing.

B. Facing Material : Exterior grade, UV-resitant heacy-duty vinyl-coated polyester, fabric from same dye lot; color and pattern matching Architect's samples.

C. Mounting Devices: As recommended by manufacturer to support weight of unit, and as follows:
   1. Factory-installed grommets at top and bottom of panel edges.
   2. Galvanized anchors installed in substrate.

D. Size: 12 feet tall minimum and manufacturer's standard 48 inch width. Provide panel quantity as required to cover are indicated on Drawings.

2.4 FABRICATION

A. Standard Construction: Use manufacturer's standard construction unless otherwise indicated; with facing material applied to face and edgesof dimensionally stable core; and with rigid edges to reinforce panel perimeter against warpage and damage.

B. Facing Material: Apply fabric facing fully covering visible surfaces of unit; with material stretched straight, on the grain, tight, square, and free from puckers, ripples, wrinkles, sags, blisters, seams, adhesive, or other visible distortions or foreign matter.
   1. Square Corners: Tailor corners. Heat-seal vinyl-coated fabric seams at corners.

C. Dimensional Tolerances of Finished Units: Plus or minus 1/16 inch for the following:
   1. Thickness.
   2. Edge straightness.
   3. Overall length and width.
   4. Squareness from corner to corner.
   5. Chords, radii, and diameters.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fabric, fabricated units, substrates, areas, and conditions for compliance with requirements, installation tolerances, and other conditions affecting unit performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install units in locations indicated. Unless otherwise indicated, install units with vertical surfaces and edges plumb, top edges level and in alignment with other units, faces flush, and to fit adjoining work accurately at borders and at penetrations.

B. Comply with manufacturer's written instructions for installation of units using type of mounting devices indicated. Mount units securely to supporting substrate.

C. Location: Install panels centered on the noise-creating equipment, with bottom edges of panels not greater than 2'-0" above grade/finished floor.
   1. Thread anchors through panel grommets, with washers in order tp permit panel removal.

3.3 INSTALLATION TOLERANCES

A. Variation from Plumb and Level: Plus or minus 1/16 inch in 48 inches, noncumulative.

B. Variation of Joint Width: Not more than 1/32-inch variation from hairline in 48 inches, noncumulative.

3.4 CLEANING

A. Clip loose threads; remove pills and extraneous materials.

B. Clean panels on completion of installation to remove dust and other foreign materials according to manufacturer's written instructions.

END OF SECTION

SECTION 110800 – EQUIPMENT COMMISSIONING

PART 1 - GENERAL

1.1 SUMMARY

A. This project will have selected building systems commissioned. The complete list of equipment and systems to be commissioned are specified in SECTION 01 91 13 GENERAL COMMISSIONING REQUIREMENTS. The commissioning process, which the contractor is partially responsible to execute, is defined in SECTION 01 91 13 GENERAL COMMISSIONING REQUIREMENTS. A Commissioning Agent (CxA) hired by IHS will manage the commissioning process.

B. Related Sections:
   1. The requirements of this Section apply to all Sections of Division 11
   2. SECTION 01 33 00 – SUBMITTAL PROCEDURES
   3. SECTION 01 91 13 – GENERAL COMMISSIONING REQUIREMENTS

1.2 DEFINITIONS

A. Refer to SECTION 01 91 13 GENERAL COMMISSIONING REQUIREMENTS, for definitions.

1.3 COMMISSIONED SYSTEMS

A. Commissioning of a system or systems specified in Division 11 is part of the construction process. Documentation and testing of these systems, as well as training of O&M personnel in accordance with the requirements of Division 01 and 11 Sections, is required in cooperation with the IHS and CxA.

B. The Equipment Commissioning will include the systems listed in SECTION 01 91 13 – GENERAL COMMISSIONING REQUIREMENTS.

1.4 SUBMITTALS

A. The commissioning process requires review of selected Submittals. The CxA will provide a list of Submittals earmarked for CxA review. This list will be reviewed and approved by IHS prior to sharing with the contractor. Refer to SECTION 01 33 00 – SUBMITTAL PROCEDURES for further details.

B. The commissioning process requires Cx Submittal review simultaneous to A/E Submittal review. Specific submittal requirements related to the Commissioning Process are specified in SECTION 01 91 13 – GENERAL COMMISSIONING REQUIREMENTS.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 START-UP AND CONSTRUCTION INSPECTIONS

A. General. Commissioning of the Building Equipment will require inspection of individual elements of the Equipment System construction throughout the construction period. The Contractor shall coordinate with the CxA in accordance with SECTION 01 91 13 –

GENERAL COMMISSIONING REQUIREMENTS and the Commissioning Plan to schedule inspections as required to support the commissioning process.

3.2 PRE-FUNCTIONAL CHECKLISTS

A. General. Pre-functional Checklists are developed and completed for all major equipment and systems being commissioned. The checklist captures equipment nameplate and characteristics data, confirming the as-built status of the equipment or system. These checklists also ensure that the systems are complete and operational, so that the functional performance testing can be scheduled. The checklists are drafted by the CxA and completed (filled out) by the installing Contractor.

B. Review. Upon notification of checklist completion, the CxA and IHS will review the Pre-Functional Checklists for accuracy. If the CxA or IHS determine that the information provided on a checklist is not accurate, the marked-up checklist will be returned to the Contractor for correction and resubmission. An item be added to the Commissioning Issue Log (CIL) to track the deficiency.

If the CxA or IHS determine that a significant number of completed checklists for similar equipment are not accurate, all the checklists for the equipment type will be returned to the Contractor for correction and resubmission.

Refer to SECTION 01 91 13 – GENERAL COMMISSIONING REQUIREMENTS

3.3 FUNCTIONAL PERFORMANCE TESTING

A. Objectives and Scope. The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. In general, each system should be operated through all modes of operation (seasonal, occupied, unoccupied, warm-up, cool-down, part- and full-load) where there is a specified system response. Verifying each sequence in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze condition, no flow, equipment failure, etc. shall also be tested.

B. Development of Test Procedures. Before test procedures are written, the CxA shall obtain all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. The CxA shall develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Prior to execution, the CxA shall provide a copy of the test procedures to the Contractor who shall review the tests for feasibility, safety, equipment and warranty protection. The CxA shall review contracted or factory testing which the CxA is not responsible to oversee and shall determine what further testing may be required to comply with the Contract Documents. Redundancy of testing shall be minimized.

C. Test Methods:

1. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's trend log capabilities or by stand-alone data loggers. The CxA will determine which method is most appropriate.

2. Setup. Each function and test shall be performed under conditions that simulate actual conditions as close as is practically possible. The Contractor executing the test shall provide all necessary materials, system modifications, etc. to produce the necessary flows, pressures, temperatures, etc. necessary to execute the test according to the specified conditions. At completion of the test, the Contractor shall return all affected building equipment and systems, due to these temporary modifications, to their pre-test condition.
3. Sampling. Multiple identical pieces of non-life-safety or non-critical equipment may be functionally tested using a sampling strategy. The sampling strategy will be developed by the CxA and approved by the Owner's Representative. For details on Sampling, refer to the Commissioning Plan. If, after three attempts at testing the specified sample percentage, failures are still present, then all remaining units are tested at the Contractor's expense.

D. Coordination and Scheduling. The Contractor shall provide sufficient notice to the CxA regarding their completion schedule for the pre-functional checklists and startup of all equipment and systems. The CxA will schedule functional tests through the Owner's Representative. The CxA shall direct, witness and document the functional testing of all equipment and systems. The Contractor shall execute the tests.

E. Problem Solving. The CxA will recommend solutions to problems found; however, the burden of responsibility to solve, correct, and retest problems lie with the Contractor and their subcontractors.

3.4 O&M PERSONNEL TRAINING REQUIREMENTS

A. Training Plans: Contractor shall develop an instructional program that includes individual training modules for each system, subsystem, and equipment as specified in SECTION 01 79 00 – DEMONSTRATION AND TRAINING.

B. The minimum training requirements for Equipment are specified in technical sections.

C. The CxA shall review and provide comment on the training plans developed by the contractor for alignment with the requirements of the OPR and BOD.

-- END OF SECTION --

SECTION 111313 – LOADING DOCK BUMPERS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Loading Dock Bumpers

1.2 RELATED REQUIREMENTS

A. Section 111319 – Stationary Loading Dock Equipment

B. Section 111326 – Loading Dock Lights

C. Related Documents: Provisions established within General and Supplementary Conditions of the Contract, Division 1 General Requirements and Drawings are collectively applicable to this Section.

D. All equipment furnished under this contract shall meet all applicable local, state and federal Codes.

1.3 SUBMITTALS

A. Before executing any work under this section of specifications, furnish submittals in accordance with Section 013300 – Submittal Procedures, to show full compliance with contract requirements on items proposed to be furnished.

1. Product Data and Equipment Manufacturer's Literature
   a. Brochures showing name and address of Equipment Manufacturer, catalog or model number of each item incorporated into the work.
   b. Equipment Manufacturer's illustration and detailed description.
   c. List of deviations from Specifications.
   d. List of commonly replaced parts for the equipment specified. Include the frequency of replacement, unit pricing and delivery times for each item.
2. Certificates: The Equipment Manufacturer shall certify that the product offered meets the characteristics of the specified description and that the product conforms to the producer's own drawings, specifications, standards, and quality assurance practices.
3. Test Reports: Provide certified equipment test reports on each type of equipment to be furnished. Reports shall include, but not be limited to, scale accuracy.
   a. Tests shall be conducted by the Equipment Manufacturer in the Equipment Manufacturer's own facility, and shall also be conducted on the same type of equipment to be furnished on this Project.
   b. Test records need not be re-certified providing no essential change in design has been made since tests were conducted.
4. Shop Drawings: Complete and detailed for each item indicating fabrication and erection of dock equipment including plans, elevations and large-scale details.

B. Closeout Submittals: Provide closeout submittals and documents.

C. Installation Drawings: Show dimensions method of assembly, installation, and conditions relating to adjoining work which requires cutting or close fitting, reinforcement, anchorage, and other work required for complete installation for equipment detailed in this Section.

D. Review: Submittals will be reviewed for general design only, and not for method of assembly, construction, or detailed compliance with Contract Documents.

E. No deviation from Contract Documents is permitted unless specifically so noted by the General Contractor and accepted by the General Contractor in writing.

F. General Contractor Responsibility:
   1. Errors or omissions in submittals regardless of review status of submittals
   2. Coordination with work of other trades.
   3. Space coordination and code compliance.
   4. Assembly and installation techniques, including structural adequacy and suitable bracing and / or anchoring for stability and seismic conditions.
   5. Maintenance of installation safety.
   6. Satisfactory performance of all work.

1.4 QUALITY ASSURANCE

A. Qualifications: Equipment Manufacturer shall regularly and currently manufacture specified equipment as one of its principal products.

B. Equipment Manufacturer shall have technical qualifications, experience, trained personnel, and facilities to install specified items.

C. Equipment Manufacturer shall have equivalent product currently installed at three (3) installations similar to this Project that has been in satisfactory and efficient operation for three (3) years.

D. There shall be a permanent service organization, maintained and trained by Equipment Manufacturer, which will render emergency service within four (4) hours of notification that service is needed.

E. All materials and equipment to be permanently installed shall be new and of such quality to satisfy the standards of the Documents. The Equipment Manufacturer, if required, shall furnish satisfactory evidence as to the kind and quality of all materials and equipment used.

F. Workers skilled in their respective trades shall perform all labor; workmanship shall be of good quality so that first-class work is performed in accordance with the standards of construction set forth in the Documents.

G. The General Contractor and the Equipment Manufacturer are solely responsible for the accurate installation of equipment / systems and are to correct any operational aspects and deficiencies without recourse to the Owner.

H. If any work is performed which is contrary to any laws, ordinances, Codes, rules and regulations, the Equipment Vendor will make all necessary changes as required to comply therewith and bear all costs arising there from without additional cost to the Owner.

I. All parts of equipment shall be of design, size and materials to satisfactorily function under all conditions within rated load and speed range; all with proper factors of safety, maximum and electrical efficiency and minimum wear on parts.

J. All parts shall be built to definite standard dimensions and tolerances so that it will be possible to replace and / or adjust any part without tooling or machining being required to install replacement parts.

K. Mechanical fastenings used on parts to wear and replacement shall be key and seat, nut screw, or other removable and replaceable types, which do not require physical deformation or field positioning. Rivets or similar devices are not permitted as mechanical fastenings for such parts.

1.5 MANUALS, DIAGRAMS AND INSTRUCTIONS

A. All manuals, diagrams, and instructions will be submitted in accordance with the Division 01 specifications.

1.6 GUARANTEE

A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the General Contractor under the requirements of the Contract Documents.

B. Special Warranty: The equipment furnished is to be guaranteed for two (2) full years, from the date of acceptance and beneficial use or as detailed on the Documents. This guarantee is to include all replacement parts, as necessary to keep the equipment operational in accordance with the performance specifications and to the Owner's satisfaction.

C. All labor and materials furnished in connection with the installation of equipment shall be covered under the general warranty. Additional details may be provided in the RFP and the contractor must meet the warranty requirements of both the RFP and this equipment specification. Upon receipt of notice from the Owner of failure of any portion of materials and workmanship furnished, the General Contractor shall promptly replace the affected part(s) with new part(s) at his own expense.

D. No device shall be acceptable that will not give satisfactory performance without excessive maintenance and attention. If it becomes evident during the guarantee period that the device is not functioning properly or in accordance with the Contract requirements, or if in the opinion of the Owner, excessive maintenance and attention must be employed to keep such device operating, the device must be removed. A new device meeting all requirements shall be installed as part of contractual work until satisfactory operation of installation is obtained. The period of guarantee shall start anew from the date of completion of each new installation performed in accordance with the preceding requirements.

1.7 EQUIPMENT MAINTENANCE

A. The Owner shall be provided with a formal Preventive Maintenance Contract with a detailed parts list, replacement costs, descriptions and designations. The Preventive Maintenance Contract, if accepted by the Owner, is not to go into effect until after the guarantee expires. The Owner has the option to accept or decline the Preventive Maintenance Contract.

B. Maintenance Training Program shall be provided to the Owner, at the Equipment Manufacturer's factory, for training of additional Hospital technicians. Costs for this program shall be at the standard rate for this service.

C. One month before the equipment guarantee is to expire; the Equipment Manufacturer shall provide a review of the maintenance instruction program along with a review of the Preventive Maintenance Contract with its detailed parts list, individual replacement costs, descriptions and designations.

1.8 TOOLS

A. Provide one (1) complete set of special tools necessary to maintain and make adjustments on every part of the equipment, if such tools are required for the maintenance of the equipment.

1.9 CONSTRUCTION CONDITIONS

A. Provide all necessary anchor bolts, shims, fastenings, recesses, cutouts, slots, holes, patching and the like to perform installation of equipment to code and regulations.

B. Coordinate installation with other trades. Provide and obtain dimensions, clearances and similar data.

1.10 ELECTRICAL EQUIPMENT

A. Electrical equipment shall be suitable for use with electrical system shown on the Drawings.

B. Provide electrical components including motors, disconnect switches, motor controllers, motor control devices, and electrical circuits and connections, which conform to requirements of NFPA 70 whether or not electrical components are furnished as part of equipment assemblies.

C. Provide all electrical wiring, conduit, and all electrical devices necessary for the installation and operation of systems and equipment furnished.

1.11 PROJECT CONDITIONS

A. In order to discover and resolve conflicts or lack of definition, which might create problems, the Equipment Manufacturer must review contract documents for compatibility with its product prior to bidding.
   1. Review structural, architectural, electrical, mechanical and plumbing drawings, and specifications.
   2. Compliance with all provisions of the contract documents is assumed in the absence of written and approved exceptions.
   3. The design of the structural, mechanical and plumbing systems within the Project are fixed.
   4. The Equipment Manufacturer’s equipment shall fit and operate within these fixed elements.

PART 2 - PRODUCTS

2.1 LOADING DOCK BUMPERS

A. Extruded Rubber Bumpers: Provide units in manufacturer’s standard lengths to fit dock edge except at dock levelers or lifts. Fabricated from heavy extruded EPDM rubber. Furnish units with predrilled anchor holes at 12 inches o.c.

B. Configuration:
   1. Pawling Industrial Guards “D-4” or equivalent 4 inch by 4 inch profile.

C. Product Characteristics:
   1. Dimensions: 10- inch high x 13- inch wide x 4 – inch thick.

D. Constructed of molded rubber (or similar) compressed between structural angle held in place by 3/4-inches steel tie (or similar).

E. Anchorage Devices: Provide anchor bolts, nuts, washers, bolts, sleeves, cast-in-place plate, and other anchorage devices as required to fasten bumpers securely in place and to suit installation type indicated. Hot-dip galvanized steel or stainless steel.

PART 3 - EXECUTION

3.1 MANUFACTURED PRODUCTS

A. Materials, fixtures, and equipment furnished shall be of current production by Equipment Manufacturers regularly engaged in the manufacture of such items.

B. Units shall be products of one Equipment Manufacturer.

C. Equipment Manufacturer of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled units.

D. Components of an assembled unit need not be products of same Equipment Manufacturer.

E. Constituent parts, which are alike, shall be the products of a single Equipment Manufacturer.

F. Components shall be compatible with each other and with the total assembly for the intended service.

G. Nameplate:
   1. Each piece of equipment shall bear a corrosion-resisting steel, or deep-etched anodized aluminum nameplate located in a reasonably accessible position, permanently secured.
      a. Nameplate shall be proportionate to size of equipment and bear the following:
      b. Name of Equipment Manufacturer.
      c. Model number.
      d. Serial number.
      e. Electrical characteristics.

H. Fasteners
   1. Rivets, bolts, nuts, studs, spacers, and metal used for welding shall be same kind of metal as materials joined.
   2. Where corrosion-resisting metals are joined to each other or to other metals, rivets, bolts, and materials used for welding shall be corrosion-resisting metal.

I. Welding
   1. Joints in fabricated equipment shall be welded by an accepted method. Carbon arc welding is not acceptable, nor is any process permitting the pick-up of carbon acceptable.
   2. Welds shall be strong and ductile, with exposed surfaces free of imperfections such as pits, runs, spatter, and cracks, and shall have same color as adjoining surfaces.

J. Steel Fabrication
   1. Steel shall be free from kinks and sharp bends. Shearing and shipping shall be done neatly and accurately. Flame cutting may be employed instead of shearing or sawing. Re-entrant cuts shall be made in the best possible manner. Burned surfaces or flame cut materials shall be ground or machined to remove ash and checks.
   2. All joints, openings, and doors shall be square and neat. The finished equipment shall be free from sharp edges, fins, burrs, and sharp projections.

3. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be continuous for all major joints, and shall have the strength required to satisfy the design, use, and loading conditions. Intermittent welds may be used for attaching reinforcement members provided such welds will satisfy the design. Members to be welded shall be positioned and held by jigs or fixtures when necessary to ensure accurate alignment. All outside corners of the containment body shall be of butt joint construction.
4. Castings shall be sound and free from patching, misplaced coring, warping, or other defects, which might render the casting unsound for use. Forging shall be uniform in quality and condition, and shall be free from tears, cracks, seams, laps, internal ruptures, imbedded scale, segregation or other defects, which may detrimentally affect the suitability for the purpose intended.

3.2 EXAMINATION

A. Examine surfaces to receive product before application to ensure that the following conditions are met:
   1. Before shipment from Equipment Manufacturer's plant and following installation at project site, finished articles shall be thoroughly inspected and tested for compliance with specifications.
   2. Equipment Manufacturer shall inspect the site and conditions for which the equipment is to be installed and advise the General Contractor, in writing, of any conditions detrimental to the proper installation and operation of the equipment.

B. Do not start the work of this section until all deficiencies have been corrected. Commencement of work constitutes acceptance of the surfaces.

3.3 PREPARATION

A. Protect equipment against dirt, water, and chemicals during installation. Thoroughly clean equipment at the completion of work.

3.4 INSTALLATION

A. The work under this Section of the Specification shall include all labor, services, materials and equipment and the performance of all work as necessary and required to furnish and install the equipment as indicated on the Drawings and as specified above.

B. Delivery and installation of the equipment shall be so performed as to avoid delay on the work by other contractors. The General Contractor shall be responsible for receiving, uncrating, setting in place all of the equipment, and providing all the proper utilities, under the supervision of the Equipment Manufacturers.

C. The Equipment Manufacturer shall be responsible for all final connections of their equipment.

D. The equipment locations, as shown on the Drawings shall be checked by the General Contractor and the Equipment Manufacturers. All exact locations shall be determined by the dimensions of the equipment, and the layout drawing before an apparatus is installed. The General Contractor shall be solely responsible for the accurate installation and correct any operational aspects and deficiencies of his equipment without any recourse to the Owner.

E. The General Contractor and the Equipment Manufacturer shall consult the architectural and structural drawings for all dimensions, locations of partitions, locations of pipes and ductwork.

F. The General Contractor and the Equipment Manufacturer shall have a factory trained, field service technician on the premises to supervise the installation of all equipment. This service shall be at no additional cost to the Owner.

3.5 WORK BY OTHER TRADES

A. The mechanical, electrical and plumbing contractors shall, within their specific areas of responsibilities, provide all labor, services, and materials required to complete the following work:
   1. Electric power wiring services to motors and control panels, which will be provided by the General Contractor, will be as shown on the electrical working drawings or equipment shop drawings. All other wiring not shown on these drawings shall be provided by the Equipment Manufacturer.

B. All labor and materials furnished in connection with the installation shall meet all applicable local, state and Federal Codes, including OSHA, and shall be subject to terms of "General Conditions".

3.6 TESTS BY EQUIPMENT MANUFACTURER

A. Equipment manufacturer shall provide equipment-commissioning services as required by the owner. A detailed recommended commissioning plan shall be approved by the owner prior to testing and acceptance of the equipment. Equipment Manufacturer shall perform tests under normal operating conditions and in presence of the Owner.

B. Provide all equipment, instruments, and labor required for tests.

C. Evidence of malfunction in any tested system, piece of equipment, or component part thereof that occurs during, or as a result of tests, shall be corrected, repaired or replaced, and the test repeated.

3.7 OPERATING AND MAINTENANCE / REPAIR TRAINING BY EQUIPMENT MANUFACTURER

A. An orientation and continuing education program shall be presented to employees when the equipment is operational. The program is to be presented by a full time employee of the Equipment Manufacturer, trained in the respective department functions. The program is to be based on the department operations and employee responsibilities with audio-visual aid equipment and tape programs including operating manuals. The audio-visual programs shall be provided to the Owner at no cost for future use.

B. A factory trained representative shall provide equipment demonstration to all of the appropriate employees, including proper daily and emergency equipment operational instructions with daily start-up and shutdown procedures. Owner shall determine schedule and number of meetings to provide to all staff.

C. An instruction program shall be provided to the Owner's maintenance personnel, by fully trained and full-time instructors, on the maintenance, care, adjustment and operation of the Equipment as detailed above.

D. All instruction shall include classroom and "hands on" training when the equipment is in operation, but before the Owner begins beneficial use. The program is to include a review of equipment operation and characteristics, maintenance manuals, schematics and spare part recommendations.

3.8 EMERGENCY SERVICE

A. During the duration of the warranty, the Equipment Manufacturer must provide emergency service within twenty-four (24) hours of notification of trouble and return to operation any piece of equipment within forty-eight (48) hours of reported failure. This service is to be performed by the Equipment Manufacturer at no additional cost to the Owner.

END OF SECTION

SECTION 111316 – LOADING DOCK SEALS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Loading Dock Seals

1.2 RELATED REQUIREMENTS

A. Section 111313: Loading Dock Bumpers

B. Section 111319: Stationary Loading Dock Equipment

C. Related Documents: Provisions established within General and Supplementary Conditions of the Contract, Division 1 General Requirements and Drawings are collectively applicable to this Section.

D. All equipment furnished under this contract shall meet all applicable local, state and federal Codes.

1.3 SUBMITTALS

A. Before executing any work under this section of specifications, furnish submittals in accordance with Section 013300 – Submittal Procedures, to show full compliance with contract requirements on items proposed to be furnished.

1. Product Data and Equipment Manufacturer's Literature
   a. Brochures showing name and address of Equipment Manufacturer, catalog or model number of each item incorporated into the work.
   b. Equipment Manufacturer's illustration and detailed description.
   c. List of deviations from Specifications.
   d. List of commonly replaced parts for the equipment specified. Include the frequency of replacement, unit pricing and delivery times for each item.
2. Certificates: The Equipment Manufacturer shall certify that the product offered meets the characteristics of the specified description and that the product conforms to the producer's own drawings, specifications, standards, and quality assurance practices.
3. Test Reports: Provide certified equipment test reports on each type of equipment to be furnished. Reports shall include, but not be limited to, scale accuracy.
   a. Tests shall be conducted by the Equipment Manufacturer in the Equipment Manufacturer's own facility, and shall also be conducted on the same type of equipment to be furnished on this Project.
   b. Test records need not be re-certified providing no essential change in design has been made since tests were conducted.
4. Shop Drawings: Complete and detailed for each item specially fabricated.

B. Closeout Submittals: Provide closeout submittals and documents.

C. Installation Drawings: Show dimensions method of assembly, installation, and conditions relating to adjoining work which requires cutting or close fitting, reinforcement, anchorage, and other work required for complete installation for equipment detailed in this Section.

D. Review: Submittals will be reviewed for general design only, and not for method of assembly, construction, or detailed compliance with Contract Documents.

E. No deviation from Contract Documents is permitted unless specifically so noted by the General Contractor and accepted by the General Contractor in writing.

F. General Contractor Responsibility:
   1. Errors or omissions in submittals regardless of review status of submittals
   2. Coordination with work of other trades.
   3. Space coordination and code compliance.
   4. Assembly and installation techniques, including structural adequacy and suitable bracing and / or anchoring for stability and seismic conditions.
   5. Maintenance of installation safety.
   6. Satisfactory performance of all work.

1.4 QUALITY ASSURANCE

A. Qualifications: Equipment Manufacturer shall regularly and currently manufacture specified equipment as one of its principal products.

B. Equipment Manufacturer shall have technical qualifications, experience, trained personnel, and facilities to install specified items.

C. Equipment Manufacturer shall have equivalent product currently installed at three (3) installations similar to this Project that has been in satisfactory and efficient operation for three (3) years.

D. There shall be a permanent service organization, maintained and trained by Equipment Manufacturer, which will render emergency service within four (4) hours of notification that service is needed.

E. All materials and equipment to be permanently installed shall be new and of such quality to satisfy the standards of the Documents. The Equipment Manufacturer, if required, shall furnish satisfactory evidence as to the kind and quality of all materials and equipment used.

F. Workers skilled in their respective trades shall perform all labor; workmanship shall be of good quality so that first-class work is performed in accordance with the standards of construction set forth in the Documents.

G. The General Contractor and the Equipment Manufacturer are solely responsible for the accurate installation of equipment / systems and are to correct any operational aspects and deficiencies without recourse to the Owner.

H. If any work is performed which is contrary to any laws, ordinances, Codes, rules and regulations, the Equipment Vendor will make all necessary changes as required to comply therewith and bear all costs arising there from without additional cost to the Owner.

I. All parts of equipment shall be of design, size and materials to satisfactorily function under all conditions within rated load and speed range; all with proper factors of safety, maximum and electrical efficiency and minimum wear on parts.

J. All parts shall be built to definite standard dimensions and tolerances so that it will be possible to replace and / or adjust any part without tooling or machining being required to install replacement parts.

K. Mechanical fastenings used on parts to wear and replacement shall be key and seat, nut screw, or other removable and replaceable types, which do not require physical deformation or field positioning. Rivets or similar devices are not permitted as mechanical fastenings for such parts.

1.5 MANUALS, DIAGRAMS AND INSTRUCTIONS

A. All manuals, diagrams, and instructions will be submitted in accordance with the Division 01 specifications.

1.6 GUARANTEE

A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the General Contractor under the requirements of the Contract Documents.

B. Special Warranty: The equipment furnished is to be guaranteed for two (2) full years, from the date of acceptance and beneficial use or as detailed on the Documents. This guarantee is to include all replacement parts, as necessary to keep the equipment operational in accordance with the performance specifications and to the Owner's satisfaction.

C. All labor and materials furnished in connection with the installation of equipment shall be covered under the general warranty. Additional details may be provided in the RFP and the contractor must meet the warranty requirements of both the RFP and this equipment specification. Upon receipt of notice from the Owner of failure of any portion of materials and workmanship furnished, the General Contractor shall promptly replace the affected part(s) with new part(s) at his own expense.

D. No device shall be acceptable that will not give satisfactory performance without excessive maintenance and attention. If it becomes evident during the guarantee period that the device is not functioning properly or in accordance with the Contract requirements, or if in the opinion of the Owner, excessive maintenance and attention must be employed to keep such device operating, the device must be removed. A new device meeting all requirements shall be installed as part of contractual work until satisfactory operation of installation is obtained. The period of guarantee shall start anew from the date of completion of each new installation performed in accordance with the preceding requirements.

1.7 EQUIPMENT MAINTENANCE

A. The Owner shall be provided with a formal Preventive Maintenance Contract with a detailed parts list, replacement costs, descriptions and designations. The Preventive Maintenance Contract, if accepted by the Owner, is not to go into effect until after the guarantee expires. The Owner has the option to accept or decline the Preventive Maintenance Contract.

B. One month before the equipment guarantee is to expire; the Equipment Manufacturer shall provide a review of the maintenance instruction program along with a review of the Preventive Maintenance Contract with its detailed parts list, individual replacement costs, descriptions and designations.

1.8 TOOLS

A. Provide one (1) complete set of special tools necessary to maintain and make adjustments on every part of the equipment, if such tools are required for the maintenance of the equipment.

1.9 CONSTRUCTION CONDITIONS

A. Provide all necessary anchor bolts, shims, fastenings, recesses, cutouts, slots, holes, patching and the like to perform installation of equipment to code and regulations.

B. Coordinate installation with other trades. Provide and obtain dimensions, clearances and similar data.

1.10 PROJECT CONDITIONS

A. In order to discover and resolve conflicts or lack of definition, which might create problems, the Equipment Manufacturer must review contract documents for compatibility with its product prior to bidding.
   1. Review structural, architectural, electrical, mechanical and plumbing drawings, and specifications.
   2. Compliance with all provisions of the contract documents is assumed in the absence of written and approved exceptions.
   3. The design of the structural, mechanical and plumbing systems within the Project are fixed.
   4. The Equipment Manufacturer's equipment shall fit and operate within these fixed elements.

PART 2 - PRODUCTS

2.1 SYSTEM MANUFACTURER

A. All equipment shall be furnished by an approved system manufacturer or equivalent. Approved system manufactures include:
   1. Kelley/4Front Engineered Solutions
   2. Rite Hite Corporation
   3. Nordock Inc.
   4. Blue Giant Corporation
   5. All-Rite Dock and Door Systems Inc.
   6. WB McGuire Co.

2.2 LOADING DOCK SEALS

A. Dock seals are to be made of foam with head curtain included

B. Seal Dimensions
   1. Height: 108"
   2. Depth: 10"
   3. Width: 12" (per side)

C. Curtain Dimensions
   1. Height: 12"
   2. Depth: 10"
   3. Width: 120"

D. Minimum height of unit off grade: 14'

E. Minimum clearance above top of side pads: 4"

F. Minimum Curtain Splits – 12"

G. Wear Pleats, Wear Face and Reinforced inside face to be constructed of manufacturer standard 40 oz chopped strand material or similar

H. Minimum cover fabric tearing strength: 210 lbs/in^2

I. Minimum cover fabric abrasion resistance: 2,000 cycles

J. Guide Strips - Yellow
   1. Minimum width: 3”
   2. Minimum height: 36”

K. All pads to be vented for air and moisture release

PART 3 - EXECUTION

3.1 MANUFACTURED PRODUCTS

A. Materials, fixtures, and equipment furnished shall be of current production by Equipment Manufacturers regularly engaged in the manufacture of such items.

B. Units shall be products of one Equipment Manufacturer.

C. Equipment Manufacturer of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled units.

D. Components of an assembled unit need not be products of same Equipment Manufacturer.

E. Constituent parts, which are alike, shall be the products of a single Equipment Manufacturer.

F. Components shall be compatible with each other and with the total assembly for the intended service.

G. Nameplate:
   1. Each piece of equipment shall bear a corrosion-resisting steel, or deep-etched anodized aluminum nameplate located in a reasonably accessible position, permanently secured.
      a. Nameplate shall be proportionate to size of equipment and bear the following:
      b. Name of Equipment Manufacturer.
      c. Model number.
      d. Serial number.
      e. Electrical characteristics.

H. Fasteners
   1. Rivets, bolts, nuts, studs, spacers, and metal used for welding shall be same kind of metal as materials joined.
   2. Where corrosion-resisting metals are joined to each other or to other metals, rivets, bolts, and materials used for welding shall be corrosion-resisting metal.

I. Welding
   1. Joints in fabricated equipment shall be welded by an accepted method. Carbon arc welding is not acceptable, nor is any process permitting the pick-up of carbon acceptable.
   2. Welds shall be strong and ductile, with exposed surfaces free of imperfections such as pits, runs, spatter, and cracks, and shall have same color as adjoining surfaces.

J. Steel Fabrication
   1. Steel shall be free from kinks and sharp bends. Shearing and shipping shall be done neatly and accurately. Flame cutting may be employed instead of shearing or sawing. Re-entrant cuts shall be made in the best possible manner. Burned surfaces or flame cut materials shall be ground or machined to remove ash and checks.

2. All joints, openings, and doors shall be square and neat. The finished equipment shall be free from sharp edges, fins, burrs, and sharp projections.
3. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be continuous for all major joints, and shall have the strength required to satisfy the design, use, and loading conditions. Intermittent welds may be used for attaching reinforcement members provided such welds will satisfy the design. Members to be welded shall be positioned and held by jigs or fixtures when necessary to ensure accurate alignment. All outside corners of the containment body shall be of butt joint construction.
4. Castings shall be sound and free from patching, misplaced coring, warping, or other defects, which might render the casting unsound for use. Forging shall be uniform in quality and condition, and shall be free from tears, cracks, seams, laps, internal ruptures, imbedded scale, segregation or other defects, which may detrimentally affect the suitability for the purpose intended.

3.2 EXAMINATION

A. Examine surfaces to receive product before application to ensure that the following conditions are met:
   1. Before shipment from Equipment Manufacturer's plant and following installation at project site, finished articles shall be thoroughly inspected and tested for compliance with specifications.
   2. Equipment Manufacturer shall inspect the site and conditions for which the equipment is to be installed and advise the General Contractor, in writing, of any conditions detrimental to the proper installation and operation of the equipment.

B. Do not start the work of this section until all deficiencies have been corrected. Commencement of work constitutes acceptance of the surfaces.

3.3 PREPARATION

A. Protect equipment against dirt, water, and chemicals during installation. Thoroughly clean equipment at the completion of work.

3.4 INSTALLATION

A. The work under this Section of the Specification shall include all labor, services, materials and equipment and the performance of all work as necessary and required to furnish and install the equipment as indicated on the Drawings and as specified above.

B. Delivery and installation of the equipment shall be so performed as to avoid delay on the work by other contractors. The General Contractor shall be responsible for receiving, uncrating, setting in place all of the equipment, and providing all the proper utilities, under the supervision of the Equipment Manufacturers.

C. The Equipment Manufacturer shall be responsible for all final connections of their equipment.

D. The equipment locations, as shown on the Drawings shall be checked by the General Contractor and the Equipment Manufacturers. All exact locations shall be determined by the dimensions of the equipment, and the layout drawing before an apparatus is installed. The General Contractor shall be solely responsible for the accurate installation and correct any operational aspects and deficiencies of his equipment without any recourse to the Owner.

E. The General Contractor and the Equipment Manufacturer shall consult the architectural and structural drawings for all dimensions, locations of partitions, locations of pipes and ductwork.

F. The General Contractor and the Equipment Manufacturer shall have a factory trained, field service technician on the premises to supervise the installation of all equipment. This service shall be at no additional cost to the Owner.

3.5 WORK BY OTHER TRADES

A. The mechanical, electrical and plumbing contractors shall, within their specific areas of responsibilities, provide all labor, services, and materials required to complete the following work:

1. Electric power wiring services to motors and control panels, which will be provided by the General Contractor, will be as shown on the electrical working drawings or equipment shop drawings. All other wiring not shown on these drawings shall be provided by the Equipment Manufacturer.

B. All labor and materials furnished in connection with the installation shall meet all applicable local, state and Federal Codes, including OSHA, and shall be subject to terms of "General Conditions".

3.6 TESTS BY EQUIPMENT MANUFACTURER

A. Equipment manufacturer shall provide equipment-commissioning services as required by the owner. A detailed recommended commissioning plan shall be approved by the owner prior to testing and acceptance of the equipment. Equipment Manufacturer shall perform tests under normal operating conditions and in presence of the Owner.

B. Provide all equipment, instruments, and labor required for tests.

C. Evidence of malfunction in any tested system, piece of equipment, or component part thereof that occurs during, or as a result of tests, shall be corrected, repaired or replaced, and the test repeated.

3.7 OPERATING AND MAINTENANCE / REPAIR TRAINING BY EQUIPMENT MANUFACTURER

A. An orientation and continuing education program shall be presented to employees when the equipment is operational. The program is to be presented by a full time employee of the Equipment Manufacturer, trained in the respective department functions. The program is to be based on the department operations and employee responsibilities with audio-visual aid equipment and tape programs including operating manuals. The audio-visual programs shall be provided to the Owner at no cost for future use.

B. A factory trained representative shall provide equipment demonstration to all of the appropriate employees, including proper daily and emergency equipment operational instructions with daily start-up and shutdown procedures. Owner shall determine schedule and number of meetings to provide to all staff.

C. An instruction program shall be provided to the Owner's maintenance personnel, by fully trained and full-time instructors, on the maintenance, care, adjustment and operation of the Equipment as detailed above.

D. All instruction shall include classroom and "hands on" training when the equipment is in operation, but before the Owner begins beneficial use. The program is to include a review of equipment operation and characteristics, maintenance manuals, schematics and spare part recommendations.

3.8 EMERGENCY SERVICE

A. During the duration of the warranty, the Equipment Manufacturer must provide emergency service within twenty-four (24) hours of notification of trouble and return to operation any piece of equipment within forty-eight (48) hours of reported failure. This service is to be performed by the Equipment Manufacturer at no additional cost to the Owner.

END OF SECTION

SECTION 111319 – STATIONARY LOADING DOCK EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Hydraulic Dock Levelers

B. Pit Mounted Scissor Lift

1.2 RELATED REQUIREMENTS

A. Section 111313 – Loading Dock Bumpers

B. Section 111326 – Loading Dock Lights

C. Related Documents: Provisions established within General and Supplementary Conditions of the Contract, Division 1 General Requirements and Drawings are collectively applicable to this Section.

D. All equipment furnished under this contract shall meet all applicable local, state and federal Codes.

1.3 REFERENCE STANDARDS

A. American National Standards Institute (ANSI):
1. ANSI MH 14.1 – Loading Dock Levelers and Dock Boards
2. ANSI MH 30.1 – Industrial Loading Dock Boards (Ramps)
3. ANSI MH 29.1 – Industrial Scissors Lift
4. ANSI MH 30.3 – Vehicle Restraining Devices (Safety, Performance and Testing)

1.4 SUBMITTALS

A. Before executing any work under this section of specifications, furnish submittals in accordance with Section 013300 – Submittal Procedures, to show full compliance with contract requirements on items proposed to be furnished.
1. Product Data and Equipment Manufacturer's Literature
   a. Brochures showing name and address of Equipment Manufacturer, catalog or model number of each item incorporated into the work.
   b. Equipment Manufacturer's illustration and detailed description.
   c. List of deviations from Specifications.
   d. List of commonly replaced parts for the equipment specified. Include the frequency of replacement, unit pricing and delivery times for each item.
2. Certificates: The Equipment Manufacturer shall certify that the product offered meets the characteristics of the specified description and that the product conforms to the producer's own drawings, specifications, standards, and quality assurance practices.
3. Test Reports: Provide certified equipment test reports on each type of equipment to be furnished. Reports shall include, but not be limited to, scale accuracy.
   a. Tests shall be conducted by the Equipment Manufacturer in the Equipment Manufacturer's own facility, and shall also be conducted on the same type of equipment to be furnished on this Project.
   b. Test records need not be re-certified providing no essential change in design has been made since tests were conducted.

4. Shop Drawings: Complete and detailed for each item indicating fabrication and erection of dock equipment including plans, elevations and large-scale details.

B. Closeout Submittals: Provide closeout submittals and documents.

C. Installation Drawings: Show dimensions method of assembly, installation, and conditions relating to adjoining work which requires cutting or close fitting, reinforcement, anchorage, and other work required for complete installation for equipment detailed in this Section.

D. Review: Submittals will be reviewed for general design only, and not for method of assembly, construction, or detailed compliance with Contract Documents.

E. No deviation from Contract Documents is permitted unless specifically so noted by the General Contractor and accepted by the General Contractor in writing.

F. General Contractor Responsibility:
1. Errors or omissions in submittals regardless of review status of submittals
2. Coordination with work of other trades.
3. Space coordination and code compliance.
4. Assembly and installation techniques, including structural adequacy and suitable bracing and / or anchoring for stability and seismic conditions.
5. Maintenance of installation safety.
6. Satisfactory performance of all work.

1.5 QUALITY ASSURANCE

A. Qualifications: Equipment Manufacturer shall regularly and currently manufacture specified equipment as one of its principal products.

B. Equipment Manufacturer shall have technical qualifications, experience, trained personnel, and facilities to install specified items.

C. Equipment Manufacturer shall have equivalent product currently installed at three (3) installations similar to this Project that has been in satisfactory and efficient operation for three (3) years.

D. There shall be a permanent service organization, maintained and trained by Equipment Manufacturer, which will render emergency service within four (4) hours of notification that service is needed.

E. All materials and equipment to be permanently installed shall be new and of such quality to satisfy the standards of the Documents. The Equipment Manufacturer, if required, shall furnish satisfactory evidence as to the kind and quality of all materials and equipment used.

F. Workers skilled in their respective trades shall perform all labor; workmanship shall be of good quality so that first-class work is performed in accordance with the standards of construction set forth in the Documents.

G. The General Contractor and the Equipment Manufacturer are solely responsible for the accurate installation of equipment / systems and are to correct any operational aspects and deficiencies without recourse to the Owner.

H. If any work is performed which is contrary to any laws, ordinances, Codes, rules and regulations, the Equipment Vendor will make all necessary changes as required to comply therewith and bear all costs arising there from without additional cost to the Owner.

I. All parts of equipment shall be of design, size and materials to satisfactorily function under all conditions within rated load and speed range; all with proper factors of safety, maximum and electrical efficiency and minimum wear on parts.

J. All parts shall be built to definite standard dimensions and tolerances so that it will be possible to replace and / or adjust any part without tooling or machining being required to install replacement parts.

K. Mechanical fastenings used on parts to wear and replacement shall be key and seat, nut screw, or other removable and replaceable types, which do not require physical deformation or field positioning. Rivets or similar devices are not permitted as mechanical fastenings for such parts.

1.6 MANUALS, DIAGRAMS AND INSTRUCTIONS

A. All manuals, diagrams, and instructions will be submitted in accordance with the Division 01 specifications.

1.7 GUARANTEE

A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the General Contractor under the requirements of the Contract Documents.

B. Special Warranty: The equipment furnished is to be guaranteed for two (2) full years, from the date of acceptance and beneficial use or as detailed on the Documents. This guarantee is to include all replacement parts, as necessary to keep the equipment operational in accordance with the performance specifications and to the Owner's satisfaction.

C. All labor and materials furnished in connection with the installation of equipment shall be covered under the general warranty. Additional details may be provided in the RFP and the contractor must meet the warranty requirements of both the RFP and this equipment specification. Upon receipt of notice from the Owner of failure of any portion of materials and workmanship furnished, the General Contractor shall promptly replace the affected part(s) with new part(s) at his own expense.

D. No device shall be acceptable that will not give satisfactory performance without excessive maintenance and attention. If it becomes evident during the guarantee period that the device is not functioning properly or in accordance with the Contract requirements, or if in the opinion of the Owner, excessive maintenance and attention must be employed to keep such device operating, the device must be removed. A new device meeting all requirements shall be installed as part of contractual work until satisfactory operation of installation is obtained. The period of guarantee shall start anew from the date of completion of each new installation performed in accordance with the preceding requirements.

1.8 EQUIPMENT MAINTENANCE

A. The Owner shall be provided with a formal Preventive Maintenance Contract with a detailed parts list, replacement costs, descriptions and designations. The Preventive Maintenance Contract, if accepted by the Owner, is not to go into effect until after the guarantee expires. The Owner has the option to accept or decline the Preventive Maintenance Contract.

B. Maintenance Training Program shall be provided to the Owner, at the Equipment Manufacturer's factory, for training of additional Hospital technicians. Costs for this program shall be at the standard rate for this service.

C. One month before the equipment guarantee is to expire; the Equipment Manufacturer shall provide a review of the maintenance instruction program along with a review of the Preventive Maintenance Contract with its detailed parts list, individual replacement costs, descriptions and designations.

1.9 TOOLS

A. Provide one (1) complete set of special tools necessary to maintain and make adjustments on every part of the equipment, if such tools are required for the maintenance of the equipment.

1.10 CONSTRUCTION CONDITIONS

A. Provide all necessary anchor bolts, shims, fastenings, recesses, cutouts, slots, holes, patching and the like to perform installation of equipment to code and regulations.

B. Coordinate installation with other trades. Provide and obtain dimensions, clearances and similar data.

1.11 ELECTRICAL EQUIPMENT

A. Electrical equipment shall be suitable for use with electrical system shown on the Drawings.

B. Provide electrical components including motors, disconnect switches, motor controllers, motor control devices, and electrical circuits and connections, which conform to requirements of NFPA 70 whether or not electrical components are furnished as part of equipment assemblies.

C. Provide all electrical wiring, conduit, and all electrical devices necessary for the installation and operation of systems and equipment furnished.

1.12 PROJECT CONDITIONS

A. In order to discover and resolve conflicts or lack of definition, which might create problems, the Equipment Manufacturer must review contract documents for compatibility with its product prior to bidding.
   1. Review structural, architectural, electrical, mechanical and plumbing drawings, and specifications.
   2. Compliance with all provisions of the contract documents is assumed in the absence of written and approved exceptions.
   3. The design of the structural, mechanical and plumbing systems within the Project are fixed.

4. The Equipment Manufacturer's equipment shall fit and operate within these fixed elements.

PART 2 - PRODUCTS

2.1 System Manufacturer

A. All equipment shall be furnished by an approved system manufacturer. Approved system manufacturers include:
   1. Kelley/4Front Engineered Solutions
   2. Rite Hite Corporation
   3. Nordock Inc.
   4. Blue Giant Corporation
   5. All-Rite Dock and Door Systems Inc.
   6. WB McGuire Co.

2.2 HYDRAULIC DOCK LEVELERS

A. Type:
   1. Provide recessed, hinge-lip-type dock levelers designed for permanent installation in a concrete pit, performed in the edge of loading platform.
      a. Quantity and location as shown on the contract drawings.

B. Rated Capacity:
   1. Capable of supporting total gross load of 30,000 lb. without permanent deflection or distortion.

C. Platform:
   1. Width: 6 feet
   2. Length: 8 feet
   3. Steel tread plate deck and lugs to be constructed of 40-50,000-psi yield material. Platform deck thickness shall be 1/4 inch high tensile steel safety tread plate with abrasive non-skid finish. Ramp to be continuously welded to the deck lugs and full width rear piano hinge. Front and rear hinge rods to be zinc plated SAE 1045, factory coated with anti-seize lubricant.

D. Lip Length
   1. Full width 16 inch extension 5/8 inch thick high tensile steel safety tread plate for rated for 30,000 pound capacity with abrasive non-skid finish.

E. Function:
   1. Dock levelers shall compensate for the differences in height between truck bed and loading platform in the following manner:
      a. Working range of 12 inches above and 12 inches below dock level.
      b. Levelers shall have ramp flex of 4" to compensate for un-level trailer beds.
      c. Rear hinges shall be fixed and shall not rise above floor level.
      d. Welded assembly to have a full width rear hinge and three solid steel deck supports.
      e. Anchor holes to be provided for bolting to the building foundation.
      f. Full operating range telescoping toe guards to close off sides when leveler is in the highest upward position.

g. Platform shall have a minimum of 8 interior deck beams plus external working range toe-guards with no more than 8" spacing between the beams.
h. Vertical Compensation: Floating travel up and down to compensate for loading and unloading of truck.
i. Maintenance Leg: Provide manufacturer's standard safety maintenance leg.

F. Safety Stops
1. Provide safety stops to limit fall of platform to 3" and 7" below dock. Safety stops to be integral part of manufacturer's standard dock levelers.
2. Safety device effective with load on platform up to 25,000 pounds.

G. Ramp Control
1. Ramp control to have a 9 tooth pawl and ratchet bar for positive engagement through full working range.

H. Pit Floor Slope: Minimum 1/2 inch, back to front.

I. Provide a curb angle:
1. 1-piece 5 x 5 x 3/8 inch angle iron with concrete anchors for the leading edge of floor, full width of door opening. Pit mounted units require an additional 7-piece frame of 2 x 2 x 1/4 inch angle iron.

J. Identification: Attach to dock leveler in conspicuous place stating:
1. Capacity.
2. Name of Manufacturer.
3. Model Number.
4. Serial Number.

K. Standard Features:
1. Structural Safety Legs
2. Permanently mounted hinged, integrated, maintenance safety strut
3. Automatic night locks
4. Cross traffic supports
5. Full operating range toe guard protection with thickness no less than 11 gage (0.120 inch)
6. Hold down system to provide unlimited leveler float
7. Shimless front and rear frame design.
8. Grease fittings
9. Open frame design-open front structure to allow easy clean out.

L. Dock leveler control box: All individual components, as well as the complete box unit, shall be UL-approved.

M. Motor (Hydraulic) Operation:
1. Electrical power pack (includes motor, pump and valve assembly) of 1 HP, 480 volt 3 phase motor
2. Control Panel: Heavy duty, single push-button activation.
3. Platform and lip operated by hydraulic cylinders.
4. Lip automatically extends and holds.
5. Engineer unit to "free float" with truck bed.
6. Provide drop-safe hydraulic safety stop.

2.3 Pit Mounted Scissor Lift

A. Provide manufacturer's standard hydraulic dock lift of capacity, size, and construction indicated, consisting of a nonslip steel platform with beveled toe guards on all four sides, steel scissor legs, and hydraulic operating system, complete with controls, safety devices, and accessories required.

B. Provide single-scissor-type hydraulic dock lifts designed for permanent, recessed installation in a preformed concrete pit at location indicated.

C. Quantity and location as shown on the contract drawings.

D. Rated Capacity: Provide lifting capacity of not less than 8,000 lb with 6,000 lb axle load at ends and 5,000 lb axle loads at sides.

E. Vertical Travel: Provide maximum vertical travel of 58 inches from a lowered height of 12 inches for a raised height of 70 inches.

F. Travel Speed: Nominal raising speed of 10 fpm.

G. Construction: Fabricate lift from structural steel shapes rigidly welded and reinforced for maximum strength, safety, and stability. Design assembly to withstand deformation during both operating and stored phases of service. Provide mounting brackets and removable lifting eyes for ease of installation.
   1. Platform: Fabricate platform from heavy steel plate with beveled toe guards on all four sides to comply with requirements of MH29.1. Provide matching, hinged, throw-over bridges where indicated and removable handrails.
      a. Platform Surface: Nonskid, safety-tread deck plate.
      b. Platform Size; 72 inches wide by 96 inches long
   2. Hinged Bridge: Provide hinged, throw-over bridge, heavy-duty, piano-type hinge welded to toe guard at end of platform. Provide bridge complete with heavy-duty lifting chains. Chamfer edge of bridge to minimize obstructing wheels of material-handling vehicles.
      a. Bridge Material: Nonskid, safety-tread steel plate.
      b. Bridge Size: 18 inches long by 72 inches wide.
      c. Ergonomic Spring assisted Bridge
   3. Removable Handrails: Steel pipe 1.5 inches (38 mm) construction, 42 inches (1,067 mm) high, with mid-rail and 4 inches (102 mm) high kick plate. Handrail sockets are flush with platform surface. Chains are provided at both open ends between the rails.
   4. Scissor Mechanism: Fabricate leg members from heavy, steel formed tube members to provide maximum strength and rigidity.
   5. Cylinders: Equip lift with not less than two heavy-duty, high-pressure, hydraulic, cylinders.
   6. Bearings: Provide pivot points with lifetime self-lubricating bushings for minimum maintenance.

H. Operation: Provide manufacturer's standard, self-contained, electric, hydraulic power unit for raising and lowering lift, controlled from a remotely located push-button station.
   1. Electrical Requirements: Coordinate wiring requirements and current characteristics with building electrical system.
   2. Power Unit: Provide manufacturer's standard, self-contained, remotely located power unit of size, type, and operation needed for capacity of lift indicated.

3. Speed control: Provide manufacturer's standard pressure compensated flow control to maintain rated speed when the lift is loaded or unloaded.
4. Free-fall protection: Provide a hydraulic velocity fuse at each cylinder to prevent the lift platform from free falling in the event of a severed hydraulic hose or broken hydraulic fitting.
5. Remote located Control Station: Provide a weatherproof, multi-button control station of the constant-pressure type with NEMA 4x rated up and down push buttons. Controller shall consist of a magnetic motor starter with three pole-adjustable overloads and 115-VAC control transformer with a fused secondary prewired to terminal strips and enclosed in a NEMA, Type 12 box.
   a. Upper-Travel-Limit Switch: Equip unit with manufacturer's standard, adjustable, upper-travel-limit switch.

I. Safety Devices: Provide manufacturer's standard and original safety devices as follows:
1. Removable Handrails: Provide removable handrails on two sides of platform with a single, removable chain across each end. Handrail detail noted above.
2. Maintenance Leg: Provide manufacturer's standard safety maintenance leg.
3. Protection: Provide manufacturer's standard toe protection along entire unprotected side(s) of lift.

J. Provide a curb angle:
1. Provide curb angle on all edges of the dock and pit. Utilize a minimum curb angle of 2 x 2 x 1/4 inch angle iron.

K. Finish and Color: Manufacturer's standard paint applied to factory-assembled and tested dock lifts before shipping. Provide toe guards with yellow and black stripes to comply with ANSIZ535.1, and paint remainder of surfaces in manufacturer's standard color.

2.4 FABRICATION

A. Dock Equipment:
1. Welded base frame construction.
2. Unit supplied completely assembled, ready for use.

2.5 FINISHES

A. Preparation: Clean surfaces free from slag and splatter, loose mill scale, oil, grease, or rust.

B. Manufacturer's standard paint applied to factory-assembled and tested dock lifts before shipping. Provide toe guards with yellow and black stripes to comply with ANSIZ535.1, and paint remainder of surfaces in manufacturer's standard color.

PART 3 - EXECUTION

3.1 MANUFACTURED PRODUCTS

A. Materials, fixtures, and equipment furnished shall be of current production by Equipment Manufacturers regularly engaged in the manufacture of such items.

B. Units shall be products of one Equipment Manufacturer.

C. Equipment Manufacturer of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled units.

D. Components of an assembled unit need not be products of same Equipment Manufacturer.

E. Constituent parts, which are alike, shall be the products of a single Equipment Manufacturer.

F. Components shall be compatible with each other and with the total assembly for the intended service.

G. Nameplate:
   1. Each piece of equipment shall bear a corrosion-resisting steel, or deep-etched anodized aluminum nameplate located in a reasonably accessible position, permanently secured.
      a. Nameplate shall be proportionate to size of equipment and bear the following:
      b. Name of Equipment Manufacturer.
      c. Model number.
      d. Serial number.
      e. Electrical characteristics.

H. Fasteners
   1. Rivets, bolts, nuts, studs, spacers, and metal used for welding shall be same kind of metal as materials joined.
   2. Where corrosion-resisting metals are joined to each other or to other metals, rivets, bolts, and materials used for welding shall be corrosion-resisting metal.

I. Welding
   1. Joints in fabricated equipment shall be welded by an accepted method. Carbon arc welding is not acceptable, nor is any process permitting the pick-up of carbon acceptable.
   2. Welds shall be strong and ductile, with exposed surfaces free of imperfections such as pits, runs, spatter, and cracks, and shall have same color as adjoining surfaces.

J. Steel Fabrication
   1. Steel shall be free from kinks and sharp bends. Shearing and shipping shall be done neatly and accurately. Flame cutting may be employed instead of shearing or sawing. Re-entrant cuts shall be made in the best possible manner. Burned surfaces or flame cut materials shall be ground or machined to remove ash and checks.
   2. All joints, openings, and doors shall be square and neat. The finished equipment shall be free from sharp edges, fins, burrs, and sharp projections.
   3. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be continuous for all major joints, and shall have the strength required to satisfy the design, use, and loading conditions. Intermittent welds may be used for attaching reinforcement members provided such welds will satisfy the design. Members to be welded shall be positioned and held by jigs or fixtures when necessary to ensure accurate alignment. All outside corners of the containment body shall be of butt joint construction.

4. Castings shall be sound and free from patching, misplaced coring, warping, or other defects, which might render the casting unsound for use. Forging shall be uniform in quality and condition, and shall be free from tears, cracks, seams, laps, internal ruptures, imbedded scale, segregation or other defects, which may detrimentally affect the suitability for the purpose intended.

3.2 EXAMINATION

A. Examine surfaces to receive product before application to ensure that the following conditions are met:
   1. Before shipment from Equipment Manufacturer's plant and following installation at project site, finished articles shall be thoroughly inspected and tested for compliance with specifications.
   2. Equipment Manufacturer shall inspect the site and conditions for which the equipment is to be installed and advise the General Contractor, in writing, of any conditions detrimental to the proper installation and operation of the equipment.

B. Do not start the work of this section until all deficiencies have been corrected. Commencement of work constitutes acceptance of the surfaces.

C. Verification of conditions:
   1. The contractor is responsible to field verify that all dimensions are the correct size and location, and is prepared for installation of leveler and components.
   2. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of loading dock equipment.
   3. Examine walls and floors of pits for suitable. Pits shall be plumb and square, and properly sloped for drainage from back to front of dock.
   4. Proceed with installation of loading dock equipment only after unsatisfactory conditions have been corrected.

3.3 PREPARATION

A. Protect equipment against dirt, water, and chemicals during installation. Thoroughly clean equipment at the completion of work.

B. Coordinate forming of pit to receive dock leveler/lift.
   1. Manufacturer of Leveler/Lift to provide pit curbing and anchors, rough-in sizes and templates to appropriate trade for installation into pit.
   2. Ensure curb angles are square, level and flush with pit surfaces.
   3. Ensure that curb angles are in proper place and pit is of adequate size to receive leveler.
   4. Pit Design:
      a. 20” for all models pit depth for new construction.

3.4 INSTALLATION

A. The work under this Section of the Specification shall include all labor, services, materials and equipment and the performance of all work as necessary and required to furnish and install the equipment as indicated on the Drawings and as specified above.

B. Delivery and installation of the equipment shall be so performed as to avoid delay on the work by other contractors. The General Contractor shall be responsible for receiving, uncrating, setting in place all of the equipment, and providing all the proper utilities, under the supervision of the Equipment Manufacturers.

C. The Equipment Manufacturer shall be responsible for all final connections of their equipment.

D. The equipment locations, as shown on the Drawings shall be checked by the General Contractor and the Equipment Manufacturers. All exact locations shall be determined by the dimensions of the equipment, and the layout drawing before an apparatus is installed. The General Contractor shall be solely responsible for the accurate installation and correct any operational aspects and deficiencies of his equipment without any recourse to the Owner.

E. The General Contractor and the Equipment Manufacturer shall consult the architectural and structural drawings for all dimensions, locations of partitions, locations of pipes and ductwork.

F. The General Contractor and the Equipment Manufacturer shall have a factory trained, field service technician on the premises to supervise the installation of all equipment. This service shall be at no additional cost to the Owner.

G. Dock Leveler/Lift:
   1. Install in prepared pit in accordance with manufacturer’s instructions
   2. Adjust dock leveler height by manufacturer’s recommendations as required to provide flush alignment with leveler and dock floor. Weld leveler frame securely to embedded curb steel.

3.5 ADJUSTING AND CLEANING

A. Adjust installed unit for smooth, safe, efficient and balanced operation.

B. Remove temporary labels and coverings and protection of adjacent work areas.

C. Restore marred, abraded surfaces to their original condition.

D. Repair or replace damaged products.

E. Remove construction debris from site and dispose.

F. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and installer that ensure loading dock equipment is without damage or deterioration at the time of Substantial Completion.

3.6 DEMONSTRATION

A. Test dock levelers for smooth operation through the entire vertical operating range.

B. Startup Services: Engage a factory-authorized service representative to perform startup services and to train hospital's maintenance personnel as specified below:
   1. Test and adjust safeties. Replace damaged and malfunctioning equipment.
   2. Train hospital's maintenance personnel on procedures and schedules related to startup and shutdown, troubleshooting, servicing, and preventive maintenance.
   3. Review data in maintenance manuals.

4. Schedule training with Agency's Representative, with at least seven days' advance notice.

3.7 WORK BY OTHER TRADES

A. The mechanical, electrical and plumbing contractors shall, within their specific areas of responsibilities, provide all labor, services, and materials required to complete the following work:
   1. Electric power wiring services to motors and control panels, which will be provided by the General Contractor, will be as shown on the electrical working drawings or equipment shop drawings. All other wiring not shown on these drawings shall be provided by the Equipment Manufacturer.

B. All labor and materials furnished in connection with the installation shall meet all applicable local, state and Federal Codes, including OSHA, and shall be subject to terms of "General Conditions".

3.8 TESTS BY EQUIPMENT MANUFACTURER

A. Equipment manufacturer shall provide equipment-commissioning services as required by the owner. A detailed recommended commissioning plan shall be approved by the owner prior to testing and acceptance of the equipment. Equipment Manufacturer shall perform tests under normal operating conditions and in presence of the Owner.

B. Provide all equipment, instruments, and labor required for tests.

C. Evidence of malfunction in any tested system, piece of equipment, or component part thereof that occurs during, or as a result of tests, shall be corrected, repaired or replaced, and the test repeated.

3.9 OPERATING AND MAINTENANCE / REPAIR TRAINING BY EQUIPMENT MANUFACTURER

A. An orientation and continuing education program shall be presented to employees when the equipment is operational. The program is to be presented by a full time employee of the Equipment Manufacturer, trained in the respective department functions. The program is to be based on the department operations and employee responsibilities with audio-visual aid equipment and tape programs including operating manuals. The audio-visual programs shall be provided to the Owner at no cost for future use.

B. A factory trained representative shall provide equipment demonstration to all of the appropriate employees, including proper daily and emergency equipment operational instructions with daily start-up and shutdown procedures. Owner shall determine schedule and number of meetings to provide to all staff.

C. An instruction program shall be provided to the Owner's maintenance personnel, by fully trained and full-time instructors, on the maintenance, care, adjustment and operation of the Equipment as detailed above.

D. All instruction shall include classroom and "hands on" training when the equipment is in operation, but before the Owner begins beneficial use. The program is to include a review of equipment operation and characteristics, maintenance manuals, schematics and spare part recommendations.

3.10 EMERGENCY SERVICE

A. During the duration of the warranty, the Equipment Manufacturer must provide emergency service within twenty-four (24) hours of notification of trouble and return to operation any piece of equipment within forty-eight (48) hours of reported failure. This service is to be performed by the Equipment Manufacturer at no additional cost to the Owner.

END OF SECTION

SECTION 111326 –LOADING DOCK LIGHTS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Dock Lights

1.2 RELATED REQUIREMENTS

A. Section 111313 – Loading Dock Bumpers

B. Section 111319 – Stationary Loading Dock Equipment

C. Related Documents: Provisions established within General and Supplementary Conditions of the Contract, Division 1 General Requirements and Drawings are collectively applicable to this Section.

D. All equipment furnished under this contract shall meet all applicable local, state and federal Codes.

1.3 SUBMITTALS

A. Before executing any work under this section of specifications, furnish submittals in accordance with Section 013300 – Submittal Procedures, to show full compliance with contract requirements on items proposed to be furnished.
   1. Product Data and Equipment Manufacturer's Literature
      a. Brochures showing name and address of Equipment Manufacturer, catalog or model number of each item incorporated into the work.
      b. Equipment Manufacturer's illustration and detailed description.
      c. List of deviations from Specifications.
      d. List of commonly replaced parts for the equipment specified. Include the frequency of replacement, unit pricing and delivery times for each item.
   2. Certificates: The Equipment Manufacturer shall certify that the product offered meets the characteristics of the specified description and that the product conforms to the producer's own drawings, specifications, standards, and quality assurance practices.
   3. Test Reports: Provide certified equipment test reports on each type of equipment to be furnished. Reports shall include, but not be limited to, scale accuracy.
      a. Tests shall be conducted by the Equipment Manufacturer in the Equipment Manufacturer's own facility, and shall also be conducted on the same type of equipment to be furnished on this Project.
      b. Test records need not be re-certified providing no essential change in design has been made since tests were conducted.
   4. Shop Drawings: Complete and detailed for each item indicating fabrication and erection of dock equipment including plans, elevations and large-scale details.

B. Closeout Submittals: Provide closeout submittals and documents.

C. Installation Drawings: Show dimensions method of assembly, installation, and conditions relating to adjoining work which requires cutting or close fitting, reinforcement, anchorage, and other work required for complete installation for equipment detailed in this Section.

D. Review: Submittals will be reviewed for general design only, and not for method of assembly, construction, or detailed compliance with Contract Documents.

E. No deviation from Contract Documents is permitted unless specifically so noted by the General Contractor and accepted by the General Contractor in writing.

F. General Contractor Responsibility:
1. Errors or omissions in submittals regardless of review status of submittals
2. Coordination with work of other trades.
3. Space coordination and code compliance.
4. Assembly and installation techniques, including structural adequacy and suitable bracing and / or anchoring for stability and seismic conditions.
5. Maintenance of installation safety.
6. Satisfactory performance of all work.

1.4 QUALITY ASSURANCE

A. Qualifications: Equipment Manufacturer shall regularly and currently manufacture specified equipment as one of its principal products.

B. Equipment Manufacturer shall have technical qualifications, experience, trained personnel, and facilities to install specified items.

C. Equipment Manufacturer shall have equivalent product currently installed at three (3) installations similar to this Project that has been in satisfactory and efficient operation for three (3) years.

D. There shall be a permanent service organization, maintained and trained by Equipment Manufacturer, which will render emergency service within four (4) hours of notification that service is needed.

E. All materials and equipment to be permanently installed shall be new and of such quality to satisfy the standards of the Documents. The Equipment Manufacturer, if required, shall furnish satisfactory evidence as to the kind and quality of all materials and equipment used.

F. Workers skilled in their respective trades shall perform all labor; workmanship shall be of good quality so that first-class work is performed in accordance with the standards of construction set forth in the Documents.

G. The General Contractor and the Equipment Manufacturer are solely responsible for the accurate installation of equipment / systems and are to correct any operational aspects and deficiencies without recourse to the Owner.

H. If any work is performed which is contrary to any laws, ordinances, Codes, rules and regulations, the Equipment Vendor will make all necessary changes as required to comply therewith and bear all costs arising there from without additional cost to the Owner.

I. All parts of equipment shall be of design, size and materials to satisfactorily function under all conditions within rated load and speed range; all with proper factors of safety, maximum and electrical efficiency and minimum wear on parts.

J. All parts shall be built to definite standard dimensions and tolerances so that it will be possible to replace and / or adjust any part without tooling or machining being required to install replacement parts.

K. Mechanical fastenings used on parts to wear and replacement shall be key and seat, nut screw, or other removable and replaceable types, which do not require physical deformation or field positioning. Rivets or similar devices are not permitted as mechanical fastenings for such parts.

1.5 MANUALS, DIAGRAMS AND INSTRUCTIONS

A. All manuals, diagrams, and instructions will be submitted in accordance with the Division 01 specifications.

1.6 GUARANTEE

A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the General Contractor under the requirements of the Contract Documents.

B. Special Warranty: The equipment furnished is to be guaranteed for two (2) full years, from the date of acceptance and beneficial use or as detailed on the Documents. This guarantee is to include all replacement parts, as necessary to keep the equipment operational in accordance with the performance specifications and to the Owner's satisfaction.

C. All labor and materials furnished in connection with the installation of equipment shall be covered under the general warranty. Additional details may be provided in the RFP and the contractor must meet the warranty requirements of both the RFP and this equipment specification. Upon receipt of notice from the Owner of failure of any portion of materials and workmanship furnished, the General Contractor shall promptly replace the affected part(s) with new part(s) at his own expense.

D. No device shall be acceptable that will not give satisfactory performance without excessive maintenance and attention. If it becomes evident during the guarantee period that the device is not functioning properly or in accordance with the Contract requirements, or if in the opinion of the Owner, excessive maintenance and attention must be employed to keep such device operating, the device must be removed. A new device meeting all requirements shall be installed as part of contractual work until satisfactory operation of installation is obtained. The period of guarantee shall start anew from the date of completion of each new installation performed in accordance with the preceding requirements.

1.7 EQUIPMENT MAINTENANCE

A. The Owner shall be provided with a formal Preventive Maintenance Contract with a detailed parts list, replacement costs, descriptions and designations. The Preventive Maintenance Contract, if accepted by the Owner, is not to go into effect until after the guarantee expires. The Owner has the option to accept or decline the Preventive Maintenance Contract.

B. Maintenance Training Program shall be provided to the Owner, at the Equipment Manufacturer's factory, for training of additional Hospital technicians. Costs for this program shall be at the standard rate for this service.

C. One month before the equipment guarantee is to expire; the Equipment Manufacturer shall provide a review of the maintenance instruction program along with a review of the Preventive Maintenance Contract with its detailed parts list, individual replacement costs, descriptions and designations.

1.8 TOOLS

A. Provide one (1) complete set of special tools necessary to maintain and make adjustments on every part of the equipment, if such tools are required for the maintenance of the equipment.

1.9 CONSTRUCTION CONDITIONS

A. Provide all necessary anchor bolts, shims, fastenings, recesses, cutouts, slots, holes, patching and the like to perform installation of equipment to code and regulations.

B. Coordinate installation with other trades. Provide and obtain dimensions, clearances and similar data.

1.10 ELECTRICAL EQUIPMENT

A. Electrical equipment shall be suitable for use with electrical system shown on the Drawings.

B. Provide electrical components including motors, disconnect switches, motor controllers, motor control devices, and electrical circuits and connections, which conform to requirements of NFPA 70 whether or not electrical components are furnished as part of equipment assemblies.

C. Provide all electrical wiring, conduit, and all electrical devices necessary for the installation and operation of systems and equipment furnished.

1.11 PROJECT CONDITIONS

A. In order to discover and resolve conflicts or lack of definition, which might create problems, the Equipment Manufacturer must review contract documents for compatibility with its product prior to bidding.
   1. Review structural, architectural, electrical, mechanical and plumbing drawings, and specifications.
   2. Compliance with all provisions of the contract documents is assumed in the absence of written and approved exceptions.
   3. The design of the structural, mechanical and plumbing systems within the Project are fixed.
   4. The Equipment Manufacturer’s equipment shall fit and operate within these fixed elements.

PART 2 - PRODUCTS

2.1 Loading Dock Light

A. Quantity: Provide quantities as shown on the contract drawings.

B. Design Features:
   1. Dock light shall be wall mounted or mounted under the roof over-hang. Unit shall be a dual arm with 60-inch reach.
   2. Dock light shall have a swivel-mounting bracket, which can be attached to mount to a standard 3-inch or 4- inch junction box.
   3. Light head shall fully support the enclosed lamp, and be equipped with an integrated power switch.

C. Fabrication:
   1. Fixture. Shall be an incandescent / halogen PAR type.
   2. Be rated at 300 Watts, minimum.
   3. Light Head Housing shall be manufactured of steel.
   4. Shall have a safety yellow protective powder coating.
   5. Wire lamp guard shall provide protection against lamp damage.
   6. Shall meet OSHA requirements for personnel and lamp protection.
   7. Be hinged to facilitate ease of lamp replacement, using simple hand tools.
   8. Wiring:
      a. Three (3) -conductor cord.

PART 3 - EXECUTION

3.1 MANUFACTURED PRODUCTS

A. Materials, fixtures, and equipment furnished shall be of current production by Equipment Manufacturers regularly engaged in the manufacture of such items.

B. Units shall be products of one Equipment Manufacturer.

C. Equipment Manufacturer of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled units.

D. Components of an assembled unit need not be products of same Equipment Manufacturer.

E. Constituent parts, which are alike, shall be the products of a single Equipment Manufacturer.

F. Components shall be compatible with each other and with the total assembly for the intended service.

G. Nameplate:
   1. Each piece of equipment shall bear a corrosion-resisting steel, or deep-etched anodized aluminum nameplate located in a reasonably accessible position, permanently secured.
      a. Nameplate shall be proportionate to size of equipment and bear the following:
      b. Name of Equipment Manufacturer.
      c. Model number.
      d. Serial number.
      e. Electrical characteristics.

H. Fasteners
   1. Rivets, bolts, nuts, studs, spacers, and metal used for welding shall be same kind of metal as materials joined.

2. Where corrosion-resisting metals are joined to each other or to other metals, rivets, bolts, and materials used for welding shall be corrosion-resisting metal.

I. Welding
1. Joints in fabricated equipment shall be welded by an accepted method. Carbon arc welding is not acceptable, nor is any process permitting the pick-up of carbon acceptable.
2. Welds shall be strong and ductile, with exposed surfaces free of imperfections such as pits, runs, spatter, and cracks, and shall have same color as adjoining surfaces.

J. Steel Fabrication
1. Steel shall be free from kinks and sharp bends. Shearing and shipping shall be done neatly and accurately. Flame cutting may be employed instead of shearing or sawing. Re-entrant cuts shall be made in the best possible manner. Burned surfaces or flame cut materials shall be ground or machined to remove ash and checks.
2. All joints, openings, and doors shall be square and neat. The finished equipment shall be free from sharp edges, fins, burrs, and sharp projections.
3. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be continuous for all major joints, and shall have the strength required to satisfy the design, use, and loading conditions. Intermittent welds may be used for attaching reinforcement members provided such welds will satisfy the design. Members to be welded shall be positioned and held by jigs or fixtures when necessary to ensure accurate alignment. All outside corners of the containment body shall be of butt joint construction.
4. Castings shall be sound and free from patching, misplaced coring, warping, or other defects, which might render the casting unsound for use. Forging shall be uniform in quality and condition, and shall be free from tears, cracks, seams, laps, internal ruptures, imbedded scale, segregation or other defects, which may detrimentally affect the suitability for the purpose intended.

3.2 EXAMINATION

A. Examine surfaces to receive product before application to ensure that the following conditions are met:
1. Before shipment from Equipment Manufacturer's plant and following installation at project site, finished articles shall be thoroughly inspected and tested for compliance with specifications.
2. Equipment Manufacturer shall inspect the site and conditions for which the equipment is to be installed and advise the General Contractor, in writing, of any conditions detrimental to the proper installation and operation of the equipment.

B. Do not start the work of this section until all deficiencies have been corrected. Commencement of work constitutes acceptance of the surfaces.

3.3 PREPARATION

A. Protect equipment against dirt, water, and chemicals during installation. Thoroughly clean equipment at the completion of work.

3.4 INSTALLATION

A. The work under this Section of the Specification shall include all labor, services, materials and equipment and the performance of all work as necessary and required to furnish and install the equipment as indicated on the Drawings and as specified above.

B. Delivery and installation of the equipment shall be so performed as to avoid delay on the work by other contractors. The General Contractor shall be responsible for receiving, uncrating, setting in place all of the equipment, and providing all the proper utilities, under the supervision of the Equipment Manufacturers.

C. The Equipment Manufacturer shall be responsible for all final connections of their equipment.

D. The equipment locations, as shown on the Drawings shall be checked by the General Contractor and the Equipment Manufacturers. All exact locations shall be determined by the dimensions of the equipment, and the layout drawing before an apparatus is installed. The General Contractor shall be solely responsible for the accurate installation and correct any operational aspects and deficiencies of his equipment without any recourse to the Owner.

E. The General Contractor and the Equipment Manufacturer shall consult the architectural and structural drawings for all dimensions, locations of partitions, locations of pipes and ductwork.

F. The General Contractor and the Equipment Manufacturer shall have a factory trained, field service technician on the premises to supervise the installation of all equipment. This service shall be at no additional cost to the Owner.

3.5 WORK BY OTHER TRADES

A. The mechanical, electrical and plumbing contractors shall, within their specific areas of responsibilities, provide all labor, services, and materials required to complete the following work:
   1. Electric power wiring services to motors and control panels, which will be provided by the General Contractor, will be as shown on the electrical working drawings or equipment shop drawings. All other wiring not shown on these drawings shall be provided by the Equipment Manufacturer.

B. All labor and materials furnished in connection with the installation shall meet all applicable local, state and Federal Codes, including OSHA, and shall be subject to terms of "General Conditions".

3.6 TESTS BY EQUIPMENT MANUFACTURER

A. Equipment manufacturer shall provide equipment-commissioning services as required by the owner. A detailed recommended commissioning plan shall be approved by the owner prior to testing and acceptance of the equipment. Equipment Manufacturer shall perform tests under normal operating conditions and in presence of the Owner.

B. Provide all equipment, instruments, and labor required for tests.

C. Evidence of malfunction in any tested system, piece of equipment, or component part thereof that occurs during, or as a result of tests, shall be corrected, repaired or replaced, and the test repeated.

3.7 OPERATING AND MAINTENANCE / REPAIR TRAINING BY EQUIPMENT MANUFACTURER

A. An orientation and continuing education program shall be presented to employees when the equipment is operational. The program is to be presented by a full time employee of the Equipment Manufacturer, trained in the respective department functions. The program is to be based on the department operations and employee responsibilities with audio-visual aid equipment and tape programs including operating manuals. The audio-visual programs shall be provided to the Owner at no cost for future use.

B. A factory trained representative shall provide equipment demonstration to all of the appropriate employees, including proper daily and emergency equipment operational instructions with daily start-up and shutdown procedures. Owner shall determine schedule and number of meetings to provide to all staff.

C. An instruction program shall be provided to the Owner's maintenance personnel, by fully trained and full-time instructors, on the maintenance, care, adjustment and operation of the Equipment as detailed above.

D. All instruction shall include classroom and "hands on" training when the equipment is in operation, but before the Owner begins beneficial use. The program is to include a review of equipment operation and characteristics, maintenance manuals, schematics and spare part recommendations.

3.8 EMERGENCY SERVICE

A. During the duration of the warranty, the Equipment Manufacturer must provide emergency service within twenty-four (24) hours of notification of trouble and return to operation any piece of equipment within forty-eight (48) hours of reported failure. This service is to be performed by the Equipment Manufacturer at no additional cost to the Owner.

END OF SECTION

SECTION 114000 – FOODSERVICE EQUIPMENT

PART 1 - GENERAL

A. This specification valid only when considered in total with all other contract documents.

B. The requirements of the “Instructions To Bidders” shall become a part of this work.

C. All work manufactured, fabricated and installed in accordance with the following:
   1. Federal, state, county and local codes, laws, regulations and rules that governs such operations.
   2. The National Sanitation Foundation (N.S.F.) and bear the N.S.F. label.
   3. Underwriter’s Laboratory (U.L.) and bear the U.L. label.
   4. American Gas Association (A.G.A.) and bear the A.G.A. label.
   5. American Society Of Mechanical Engineers (A.S.M.E.) and bear the A.S.M.E. label.
   6. National Fire Protection Association Standard 96 (N.F.P.A. 96),and UL300.

PART 2 - WORK SPECIFIED UNDER THIS SECTION

A. Provide installed complete and ready for final electrical, plumbing and mechanical connections, all foodservice equipment items and work shown on drawings and/or specifications.

B. Secure necessary permits and licenses for prosecution of foodservice equipment work, pay all fees in conjunction therewith, arrange for inspections and secure necessary approvals.

C. Verify conditions, existing and proposed, at project including utility services, ceiling heights, wall lengths, door openings and passage sizes to insure ingress of equipment.

PART 3 - WORK SPECIFIED UNDER OTHER SECTIONS (TO BE PERFORMED BY OTHER TRADES UNDER The General Contract)

A. Plumbing services and final connections including piping, grease interceptors, shut-off valves, trim, traps, back flow preventers and related fittings except as specifically listen in the individual item specifications.

B. Electrical services and final connections including exhaust hood light switches, exhaust and make-up air systems switches, wiring, line disconnect switches, safety cut-outs, control panels, contactors, fuse boxes and other related fittings except as specifically listen in the individual item specifications.

C. Exhaust hood or ventilator duct work upstream from finished ceiling, wall or connection position as indicated on drawings and welded connections to exhaust hoods, ventilators and kitchen equipment ducts.

D. Electrical, Plumbing and Mechanical Contractors to disconnect existing equipment, which is to be reused on this project, from utilities in order for KEC to remove such items. MEP traded are to cap these utilities for safety.

PART 4 - MATERIALS

A. Unless otherwise specified or indicated, all materials to be new, of best quality, perfect and without flaws, delivered upon completion in an undamaged condition.

B. Stainless steel (S/S) shall be type 302 extra low carbon, non-magnetic, austenitic 18% chrome, 8% nickel, corrosion resistant alloy steel. Sheets shall be flat, free of all buckles and surface imperfections.

C. Galvanized iron (G.I.) shall be approved grade copper bearing steel.

D. All gauges for sheet iron and steel shall be U.S. Standard gauges and finished equipment gauge thickness shall not vary more than 5% plus or minus from thickness indicated below:

Gauge	Thickness	Gauge	Thickness
#10	0.1406 (3.50 mm)	#16	0.0625 (1.50 mm)
#12	0.1094 (2.75 mm)	#18	0.0500 (1.25 mm)
#14	0.0781 (2.00 mm)	#20	0.0375 (1.00 mm)

E. Stainless steel pipe and tubing shall be seamless or welded of gauge specified. Seamless tubing shall be thoroughly and correctly annealed, pickled and ground smooth. Welded tubing shall be thoroughly heat treated and properly quenched to eliminate precipitation, drawn true to size and polished to match stainless steel sheets.

F. Structural sheet members used for framing consisting of angles, bars, channels, etc. shall be ductile in quality, free from hard spots, runs, checks, cracks and other defects. They shall be smooth galvanized by the hot dip process with all surplus removed, and free of runs, blisters, excess spelter and uncoated spots or patches.

PART 5 - SHEET METAL FABRICATION

A. Each piece of fabricated equipment shall be constructed in a workmanlike and strong manner. This shall include all necessary reinforcing, racing, welding and the proper number and spacing of uprights and crossmembers for strength as set forth in the drawings and specifications. Whenever size permits, equipment shall be fabricated of a single sheet of metal. Equipment not braced in a rigid manner, which is subject to rattle, or wobble will be unacceptable.

B. All exposed surfaces shall be free from bolt, screw and rivet heads. When bolts are required, they shall be of concealed type and be of similar composition as the metal to which they are applied. Where bolts, screws or studs on the interior of fixtures are visible or may come in contact with hands or wiping cloths, they must be capped with an acorn nut with lock washer.

C. All welding shall be done by the heliarc method. Where filler rods are used, they should be of the same grade composition as the materials to be joined and contain a flux to minimize carbide precipitation. All welds shall be complete, strong and ductile, sound, non-porous, free of pits, cracks and other mechanical imperfections. Excess metal shall be ground off and polished smooth creating one homogenous color and finish. All unexposed welds shall be pacified and suitably coated to prevent corrosion. In no case shall soldering be considered as a replacement for welding, nor shall any soldering operation be done where dependence is placed on strength and stability of the joint.

D. Stainless steel where exposed shall be polished to a #4 commercial finish. Where unexposed, finish may be #2B. The grain of polishing shall run in the same direction of all horizontal and vertical surfaces on each item of equipment.

E. All exterior galvanized parts, exposed members of framework and wrought steel pipe where specified to be painted shall be cleaned, properly primed with rust inhibiting primer, de-greased and finished with two coats epoxy base gray hammertone paint.

F. In general, fixtures shall be shop fabricated of one-piece construction, shipped to the job completely assembled. Equipment too large to transport or enter the building in one piece shall be constructed so that welded field joints can be made at the jobsite.

G. Suitable pipe slots shall be provided through all undershelves to accommodate necessary service lines. These pipe slots shall be proper size and neatly made with turned down edges on all four sides to eliminate cutting or defacing equipment on the jobsite. Base of cabinets to allow for concealed pipe space.

H. Ends of backsplashes and hollow sections to be closed during fabrication.

I. Trim is not an acceptable substitute for accuracy and neatness.

J. All equipment that butts walls shall be scribed and sealed to the walls with a silicone rubber sealant (Dow Corning 780, General Electric Series SE1200, or approved equal).

K. Where two or more pieces of equipment join, the seam shall be sealed with a silicone rubber sealant as above.

L. High-temp silicone sealant shall be used at joints adjacent to or between pieces of heat producing equipment.

M. Trademarks and the name of the fabricator shall not be fastened to any items of equipment.

N. Electrical requirements:
   1. All components and assemblies incorporated in the work shall bear the U.L. label.
   2. All wiring shall be made in accordance with prevailing building codes and regulations.
   3. All wiring and components shall be waterproof.
   4. When specified, all foodservice equipment shall be completely wired internally where electrical services are required. All outlets and receptacles mounted on or in fabricated equipment shall be furnished, installed and pre-wired to junction boxes. All switches, controls, electrical devices, appliances and equipment built into or forming an integral part of the fixture shall be furnished, installed and pre-wired to junction boxes. All wiring terminating in junction boxes shall be tagged showing item number, voltage, characteristics and load information.
   5. All electrically heated equipment shall be internally wired to a thermostatic control and an “on/off” red neon pilot light. Both to be mounted on a terminal box on a removable control panel.
   6. Rigid steel conduit shall be used for this work, zinc-coated where unexposed and chrome plated where exposed.
   7. Convenience outlets for evaporators shall be twist lock type.
   8. Fluorescent light fixtures shall be complete with ballasts and warm white lamps (unless
   9. specified otherwise).

O. Plumbing requirements

1. All necessary faucets shall be furnished with the foodservice equipment and be mounted and connected to by the general contractor.
2. Water inlets shall be located above the positive water level to prevent siphoning of liquids into the water system. Where submerged inlets are required, suitable check valves and vacuum breakers shall be furnished and installed on the fixture to prevent siphoning. Where exposed, piping shall be chrome plated.
3. Provide pipe slots and/or do all drilling, punching and cutting of fixtures required to provide access for mechanical connections and/or runs.

P. Refrigeration requirements
1. Provide air cooled compressors mounted on friction slides in compressor housings with adequate air supply and exhaust for proper operation.
2. All refrigeration systems to be furnished with compressor, expansion valve, isolation valve, sight glass, charging valve, lines and all necessary components to make a complete operable self-contained system.
3. Each refrigerated cold pan shall be provided with on/off switch and red neon pilot light.
4. Normal operating temperatures to be:

Refrigerators . . . . . + 35 degrees F.
Freezers . . . . 0 degrees F.
Cold Pans . . . . . + 10 degrees F.

5. All refrigerated pans and cabinets shall be provided with breaker strips where adjoining top of cabinet face materials.

PART 6 - MILLWORK FABRICATION

A. Millwork shall conform to the requirements and specifications of the Architectural Woodworking Institute (A.W.I.).

B. The construction and installation of all millwork shall be as indicated on the drawings and shall conform to the requirements of the Architectural Woodworking Institute standards for “custom grade” millwork.

C. Moisture content of all lumber, plywood and millwork shall not exceed 10%.

D. Millwork and materials shall conform in all respects to local codes for fire retardant treatments.

E. Unexposed wood for construction of mill fabricated woodwork shall be grade B red gum, yellow poplar, birch or other suitable hardwood standard with the mill. Unless otherwise specified in Item Specifications.

F. Plywood shall be Douglas fir of the thickness indicated on the drawings or required, good one or both sides as conditions require. Exposed faces shall be surfaced with a medium density phenolic overlay. Unless otherwise specified in Item Specifications.

G. Hardwood plywood, particle board core if specified, good one or both sides as required, shall have face veneers of the species and match indicated on the drawings. Exposed edges shall be “V” banded with solid stock to match veneer.

H. Moldings, trim, solid hardwood exposed to view, etc., shall be of the shapes and sizes indicated on the drawings. Birch shall be plain sawn and oak shall be plain sawn “red oak”, unless otherwise indicated.

I. Nails, screws and other rough hardware, unless otherwise indicated on the drawings shall be in accordance with the best practices of the trade.

J. Millwork abutting exterior wall shall be backprimed.

K. Wherever laminated plastic materials are specified for cabinetwork, they shall be “Formica”, “Wilsonart” unless otherwise specified in Item Specifications or as approved by the architect. All materials shall be laminated to the close-grained plywood such as mahogany or birch, of selected smooth sanded stock to insure a ripple-free surface. Top sheet shall be placed on and above finished edge. Electrical work shall be as specified above under paragraph 5.14.

L. Where solid surface tops are specified, they shall be “Formica”, “Avonite”, “Corian” unless otherwise specified in Item Specifications or approved by the architect. The solid surface top shall be non-porous and installed on top of 3/4” plywood sub-top, as specified above, with 1/4” shim strips between solid surface material and sub-top for proper air circulation.

PART 7 - EQUIPMENT OF STANDARD MANUFACTURE

A. Electrical requirements
   1. All portable equipment and items which plug in for normal use are to be furnished with an approved cord and cap to mate with receptacles furnished in the project. One leg shall be grounded to the frame of the equipment.
   2. In the event that any item of equipment to be included in the work is not available in the electrical characteristics furnished on the project, provide a suitable transformer to make the item work properly on the available power supply.

B. Refrigeration requirements
   1. All self-contained refrigeration systems furnished under this contract shall include start-up, one-year parts and labor warranty, plus an additional four year parts warranty on the compressor.

PART 8 - EQUIPMENT REFRIGERATION – REMOTE

A. Provide all equipment refrigeration work indicated on the drawings, schedules and specifications including, but not limited to, condensing units, evaporator units, controls, piping and all accessories and components as required to provide a complete operable and satisfactory system in accordance with approved refrigeration practices.

B. Manufacturer’s directions shall be followed in all cases where the manufacturer furnished directions covering points not shown on the drawings and specifications.

C. Routing of piping must be coordinated with other trades to avoid conflict of spacing. All horizontal and vertical runs of tubing shall be securely supported and/or fastened to prevent sagging. No sharp bends or kinks will be permitted. Piping and manifolds to be kept high as practical to avoid trapping suctions lines.

D. After lines have been run, all sleeves, including sleeves through refrigerator bodies, shall be caulked and make watertight using permagum, pecora or equivalent material.

E. Connections in piping shall be accomplished using sweat fittings except at easily accessible valves and controls where flared fittings may be used.

F. Cap all piping until final connections are made.

G. Provide and install all hangers for evaporators as required.

H. Refrigerant pipe shall be type “L” all hard drawn seamless copper tubing with silver soldered joints.

I. Piping within walk-in compartments shall be finished with chromotone paint.

J. Refrigerant shut-off valves in the refrigerant piping shall be Henry, or equal, for line sizes 7/8” o.d. and larger and Packless diaphragm type for smaller sizes.

K. Expansion valves shall be Sporlan, or equal, and placed in the liquid line at a point where line enters the evaporator.

L. Filter-drier shall be Sporlan, or equal.

M. Solenoid valves shall be Sporlan type with manual lift stem, or equal, and placed in the liquid line with room thermostat.

N. Sight-glass shall be Sporlan, or equal, and placed in the liquid line.

O. Each system shall consist of refrigerant, type “L” piping, liquid and suction line stop valves, evaporator, thermostatic expansion valve, heat exchanger, liquid line solenoid valve, filter drier, liquid indicator, vibration eliminator and condensing unit.

P. Temperature of refrigerated compartments shall be controlled by means of a thermostat wired to actuate a solenoid valve in the liquid line.

Q. All lines outside of the refrigerated compartments shall be insulated the entire length from evaporator to condensing units with 3/8” thick Armstrong “Armaflex”, or equal. Group insulation of lines is not permitted. Insulated lines exposed to the elements shall also be finished with
“Armaflex WB Finish”, white in color, applied in two coats with roller or brush.

R. Provide drain line heaters wired for evaporator line voltage in all freezer compartments.

S. Testing:
1. Lines shall be blown out with dry nitrogen prior to making final connections.
2. Accomplish pressure test to 150 lbs. (or higher if required by code).
3. Evacuate system with a vacuum pump for a period of 24 hours. Break vacuum with refrigerant to 0 PSIG., re-establish vacuum and charge with refrigerant for operation.
4. Run operational check for 3 days.

T. Submit installation drawings and catalog cut sheets for approval prior to installation.

U. All refrigeration systems shall include start-up, one-year parts, and labor warranty, plus additional four-year parts warranty on the compressor.

PART 9 - WORKMANSHIP

A. Install in strict accordance with manufacturer’s directions and recommendations by skilled mechanics of trades generally associated with individual items. Secure all items in place as shown on the drawings or as directed. Protect against damage at all times.

B. Coordinate equipment provided and all utility requirements with respective drawings and specifications to assure proper rough-in, utility services and conformance to applicable code requirements.

C. Check all measurements at the building prior to fabrication of equipment. All equipment must conform to the finished building conditions. Where obstructions occur, equipment must be neatly scribed, fitted to and around same, resulting in a sanitary, homogenous fixture.

D. Provide competent field representative to be present to advise the respective trades (such as required wall backing, utility rough-ins and final connection), and verify size and location of all concealed work before it is covered up.

E. Clean and polish all equipment items prior to inspection and acceptance.

PART 10 - NOT USED

PART 11 - TESTING AND REGULATING

A. Start up, test, regulate and prove to the owner or their representative that all equipment is operating properly.

B. Instruct in the use of all equipment. Ensure that all items of equipment are connected, started up and in working order prior to scheduling demonstrations.

C. Instruct in maintenance procedures for all equipment.

D. Furnish two equipment service manuals bound in hard cover three-ring binders covering all equipment furnished under this section and consisting of:
   1. Specification sheets
   2. Operating instructions
   3. Parts lists and service instructions
   4. Maintenance instructions
   5. Local factory authorized service agencies and phone numbers

PART 12 - SHOP DRAWINGS

A. Submittals:
   1. Specification sheets on all items of standard manufacture, preceding each cut sheet provide a “lead sheet” showing manufacturer’s name, size, descriptive data, capacities, utility requirements, etc. Provide this lead sheet for all custom fabricated items as well. Bind in brochure form in numerical sequence in its entirety. **KEC shall match the item names, descriptions etc. on the CD documents or they may be rejected.**
   2. MPE rough-ins: KEC to study bid package CD’s including foodservice and MPE engineering MPE Rough-in drawings, submit RFI’s related to MPE rough-ins, mark up recommended changes and submit the document as PDF for approval PRIOR to full submittal package. The intent of this is to promote accuracy and completeness of all CD documents used in the construction of this facility. **Recreation of Floor plans and MPE rough-in drawings is NOT required or recommended.** MPE Rough-ins have been carefully planned and dimensionally located by the Foodservice Consultant. However, input from KEC is deemed important and shall be considered. Design team will adjust current CD’s to include accepted changes In the event that MPE rough-ins have been completed and/or this project in an expansion and/or remodel of existing foodservice facility, the KEC shall check existing rough-in locations thereof and notify the design team via the aforementioned KEC review document.
   3. Concrete base and curb plan,as applicable, detailed and fully dimensioned to minimum scale of 1/4” = 1’-0”.
   4. Depression plan for drain troughs and insulated floor areas detailed and fully dimensioned to a minimum scale of 1/4” = 1’-0”.

5. Manufacturer shop drawings of all equipment specified for custom fabrication shall be detailed and fully dimensioned to a minimum scale of 3/4” = 1’-0”. Drawings shall show all dimensions, all details of construction, installation and relation to adjoining work, reinforcing, anchorage and other work required for the complete kitchen installation. **Custom manufacturers to include item numbers and use equipment names and descriptions per contract CD’s.** Provide minimum 3” x 3” clear space for review stamp. Submit as electronic PDF for review.
6. Revise drawings to reflect field dimensions of installed rough-ins and furnish equipment to meet these conditions. No extra costs allowed for changing of utility services to fit equipment installation and connection.

B. Shop drawings shall be in the form of properly labeled digital PDF set and one direct print of each sheet unless otherwise noted in architectural specifications.

C. Manufacture shop drawings are to be submitted separately, by Manufacturer. This is a must to allow different review status be applied as needed.

D. Cut sheets it’s table of contents and lead sheets, manufacturer shop drawings, and all submittals and RFI’s shall **use the equipment names and descriptions provided on the CD’s.** KEC is not to add item numbers and/or sub scripts such as a’s and b’s, decimals, etc. If an item Number has multiple manufacturer components they shall be included in the associated equipment number. This speeds up the submittal review process as well as eases the subcontractor payment requests process.

E. The marked-up version shall be returned to the GC after appropriate design team member review for distribution of prints to specified persons or organizations as directed.

F. One digital PDF book of all equipment cut sheets, unless otherwise noted in architectural specifications, shall be submitted. One set will be returned to the kitchen equipment contractor who will promptly revise as directed and return to GC. GC shall re-distribute corrected sets to their subcontractors as necessary.

G. The kitchen equipment contractor is cautioned that they are responsible for checking and coordinating all shop drawings pertaining to their contract, for compliance with the contract documents, dimensions, fit, existing conditions and coordination with other work.KEC is to pre-view all submittals for accuracy, compliance with project general and item specifications PRIOR to submitting for formal review. KEC is responsible to advise the manufacturer to make corrections PRIOR to formal submittal KEC to GC.

H. The foodservice consultant will review such submittals with reasonable promptness and indicate required corrections. The foodservice consultant’s approval of such drawings or schedules is rendered as a service only and shall not relieve the kitchen equipment contractor from responsibility for deviations from the contract documents unless they have, in writing, called the foodservice consultant’s attention to such deviations at the time of submission and received specific written approval thereof, nor shall it relieve them from responsibility for errors and/or omissions of any sort in the shop drawings or schedules.

I. Shop drawings returned to the kitchen equipment contractor marked “Revise and Resubmit” or “Rejected” shall be corrected as required for conformance and resubmitted as stated herein before for the initial submission. No additional time will be allowed to complete project as a result of unacceptable submittals. Re-review of such

submittals is limited to one time after the initial review. If these submittals are returned a second time the Foodservice Consultant may submit for additional services which shall be paid by the KEC.

PART 13 - GUARANTEE

A. The kitchen equipment contractor shall guarantee all work provided under their contract against defects in workmanship and materials for one year from the date of final acceptance of the completed installation or as specified in architectural specifications.

B. If, within any guarantee period, repairs or changes are required in connection with the work, the kitchen equipment contractor shall promptly upon notice:
   1. Place in satisfactory condition in every particular all of such guaranteed work, correct all defects therein .
   2. Make good all damage to the building or equipment or contents thereof which is the result of the use of materials, equipment or workmanship which are inferior, defective or not in accordance with the terms of the contract.

C. In addition to the above, all compressors supplied for refrigeration systems, either remote, connected or as an integral part, shall be supplied with the manufacturer's five year extended warranty.

PART 14 - PROGRESS SCHEDULE

A. The GC sets the schedule.

B. The government (US Government), herein referred to as the "owner" do not have a contractual relationship.

PART 15 - INSURANCE

A. See CSI sections 00 00 00, and 01 00 00 for requirements.

PART 16 - DELAYS CAUSED BY KEC

A. See CSI sections 00 00 00, 01 00 00, FAR and the contract for details, penalties, termination, etc.

PART 17 - INTENT OF DOCUMENTS

A. Drawings and specifications are cooperative and supplementary. Portions of the work which can be best illustrated by the drawings may not be included in the specifications and portions best described by specifications may not be depicted on the drawings. It is the intention of the contract documents to include all labor, materials and services necessary for proper and complete construction of the foodservice equipment work.

B. The completeness and correctness of the contract documents shall be verified before execution of the kitchen equipment contract. The kitchen equipment bidder shall notify the foodservice consultant of omissions or discrepancies. The lack of such notification shall be construed as acceptability of all documents and as a waiving of rights to future claims arising from omissions or errors.

C. Whenever the drawings and specifications show larger sizes or higher standards than are required by the regulations, the drawings and specifications shall govern.

Whenever the drawings and specifications show something that will violate the regulations, the regulations will govern.

D. Some items in the item Specifications require KEC to submit RFI's to verify catalog equipment color options, plate tray and cup sizes and material types. These RFI's are to be submitted by the KEC thru the GC PRIOR to submittals so the submittals are as complete and accurate as possible. KEC to bundle these type questions on one RFI. Any other RFI type questions, discrepancies in documents, etc., to be submitted separately.

E. Prior to submitting bid to the GC, the KEC shall study and identify and submit RFI for clarification, which will be shared with all bidders. Post award CO requests may be rejected if deemed a discrepancy that should have come up prior to bid.

PART 18 - DEFINITIONS

A. Furnish: To purchase and deliver.

B. Install: To uncrate, assembly and place into final position ready for final connections.

C. Provide means to furnish and install.

D. "As Shown", "as detailed", "as indicated" or words of similar import mean as indicated on the drawings.

E. "As selected", "as approved", or words of similar import mean as selected by, as approved by, or as accepted by the Consultant and Owner.

F. "Approved equal", or "equal" shall mean as approved and accepted by the Consultant and Owner.

G. "Shall" means mandatory.

H. "As required" means as required by the contract documents.

I. "As necessary" means essential to the completion of the work.

J. "Concealed" means not visible in the finished work.

K. "Exposed" means visible in the finished work.

L. "Days" means calendar days.

M. "Substantial Completion" means the stage in the progress of Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

N. "Owner" means the person or organization executing the contract for the work specified herein.

O. "Foodservice Consultant" means the person or organization that has contracted to design and specify the foodservice facilities.

P. "Work" of the Kitchen Equipment Contractor shall mean all labor, materials, equipment and services necessary to fabricate, deliver, erect and set-in-place all of the foodservice equipment in strict accordance with the drawings and specifications and ALL applicable codes and AHJ regulations.

Q. "Bid Documents" means the drawings and specifications complete with addendums.

R. Abbreviations:

AFF	=	Above Finished Floor
CO	=	Change Order and/or Request for CO
KEC	=	Kitchen Equipment Contractor
NIKEC	=	Not in Kitchen Equipment Contract
NIPS	=	Not in Project Scope (Cost Scope)
NSF	=	National Sanitation Foundation
EC	=	Electrical Contractor
GC	=	General Contractor
JSN	=	Joint Schedule Number
MC	=	Mechanical Contractor
MPE	=	Mechanical, Plumbing & Electrical
MUA	=	Make Up Air
PC	=	Plumbing Contractor
RFI	=	Request for Information
TBD	=	To Be Determined
TD	=	Thermal Detector
UC	=	Under Counter
UDS	=	Utility Distribution System
VIF	=	Verify In Field

PART 19 - OWNER FURNISHED PRODUCTS

A. Owner's Responsibilities:
   1. Arrange for and deliver Owner received Shop Drawings, Product Data, and Samples to GC and KEC.
   2. Arrange and pay for product delivery to site.
   3. On delivery, inspect products jointly with GC.

B. Kitchen Equipment Contractor's Responsibilities:
   1. Contractor shall give Owner written notice stating dates when Owner-furnished items must be received at the job site to insure Project completion in accordance with established schedule.
   2. Review Owner-reviewed Shop Drawings, Product Data, and Samples.
   3. Receive and unload products at site: inspect for completeness or damage, jointly with Owner.
   4. Handle, store, assemble, install, connect and finish such products, including furnishing lubricants and fluids and procedures required to render product serviceable and operative.
   5. Contractor is responsible for the coordination and interface of Owner-Furnished and Installed work with Work of this Contract to provide all required mechanical and electrical rough-ins, openings, supports, dimensions, etc., as required for a complete installation.

PART 20 - ITEMIZED FOODSERVICE EQUIPMENT SPECIFICATIONS

A. Equipment list. Where manufacturer's name and model number is indicated, it means the item shall be either that item or a **pre- approved** equal, and all standard materials, components, capacities, sizes and features furnished for that model, whether specifically delineated or not, shall be considered inherent in the specifications.

B. Bids shall be submitted per plan and specifications, and state this in the base bid. Any proposed alternates can be listed separately as proposed decreases or increases to base bid, by line item number. Each shall include net increase or decrease to bid with explanation for substitution/alternate product cost, MPE impact, Structural impact, design and design intent impact, schedule impact, etc. and the reason for the substitution request.

END OF GENERAL SPECIFICATIONS

PART 21 - ITEM SPECIFICATIONS:

KITCHEN

ITEM#: **1** DESCRIPTION: **Refrigeration System**
Quantity: 1
Provided By: KEC
Manufacturer: RDT
Model No.: IRW2-04Z-CT3-AECST

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
3. Indoor, water cooled (from buildings central plant chilled water system) with 100% redundancy, with automatic switch-over, built-in.
4. UL Listed, water-cooled refrigeration system shall be housed on a single compact structural steel frame. The system shall include water-cooled condensers designed to operate at 20 degrees Temperature Differential (TD).
5. Entire tubular steel frame shall be pre-assembled, welded, cleaned and painted with two coats of polyurethane.
6. The water circuits of the condensers shall be valved separately and pre-piped to a common supply and return header. The header shall employ a bronze ball valve for connection to building condenser or chilled water supply.
7. All compressor units shall be scroll type and factory assembled to operate with R-448a refrigerant.
    a. 7.5 HP (primary) medium temperature digital scroll compressor.
    b. 7.5 HP (back-up) medium temperature scroll compressor in parallel for 100% redundancy.
    c. 7.5 HP (primary) low temperature digital scroll compressor.
    d. 7.5 HP (back-up) low temperature scroll compressor in parallel for 100% redundancy.
8. Compressors and refrigeration piping will be installed in such a manner as to eliminate noise with vibration eliminators in refrigeration lines, as needed.
9. Each system shall be equipped with a ball-bearing fan motor, an XC645CX Dixell controller (digital compressors only), oil separators, fixed head pressure control, suction filter, liquid line sight glass, liquid line drier, crankcase heaters, headmaster

controls or fan cycling, liquid line inlet and outlet valves, defrost cycle and armored super hose connections (in lieu of capillary tubes).

10. All refrigerant lines shall be extended to one side of the package in a neat and orderly manner. All tubing shall be securely supported and anchored with non-corrosive coated clamps. All joints must be brazed, not soldered. All piping and controls shall be factory pressure-tested with nitrogen at 175 PSI.
11. All field piping installed as per factory standards and the sizing of the piping shall meet proper velocities as per factory standards.
12. Insulation will be foam type 25/50 smoke and fire type. Medium temperature will use 3/4" thick wall, low temperature will use 1" thick wall and sub-cooled liquid lines will use 1/2" thick wall insulation. All insulation shall be jacketed with Aluminum (complying with division 15000,) 1-1/2” overlap and secured with wire “zip” ties. All jacket elbows to be roll formed.
13. All field piping installed by KEC’s certified refrigeration subcontractor to shall include plastic bushing wherever steel to copper tubing comes together.
14. KEC’s subcontractor to include all labor, material, equipment, tools, refrigerant, oil, and other required accessories for the complete installation of the systems as shown and specified. Interconnection of all accessories accomplished for ease of servicing.
15. After installation, by KEC’s subcontractor and before charging, evacuate all piping systems to a 500-micron evacuation. After evacuation, charge system with nitrogen and maintain pressure of 150% working pressure for 6 hours. Cap off, install pressure gauge and hold for 24 hours minimum. Re-evacuate, hold for 6 hours, charge and make electronic detector test all joints.
16. Final wiring of connections, conduit and/or pull boxes, provided under GC’s applicable electrical and plumbing contracts. See R-1 drawing for wiring schematic for field wiring.
17. Included shall be a full one (1) year warranty for all parts by factory and 90-day warranty on labor on the entire refrigeration package, from the day of final acceptance of the installation as previously specified.
18. KEC’s Installation subcontractor shall provide all refrigerant piping & piping components, vertical and horizontal supports, hangers, insulation and refrigerant(s) between rack and coils per manufacturer requirements and all applicable code and AHJ regulations. Coordinate routing with GC and other trades to avoid conflicts.
19. Provide shop drawing for approval prior to fabrication.

ITEM#: **2** DESCRIPTION: **Water Treatment System – Cooking Equipment**

Quantity: 1
Provided By: KEC
Manufacturer: Everpure
Model No.: EZ-RO™ 650/50ATM

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide Booster Pump assembly.

3. System to have the ability to blend pretreated CW with post-treated CW to assure correct range of mineral content to properly operate equipment served by this system.
4. Provide air gap kit approved for drain.
5. Provide (1) each replacement filters: Prefilter, RO Membrane and Mineral Addition cartridge.
6. KEC to coordinate and verify wall backing with GC and routing to appliances as scheduled, with PC.

ITEM#: **3** DESCRIPTION: **Water Treatment System – Beverage Equipment**

Quantity: 1
Provided By: KEC
Manufacturer: AJ Atunes
Model No.: VZN-521H-T5

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide (1) each replacement filters: Carbon cartridge(s) & TAC Cartridge.
3. KEC to coordinate and verify wall backing with GC and routing to appliances as scheduled, with PC.

ITEM#: **4** DESCRIPTION: **Trash Gondola (NIKEC)**

Quantity: 1
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner's Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier's JSN list.

ITEM#: **5** DESCRIPTION: **Alum Treadplate Wall Panels**

Quantity: Lot
Provided By: KEC
Manufacturer: Custom S/S Fabricator
Model No.: 3003 Aluminum

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, detail drawings and the following:
2. Sheets to be 1/8" thick, 3003 series Aluminum.
3. Attach to wall with project approved adhesive, coordinate with GC.
4. 96"x48" sheets to be installed horizontally from top of cove base.
5. Sheets to have two horizontally run, formed in, inverted "V's" per detail SD-10.

ITEM#: **6** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **7** DESCRIPTION: **Delivery Pallets (NIKEC)**
Quantity: 3
Provided By: Owner's Vendor - NIPS
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner's Vendor for proper fit & requirements.

ITEM#: **8** DESCRIPTION: **Alum Treadplate Wall Panels**
Quantity: Lot
Provided By: KEC
Manufacturer: Custom S/S Fabricator
Model No.: 3003 Aluminum

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, detail drawings and the following:
2. Sheets to be 1/8" thick, 3003 series Aluminum.
3. Attach to wall with project approved adhesive, coordinate with GC.
4. 96"x48" sheets to be installed horizontally from top of cove base.
5. Sheets to have two horizontally run, formed in, inverted "V's" per detail SD-10.

ITEM#: **9** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **10** DESCRIPTION: **Dunnage Shelving**
Quantity: Lot
Provided By: KEC
Manufacturer: Channel
Model No.: Aluminum Cantilevered

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide sizes per plan, each unit to have solid shelf on bottom, (3) T-Bar Shelves, Cross Supports and Hardware, and end and common uprights.
3. Each section to have (4) shelves.
4. To be adjustable without tools.

5. Cantilever design without front posts.
6. All welded, aluminum or other non-corrosive finish.
7. Provide with lifetime guarantee against rust.

ITEM#: **11** DESCRIPTION: **Delivery Pallet – Water (NIKEC)**
Quantity: 1
Provided By: Owner's Vendor - NIPS
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.

ITEM#: **12** DESCRIPTION: **Delivery Pallets – MRE's (NIKEC)**
Quantity: 1
Provided By: Owner's Vendor - NIPS
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.

ITEM#: **13** DESCRIPTION: **Alum Treadplate Wall Panels**
Quantity: Lot
Provided By: KEC
Manufacturer: Custom S/S Fabricator
Model No.: 3003 Aluminum

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per General Specifications, plan, detail drawings and the following:
2. Sheets to be 1/8" thick, 3003 series Aluminum.
3. Attach to wall with project approved adhesive, coordinate with GC.
4. 96"x48" sheets to be installed horizontally from top of cove base.
5. Sheets to have two horizontally run, formed in, inverted "V's" per detail SD-10.

ITEM#: **14** DESCRIPTION: **Can Rack System**
Quantity: 1
Provided By: KEC
Manufacturer: Eagle
Model No.: CRC4

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide (3) 2436EZ shelves with (4) P63-EZ posts with flanged feet.
3. Provide with (4) Eagle CRC4 can racks on each of (3) shelves for 96 #10 can capacity.

4. Must have FIFO capability.
5. KEC set bottom shelf 10” AFF, set other (2) shelves at 24” on center from bottom shelf.

ITEM#: **15** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **16** DESCRIPTION: **Dry Storage Shelving**
Quantity: Lot
Provided By: KEC
Manufacturer: Cambro
Model No.: Camshelving Premium

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide unit sizes per plan, use common post and connectors where possible.
3. Provide with non-corrosive plastic or composite construction material with removable inlays.
4. Each section to consist of (3) louvered shelves and (1) solid shelf on bottom. Matts to be individually removable for washing.
5. Posts to be 64” high.
6. Provide with seismic feet.
7. Minimum weight capacity per shelf to be 600 Lbs.
8. Coordinate proper fit inside room prior to shipment.
9. KEC set bottom shelf 10” AFF.

ITEM#: **17** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **18** DESCRIPTION: **Clean Linen Rack**
Quantity: 1
Provided By: KEC
Manufacturer: Cambro
Model No.: Camshelving Elements Extra VS4

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide Camshelving Elements Extra VS4
3. Unit to be 21” D x 72” H x 60” L.
4. Provide (2) extra single post connectors to be set approx. 60” AFF.

5. Provide 1"x 60" diameter S/S tube to be attached to added single traverses with secure clamps and/or S/S brackets. Tube to be closed on both ends.
6. Provide with seismic feet.

ITEM#: **19** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **20** DESCRIPTION: **Soap & Towel Dispensers (NIKEC)**
Quantity: 7
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier's JSN list.

ITEM#: **21** DESCRIPTION: **Hand Sinks w/Splash Guards**
Quantity: 7
Provided By: KEC
Manufacturer: John Boos
Model No.: PBHS-W-140-P

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide welded 8" high, S/S side splashes on left & right sides.
3. Provide Component Hardware, Encore model KE19-1002-SB1 hands free, electronic faucet with AC adapter.
4. KEC to coordinate and verify wall backing by GC.

ITEM#: **22** DESCRIPTION: **Trash Receptacles (NIKEC)**
Quantity: 7
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier's JSN list.

ITEM#: **23** DESCRIPTION: **Eye Wash System (NIKEC)**
Quantity: 1
Provided By: PC
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with GC for location and wall backing.

ITEM#: **24** DESCRIPTION: **Soiled Linens Receptacle (NIKEC)**
Quantity: 1
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.

ITEM#: **25** DESCRIPTION: **Walk-in Freezer**
Quantity: 1
Provided By: KEC
Manufacturer: Thermarite
Model No.: Custom

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan and manufacturer's standard specifications, plans, elevations and details and the following: Must meet US Energy Code, effective January 1, 2009.
2. Size and shape per plan, 9'-6" high. Provide foam "hard-nose" type construction or equal to match plan sizes. **Nominal sizes are not acceptable.**
3. Wall and ceiling panel insulation shall be a full 4" Class 1 foamed-in-place urethane with a K factor of at least .125. All panels to be built with 4" high density rails at the perimeter with 3 cam locks along each side and two cam locks at the ceilings and floor connections (CFC Free).
4. Provide heavy duty, vertical wall backing on hinge side of door panel for Air Curtain specified under item #26.
5. Provide J-box with pre-wired conduit inside wall panel at human doors for air curtain per electrical plan; provide appropriate micro switch built into door frame. Air curtain to automatically start when door opens and stop when door closes.
6. Interior and ceiling shall be 26 ga. Sanisteel ® Antimicrobial white finish with embossed vertical "Mesa" rib pattern on walls only.
7. Unexposed exterior shall be 26 ga. galvanized steel.
8. Exposed exterior to be 26 ga. Sanisteel ® Antimicrobial white finish with embossed vertical "Mesa" rib pattern.
9. Provide (1) 36" x 78" flush mounted, self-closing door with 14"x24" triple panel vision panel (heated in cooler and freezer), with third hinge, 36" high aluminum thread plate kick plates on both sides, dead bolt lock with interior safety release. Flush S/S, heated threshold.

10. Human door sections shall include flush mounted Modularm model 75LC multi-monitor alarm and light control on latch side of door with the Modularm IP-1 internal switch flush mounted with occupancy detector. Provide with 3-way manual light switches. System to have output to Building Management System for temperature alarm.
11. Provide (3) Kason 22” LED fixture with LED bulbs. Lights to be shipped loose for field installation by electrical contractor.
12. Provide matching trim to adjacent building walls and closure panels to ceiling (No Mesa Rib Pattern) to ceiling. Use silicone to adhere trim to box and building walls if possible. If crews and/or rivets are required, use white head screws and/or rivets.
13. Provide 1-1/2” thick by 8” high, horizontally mounted, S/S bumper guards on exterior and interior per plan. Mount at 10” AFF on center. Bumper guards to be mitered at corners with all ends closed.
14. Provide with 48” high by length(s) shown on plan, Aluminum diamond treadplate wall liners in interior locations per plan (above dunnage racks).
15. Box must be assembled by a factory authorized/approved installation contractor, no exceptions. **Letter of approval from manufacturer is required-NO EXCEPTIONS.**
16. KEC to verify thermal barrier locations and slab conditions and advise GC if they are not within normal tolerances prior to slab pour and prior to fabrication.
17. KEC coordinate wall openings and clearances with GC.
18. Provide shop drawing for approval prior to fabrication.

ITEM#: **26** DESCRIPTION: **Air Curtain – Freezer**
Quantity: 1
Provided By: KEC
Manufacturer: Kolpak
Model No.: HAL-C2-N1

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide with appropriate microswitch provided as part of item #25.
3. KEC coordinate switch location and type with walk-in manufacturer.
4. KEC to supplement manufacturers adhesive attachment with S/S screws to secure attachment.

ITEM#: **27** DESCRIPTION: **Freezer Shelving**
Quantity: Lot
Provided By: KEC
Manufacturer: Cambro
Model No.: Camshelving Elements XTRA

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide unit sizes per plan, use common post and connectors where possible.
3. Provide with non-corrosive plastic or composite construction material with removable inlays.

4. Each section to consist of (3) louvered shelves and (1) solid shelf on bottom. Matts to be individually removable for washing.
5. Posts to be 64” high.
6. Minimum weight capacity per shelf to be 600 Lbs.
7. Provide with seismic feet.
8. Coordinate proper fit inside walk-in prior to shipment.
9. KEC set bottom shelf 10” AFF.

ITEM#: **28** DESCRIPTION: **Freezer Evap Coils**
Quantity: 2 (Part of Item #1)
Provided By: KEC
Manufacturer: RDT
Model No.: BEL0100

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide thru RDT or approved equal refrigeration system manufacturer.
3. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
4. Must include Ecosmart® demand defrost system.
5. Secure with Nylon bolts.
6. Provide shop drawing prior to fabrication.

ITEM#: **29** DESCRIPTION: **Freezer Dunnage Rack**
Quantity: 1
Provided By: KEC
Manufacturer: Cambro
Model No.: DRS360

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide 12” high models.
3. Provide with minimum 1,500 lb. capacity.
4. Provide Speckled Gray (480).

ITEM#: **30** DESCRIPTION: **Spare Number**

Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **31** DESCRIPTION: **Walk-in Cooler**
Quantity: 1
Provided By: KEC
Manufacturer: Thermalrite
Model No.: Custom

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan and manufacturer's standard specifications, plans, elevations and details and the following: Must meet US Energy Code, effective January 1, 2009.
2. Size and shape per plan, 9'-6" high. Provide foam, "hard-nose" type construction or equal to match plan sizes. **Nominal sizes are not acceptable.**
3. Wall and ceiling panel insulation shall be a full 4" Class 1 foamed-in-place urethane with a K factor of at least .125. All panels to be built with 4" high density rails at the perimeter with 3 cam locks along each side and two cam locks at the ceilings and floor connections (CFC Free).
4. Provide heavy duty, vertical wall backing on hinge side of door panel for Air Curtain specified under item #33.
5. Provide backing in ceiling panel to support item # 26, Food Preservation System.
6. Provide J-box with pre-wired conduit inside wall panel at human doors for air curtain per electrical plan; provide appropriate micro switch built into door frame. Air curtain to automatically start when door opens and stop when door closes.
7. Interior and ceiling shall be 26 ga. Sanisteel ® Antimicrobial white finish with embossed vertical "Mesa" rib pattern on walls only.
8. Unexposed exterior shall be 26 ga. galvanized steel.
9. Exposed exterior to be 26 ga. Sanisteel ® Antimicrobial white finish with embossed vertical "Mesa" rib pattern.
10. Provide (1) 36" x 78" flush mounted, self-closing door with 14"x24" triple panel vision panel (heated in cooler and freezer), with third hinge, 36" high aluminum thread plate kick plates on both sides, dead bolt lock with interior safety release. **No threshold.**
11. Human door sections shall include flush mounted Modularm model 75LC multi-monitor alarm and light control on latch side of door with the Modularm IP-1 internal switch flush mounted with occupancy detector. Provide with 3-way manual light switches. System to have output to Building Management System for temperature alarm.
12. Provide with buck opening for reach-in doors as specified under item #32. Provide with foamed in place j-box 6" below to of wall panel with 1/2" conduit up through wall and ceiling panel for power for door lights.
13. Provide (6) Kason 48" LED fixture with LED bulbs. Lights to be shipped loose for field installation by electrical contractor.
14. Provide matching trim to adjacent building walls and removable closure panels (No Mesa Rib Pattern) to ceiling.
15. Provide 1-1/2" thick by 8" high, horizontally mounted, S/S bumper guards on exterior and interior per plan. Mount at 10" AFF on center. Bumper guards to be mitered at corners with all ends closed.
16. Provide with 48" high by length(s) shown on plan, Aluminum diamond treadplate wall liners in interior locations per plan (above dunnage racks).

17. Box must be assembled by a factory authorized/approved installation contractor, no exceptions. **Letter of approval from manufacturer is required-NO EXCEPTIONS.**
18. KEC to verify thermal barrier locations and slab conditions and advise GC if they are not within normal tolerances prior to fabrication.
19. KEC coordinate wall openings and clearances with GC.
20. Provide shop drawing to include Item #32, for approval prior to fabrication.

ITEM#: **32** DESCRIPTION: **Reach-in Glass Doors**
Quantity: 1 (Part of Item #31)
Provided By: KEC
Manufacturer: Anthony
Model No.: Eliminaator Renu

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, manufacturer's standard specifications and the following:
2. Provide as part of Item #31, Walk-in Cooler.
3. Provide with (2) 24" x 67"H door with low E glass, triple pane doors.
4. Provide with Anti-Fog, Cloze Control, LifePlus Gasket & Optimax Pro 24 LED lights.
5. Provide with factory installed cylinder lock.
6. Provide with low energy frame and full length door handles.
7. Incorporate into shop drawing for item #31 for approval prior to fabrication.
8. Provide brushed S/S exterior frame and door handles.
9. Provide shop drawings for approval prior to fabrication.

ITEM#: **33** DESCRIPTION: **Air Curtain – Cooler**
Quantity: 1
Provided By: KEC
Manufacturer: Kolpak
Model No.: HAL-C2-N1

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Appropriate microswitch provided as part of item #31.
3. KEC coordinate switch location and type with walk-in manufacturer.

ITEM#: **34** DESCRIPTION: **Mobile Sheet Pan Racks**
Quantity: 2
Provided By: KEC
Manufacturer: New Age
Model No.: 1335-M

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Modify ((M) in model number) to be 72" high.
3. Provide with all welded, Aluminum construction.

4. Provide corner bumpers.
5. Provide with all locking casters.
6. Provide with vertical pan stop.

ITEM#: **35** DESCRIPTION: **Cooler Shelving**
Quantity: Lot
Provided By: KEC
Manufacturer: Cambro
Model No.: Camshelving Premium

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide unit sizes per plan, use common post and connectors where possible.
3. Provide with non-corrosive plastic or composite construction material with removable inlays.
4. Each section to consist of (3) louvered shelves and (1) solid shelf on bottom. Matts to be individually removable for washing.
5. Posts to be 64" high.
6. Minimum weight capacity per shelf to be 600 Lbs.
7. Coordinate proper fit inside walk-in prior to shipment.
8. KEC set bottom shelf 10" AFF.

ITEM#: **36** DESCRIPTION: **Food Preservation System**
Quantity: 1
Provided By: KEC
Manufacturer: Thermalrite
Model No.: PSF-24PCO

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. To be attached to inside of walk-in cooler ceiling panel.

ITEM#: **37** DESCRIPTION: **Cooler Dunnage Racks**
Quantity: 1
Provided By: KEC
Manufacturer: Cambro
Model No.: DRS360

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide 12" high models.
3. Provide with minimum 1,500 lb. capacity.
4. Provide Speckled Gray (480).

ITEM#: **38** DESCRIPTION: **Cooler Evap Coils**
Quantity: 2 (Part of Item #1)
Provided By: KEC
Manufacturer: RDT
Model No.: BELO125

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide thru RDT or approved equal refrigeration system manufacturer.
3. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
4. Must include Ecosmart® demand defrost system.
5. Secure with Nylon bolts.
6. Provide shop drawing prior to fabrication.

ITEM#: **39** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **40** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **41** DESCRIPTION: **Produce Wash System**
Quantity: 1
Provided By: KEC
Manufacturer: Powersoak
Model No.: PPU2B-66L-208-3

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan and manufacturer's standard specifications, plans, elevations and details and the following:
2. Provide with advanced free flowing wash action, front to back.
3. Provide 30" x 120" unit with the following from left to right:
    a. Provide left end splash.
    b. Provide approximately 29" drain board section. Open below for Item #47.
    c. Provide approximately 30" drain board with full size, 1" deep rinse sink with perforated, removable, screen set flush with counter top. Provide with finger pull holes. Sink pitched to back right corner to include Fisher #6541-2400, 1-1/2" threaded drain.
    d. Provide approximately 8" drain board section over motor and controls.
    e. Provide (2) bay powered wash sink with Powersoak S/S rotary drain. Include 14 ga. S/S bracket for rotary drain handle and ALL other drains.

f. Provide approximately 30” drain board with full size, 1” deep rinse sink with perforated, removable, screen set flush with counter top. Provide with finger pull holes. Sink pitched to back left corner to include Fisher #6541-2400, 1-1/2” threaded drain.
g. Provide right end splash, closed end with 14 ga., 8” high, S/S splash guard integral to end splash.

4. KEC to coordinate fit of item #42.
5. Provide (1) 4”x4x1-3/4” deep electrical receptacle box(es) welded into 14 ga. S/S bracket per drawings for item #47. Conduit, wiring, and receptacle by EC
6. Provide shop drawing for approval prior to fabrication.

ITEM#: **42** DESCRIPTION: **Trash Receptacles (NIKEC)**
Quantity: 12
Provided By: Owner’s Med Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner’s Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier’s JSN list.

ITEM#: **43** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **44** DESCRIPTION: **Pre-Rinse Assembly w/Faucet**
Quantity: 1
Provided By: KEC
Manufacturer: Fisher
Model No.: 52930

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide S/S, back splash mounted valve with lever handles and 1/2” brass, close elbows.
3. Provide with 6”, S/S add a faucet spout.

ITEM#: **45** DESCRIPTION: **Produce Wash Agent Dispenser (NIKEC)**
Quantity: 1
Provided By: Owner’s Vendor - NIPS
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner's Vendor for proper fit & requirements.

ITEM#: **46** DESCRIPTION: **Pre-Rinse Assembly**
Quantity: 1
Provided By: KEC
Manufacturer: Fisher
Model No.: 53511

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide S/S, single CW back splash mounted valve with lever handle and 1/2" brass, close elbows.

ITEM#: **47** DESCRIPTION: **Produce Spin Dryer**
Quantity: 1
Provided By: KEC
Manufacturer: Electrolux
Model No.: VP2

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide inner basket with holes.
3. KEC to coordinate for fit under Item #41.

ITEM#: **48** DESCRIPTION: **Knife Sanitize/Storage Cabinet – Wall mounted**
Quantity: 1
Provided By: KEC
Manufacturer: Edlund
Model No.: KSUV-18

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. KEC to verify and coordinate wall backing requirements.

ITEM#: **49** DESCRIPTION: **Mobile Soiled Wares Shelves**
Quantity: 3
Provided By: KEC
Manufacturer: Cambro
Model No.: CPMU244867S4

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:

2. Provide with non-corrosive plastic or composite construction material with removable inlays.
3. Each unit to consist of (4) solid shelves. Matts to be individually removable for washing.
4. Posts to be 64” high.
5. KEC set bottom shelf 10” AFF.
6. Minimum weight capacity per unit to be 750 Lbs.
7. Provide with polymer or S/S hub casters with donut bumpers.

ITEM#: **50** DESCRIPTION: **Mobile Clean Wares Shelves**
Quantity: 3
Provided By: KEC
Manufacturer: Cambro
Model No.: CPMU244867V4

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide with non-corrosive plastic or composite construction material with removable inlays.
3. Each unit to consist of (3) louvered shelves and (1) solid shelf on bottom. Matts to be individually removable for washing.
4. Posts to be 64” high.
5. KEC set bottom shelf 10” AFF.
6. Minimum weight capacity per unit to be 750 Lbs.
7. Provide with polymer or S/S hub casters with donut bumpers.

ITEM#: **51** DESCRIPTION: **Prep Table w/Sink**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. Provide 14 ga. S/S top with Marine edge and NSF approved sound deadening or sound deadening gaskets.
4. Provide with (1) 16”x20”x14” deep, formed, integrally welded S/S sink bowl with die stamped opening for drain and 14 ga. S/S bracket for lever waste handle & sink drain. Provide with Fisher model 22322 lever drain with overflow.
5. Provide with (2) 18 ga. S/S undershelves on left, S/S cross bracing on right to be open in front.
6. Provide with (1) Fisher model 61107 S/S faucet with model 2400-2103, 1/2” brass, close elbows.
7. Provide (2) 4”x4”x1-3/4” deep electrical receptacle box(es) welded into backsplash per drawings. Conduit, wiring, and receptacle by EC.

8. Provide S/S cross bracing and undershelves per elevations & sections.
9. KEC to coordinate fit of item #42.
10. Provide shop drawing for approval prior to fabrication.

ITEM#: **52** DESCRIPTION: **Double Overshelf**
Quantity: 1 (Part of Item#51)
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. This overshelf to extend over item #41 at both ends, per plan
4. Provide double tier, 18 ga. S/S overshelves on 14 ga. S.S angle brackets welded to S/S collars with set screws to allow independent height adjustment. Provide with 1-1/2” dia. S/S tubular uprights. Uprights to pass thru backsplashof item #51 and be fully welded to table legs to prevent wobble.
5. Provide 18 ga. S/S brackets for “wall” brackets of items #44 & #46.
6. Provide 18 ga., double pan S/S bracket for item #45, coordinate size with Owner’s vendor, and item #58’s disc rack. Item #45 & #58 to be mounted on opposite face same bracket.
7. Provide shop drawing for approval prior to fabrication.

ITEM#: **53** DESCRIPTION: **Work Table**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. Provide 14 ga. S/S top with NSF approved sound deadening or sound deadening gaskets.
4. Provide (2) 4”x4”x1-3/4” deep electrical receptacle box(es) welded into backsplash per drawings. Conduit, wiring, and receptacle by EC.
5. Provide 18 ga. S/S vertical chase from floor to underside of table. Provide 6” high, 14 ga. Galvanized curb with S/S coved base with fully welded seams. Vertical chase to have removable panel on one side and shallow Unistrut mounted horizontally per section drawing. See detail SD-3.
6. Provide S/S cross bracing and undershelves per elevations & sections.
7. Provide shop drawing for approval prior to fabrication.

ITEM#: **54** DESCRIPTION: **Overshelf w/Utensil Rack**
Quantity: 1 (Part of Item #53)
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. Provide single tier, 18 ga. S/S overshelf on 14 ga. S.S angle brackets welded to S/S collars with set screws to allow independent height adjustment. Provide with 1-1/2" dia. S/S tubular uprights. Uprights to pass thru backsplashof item #51 and be fully welded to table legs to prevent wobble.
4. Extend uprights to support double, 1/4" x 2" S/S pot hanger rails with 6" diameter radius at ends. Provide full compliment of S/S, double sided pot hooks at 6" OC.
5. Provide shop drawing for approval prior to fabrication.

ITEM#: **55** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **56** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **57** DESCRIPTION: **Hotel/Sheet Pan Dollies**
Quantity: 3
Provided By: KEC
Manufacturer: New Age
Model No.: 51702VB

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Modify handle to 32" height.
3. Provide to accept (1) stack of 12" x 20" pans and (1) stack of 18" x 26" sheet pans.
4. Provide vertical bumpers.

ITEM#: **58** DESCRIPTION: **Food Processor**
Quantity: 1
Provided By: KEC
Manufacturer: Robot Coupe
Model No.: R301 Ultra Dice

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide Fine serrated blade assembly for chopping herbs and Spices (27287).
3. Provide Cuisine Kit for fruit sauces and citrus fruit juice (27396).
4. Provide Wall-mounted blade and disc holder: holds 1 blade and 8 discs (107810).
5. Provide Disc cleaning kit (39881).
6. Provide (5) disc pkg, to include; 1/4" grating (27046), 1/4"x1/4" Julienne (27610), 1/8" Slicing (27086), 5/64" Julienne (27599) & 3/16" slicing (27087) discs.
7. Provide 5/64" Ripple cutting disc (27621).
8. Provide Hard Cheese grating disc (27764).

ITEM#: **59** DESCRIPTION: **Slicer – Automatic**
Quantity: 1
Provided By: KEC
Manufacturer: Vollrath
Model No.: 40951

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide 12" safe blade removal tool.

ITEM#: **60** DESCRIPTION: **Mobile Slicer Stand**
Quantity: 1
Provided By: KEC
Manufacturer: New Age
Model No.: 98000

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Table to have all welded construction.
3. Frame top edges formed to hold sheet pans as top extensions.
4. Provide with vertical bumpers.
5. Provide with 14 ga. S/S top.
6. Angle slides to accommodate full and half size sheet pans.
7. Provide with (4) locking casters.

ITEM#: **61** DESCRIPTION: **Mixer Utensil Stand – Floor**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. Provide with 6” diameter by 1/4” thick S/S base plate with tapered edges and (5) countersunk, 5/16” holes for attachement screws.
4. Provide with 84” high by 1-5/8” diameter tubular post with closed top and fully welded to base plate. Post to have (5) 14 ga. S/S vertical flutes fully welded to post and base plate, to extend 18” vertically up post. Post to have (6) 1/4” S/S rods welded to post at 45˚ vertical angle from post. Rods to be arranged around post with 120˚ separation, in (2) rows, (3) rods per row.
5. Provide shop drawing for approval prior to fabrication.

ITEM#: **62** DESCRIPTION: **60 Qt. Mixer**
Quantity: 1
Provided By: KEC
Manufacturer: Doyon
Model No.: BTF060

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide 40 qt. bowl and alternative material for 60 qt. mixer.
3. Provide meat grinder attachment.
4. Provide S/S bowl dolly on casters.

ITEM#: **63** DESCRIPTION: **Baker’s Table**
Quantity: 1
Provided By: KEC
Manufacturer: John Boos
Model No.: BT3S03A

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide 1-3/4" thick, North American, hard rock maple top w/ 4" coved riser on back and sides.
3. Provide S/S base w/ locking, 3 tier drawer unit on left.
4. Provide (2) vertical cover corners.
5. Provide 84”L x 30”W.
6. Provide with adjustable, S/S flanged feet on outside corners.
7. Provide NSF certified.
8. Provide shop drawing for approval prior to fabrication.

ITEM#: **64** DESCRIPTION: **7 Qt. Mixer**
Quantity: 1
Provided By: KEC
Manufacturer: Vollrath
Model No.: 40755

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with standard accessories.

ITEM#: **65** DESCRIPTION: **Ingredient Bins – Baking**
Quantity: 3
Provided By: KEC
Manufacturer: Rubbermaid
Model No.: 3600-88

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. KEC coordinate for fit under item #63.

ITEM#: **66** DESCRIPTION: **Ingredient Bins – Cooking**
Quantity: 3
Provided By: KEC
Manufacturer: Rubbermaid
Model No.: 3600-88

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. KEC coordinate for fit under item #67.

ITEM#: **67** DESCRIPTION: **Work Table**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. Provide 14 ga. S/S top with NSF approved sound deadening or sound deadening gaskets.
4. Provide 2" thick by 6" high back splash.
5. Provide S/S cross bracing per elevations & sections.
6. Provide with S/S, adjustable flanged feet.

7. Provide shop drawing for approval prior to fabrication.
8. KEC to coordinate fit of items #42, #57 & #57.

ITEM#: **68** DESCRIPTION: **Overshelf**
Quantity: 1
Provided By: KEC
Manufacturer: Integral part of Item #67
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. Provide 18 ga. S/S overshelf with 14 ga. S.S. angle brackets welded to S/S collars with set screws for height adjustment.
4. Povide with 1-5/8” diameter S/S uprights to extend down through backsplash of item #67 and secured to legs to prevent wobble. Top of uprights to be 64” AFF with closed tops.

ITEM#: **69** DESCRIPTION: **Reach-in Blast Chiller/Thaw Cabinet**
Quantity: 1
Provided By: KEC
Manufacturer: IRINOX
Model No.: MF 70.1 L PLUS

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
3. Provide door hinged on right.
4. Provide with (4) swivel casters, front (2) locking.
5. Provide (2) additional shelves.
6. Provide use, cleaning and routine maintenance demonstrations by factory authorized Agent plus:
   a. One (4) hour Chef session training after start-up as scheduled with owner and operator.
   b. One (2) hour Chef session training 30 day after initial training as scheduled with owner and operator.

ITEM#: **70** DESCRIPTION: **Mobile Baker’s Rack**
Quantity: 1
Provided By: KEC
Manufacturer: CAMBRO
Model No.: CPMU244275S5

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with single shelf security cage on top section.
3. Provide with shelf rails on back and ends of all non-security shelves.

ITEM#: **71** DESCRIPTION: **Ingredient Bins – Small**
Quantity: Lot
Provided By: KEC
Manufacturer: Rubbermaid
Model No.: 3600-88

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide (3) model 9G60, 2.62 Gallon bins and (3) 9G57, 6.25 Gallon bins.
3. KEC coordinate for fit on bottom two shelves of item #70.

ITEM#: **72** DESCRIPTION: **Mobile Cooling Racks**
Quantity: 2
Provided By: KEC
Manufacturer: New Age
Model No.: 1335-M

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Modify ((M) in model number) to be 72" high.
3. Provide with all welded, Aluminum construction.
4. Provide corner bumpers.
5. Provide with all locking casters.
6. Provide with vertical pan stop.

ITEM#: **73** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **74** DESCRIPTION: **Fire Suppression System**
Quantity: 1
Provided By: KEC
Manufacturer: Ansul
Model No.: R-102

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:

2. Furnish through the exhaust hoods manufacturer.
3. Furnish complete wet chemical system to meet NFPA #96, UL 300 and local code requirements.
4. Submit plans to the city as required for permit. KEC to pay for permit.
5. This system to be sized with extra liquid chemical tanks as necessary to cover exhaust hoods #75,86 & #105.
6. Provide (1) 2-1/2" mechanical gas valve, KEC verify prior to bid.
7. System is complete with micro-switch which the EC uses to control building systems such as exhaust fan/MAU fan, shunt trips, alarms, etc.
8. Provide with chrome or S/S pipe and fittings where exposed.
9. Piping to be concealed to greatest extent possible.
10. KEC to coordinate location and box and conduit within wall for pull station(s) for recessed installation with GC.
11. KEC to coordinate with GC for system requirements and testing.

ITEM#: **75** DESCRIPTION: **Exhaust Hood w/MUA Plenum**
Quantity: 1
Provided By: KEC
Manufacturer: Spring Air
Model No.: FN-B-MB-ZH(D)-9.5/5

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Size and shape per plan with 3" air space in rear.
3. Provide with open ended connection to exhaust hood item #86.
4. Static pressure at exhaust collar shall not exceed 1.0" of Water Column (WC).
5. The DynaFlow, comfort flow, makeup air hood shall be a Spring Air Systems box canopy, high efficiency, VE hood, including makeup air plenum with three way zone control, UL/ULC listed, and built in accordance with the NFPA-96.
6. The unit casing shall be a minimum 18 GA. stainless steel on all exposed surfaces.
7. The filter hood shall include S/S, UL/ULC listed VE baffle grease filters mounted in an integral stainless steel rack inclined at 45 degrees. The filter rack shall include a full length stainless steel grease gutter and grease cup.
8. The hood shall have (3), recessed LED lights. All lights common to one section of the hood to be inter-wired by Spring Air Systems.
9. Hood shall include temperature sensor for automatic fan start per code requirements pre-mounted in exhaust duct collar(s). **KEC Coordinate with EC.**
10. The DynaFlow fresh air plenum provides all the fresh air required for the commercial kitchen. The fresh air is routed to three (3) regions within the boundaries of the appliances. Each region includes an aerodynamically designed s/s perforated discharge panel.
11. The first (1) region discharges through a full length s/s panel located at the bottom of the DynaFlow plenum. Fresh air is directed through the Comfort Tuning Blade (CTB) towards the appliances providing maximum exhaust air reduction. The second (2) Region discharges through a full length s/s angular panel located at the bottom front of the DynaFlow plenum. The fresh air is directed towards the chef to provide a more comfortable work environment in front of the hood. The third (3) region provides horizontal discharge of fresh air through a s/s perforated panel out the front of the

hood into the kitchen. The third region provides the exact amount of fresh air to balance the kitchen and ensure optimum capture.

12. The S/S front makeup air plenum shall include multiple MB FRONT perforated panels every 33” (838mm) to 41” (1040mm) across the hood. The MB FRONT grills shall include a manually operated Adjustable Blade damper for individual adjustment over each appliance. The CTB damper is easily adjusted by the chef at the lower discharge to provide local adjustment of airflow to the chef by the chef.
13. Exhaust hood shall include model ZH(D) zone flow damper as part of Demand Kitchen Ventilation Control (DKVC) system as specified under item #96.
14. See item #96 for controls information.
15. Provide with matching closure panels to finished ceiling. Verify ceiling height and type prior to submittal.
16. KEC to coordinate with GC for early hanger installation and early delivery of hood.
17. Provide shop drawing for approval prior to fabrication.

ITEM#: **76** DESCRIPTION: **S/S Wall Paneling w/Window Frame**

Quantity: Lot
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations and detail drawing and the following:
2. Liner to be full length and height of wall where exposed.
3. Provide with 2” wide by approx. 7-1/4” thick frame around both front and back of pass-through opening. Provide as telescoping type with fully weled and polished corners.
4. Provide 20 ga, 304 series stainless steel with #4 mill finish.
5. Provide S/S, full height wall caps at both ends.
6. Provide with offset overlapping joints per detail.
7. Provide with “Z” molding at bottom to overlap tile base.
8. Coordinate with GC for transition with adjacent finishes.
9. Provide shop drawing for approval prior to fabrication.

ITEM#: **77** DESCRIPTION: **Work Table w/Overshelf**

Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide 14 ga. S/S top and NSF approved sound deadening or sound deadening gaskets. Top to have raised, die stamped openings for overshelf.
3. Provide S/S cross bracing and undershelves per elevations & sections.

4. Provide partial length, single tier, 18 ga. S/S overshelf on 14 ga. S.S angle brackets welded to S/S collars with set screws to allow height adjustment. Provide with 1-1/2" dia. S/S tubular uprights. Uprights to pass thru table top and be fully welded to table legs to prevent wobble.
5. Extend uprights to support double, 1/4" x 2" S/S pot hanger rails with 6" diameter radius at ends. Provide full compliment of S/S, double sided pot hooks at 6" OC.
6. Provide shop drawing for approval prior to fabrication.

ITEM#: **78** DESCRIPTION: **Hotel Pan Dollies**
Quantity: 3
Provided By: KEC
Manufacturer: New Age
Model No.: 1193-MM

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Modify handle to 32" height.
3. Modify to accept (2) stacks of 12" x 20" pans on bottom shelf and (2) stacks of 1/2 and 1/3rd size pans on top shelf. Top shelf to be removable soild shelf with center support.
4. Provide with vertical bumpers.

ITEM#: **79** DESCRIPTION: **Combi Oven – Upper**
Quantity: 1
Provided By: KEC
Manufacturer: UNOX
Model No.: XAVC-06FS-GPLM

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide for Liquid Propane at elev above 4,000 above sea level. KEC to confirm.
3. Provide with door hinged on right.
4. Must have 316 series S/S interior.
5. Must have capacity for (5) full size, 18x26 sheet pans or (10) 12x20x2.5 hotel pans.
6. Must have the ability to operate with static fan in steam mode.
7. Provide with SMART.Drain to separate & collect fats.
8. Provide with LIEVOX proofing function.
9. Provide with Ethernet connection in lieu of USB.
10. Provide with HYPER.Smoker feature.
11. Provide with the following UNOX accessories:
    a. Provide with (1) Double stack installation kit for gas ovens (XAVQC-00E2-G).
    b. Provide with (1) extra oven rack (GRP560).
    c. Provide with (1) Grill frame (GRP561).
    d. Provide with (3) Chicken racks (GRP570).
    e. Provide with (3) Steam & Fry pans (GRP575).
    f. Provide with (3) Perforated bake pans (TG515).

g. Provide with (2) Grill pans (TG530).
h. Provide with (1) 18x26 lateral support kit (XUC560).
i. Provide with (2) cases of DET&Rinse ECO tablets.

12. Provide (1) Dormont 1675KITCF2S48, 48” gas quick disconnect gas hose with restraining device.
13. Provide (2) Dormont CMB37BP2Q48, 48” coated, lead free water hoses with quick disconnects and garden hose adapters.
14. Provide (1) water pressure regulator for wash down connection only.
15. Provide Factory Certified installation and start-up;
    a. KEC to manage installation to ensure it is done in a neat and orderly manner, per manufacturer instructions and per plans and specs.
    b. Location of Detergent and rinse aid shall be in S/S side “saddle type” brackets. Install so that both ovens are fed from a single detergent and single rinse aid.
    c. Drains shall be neatly and securely attached to the oven stand, NOT the floor and/or walls. Zip ties are NOT acceptable. Drains are to be routed per plan, not necessarily the shortest route.
    d. Provide necessary adapters, components etc., so that (1) detergent feeds both ovens and (1) rinse agent feeds both ovens.
    e. Water for steam generation is supplied by the Water Treatment System specified under item #2. KEC to coordinate and verify.
    f. KEC provide installation plan for approval after site survey but before installation.
16. Provide use, cleaning and routine maintenance demonstrations by factory authorized Agent plus:
    a. One (4) hour Chef session training after start-up as scheduled with KEC, owner and operator.
    b. One (2) hour Chef session training approximately 30 days after initial training as scheduled with owner and operator.

ITEM#: **80** DESCRIPTION: **Combi Oven w/Mobile Stand**
Quantity: 1
Provided By: KEC
Manufacturer: UNOX
Model No.: XAVC-06FS-GPLM

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide for Liquid Propane at elev above 4,000 above sea level. KEC to confirm.
3. Provide with door hinged on right.
4. Must have 316 series S/S interior.
5. Must have capacity for (5) full size, 18x26 sheet pans or (10) 12x20x2.5 hotel pans.
6. Must have the ability to operate with static fan in steam mode.
7. Provide with SMART.Drain to separate & collect fats.
8. Provide with LIEVOX proofing function.
9. Provide with Ethernet connection in lieu of USB.
10. Provide with HYPER.Smoker feature.
11. Provide with the following UNOX accessories:

a. Provide with (1) extra oven rack (GRP560).
b. Provide with (1) Grill frame (GRP561).
c. Provide with (3) Chicken racks (GRP570).
d. Provide with (3) Steam & Fry pans (GRP575).
e. Provide with (3) Perforated bake pans (TG515).
f. Provide with (2) Grill pans (TG530).
g. Provide with (1) 18x26 lateral support kit (XUC560).
h. Provide with (2) cases of DET&Rinse ECO tablets.

12. Provide (1) Dormont 1675KITCF2S48, 48” gas quick disconnect gas hose with restraining device.
13. Provide (2) Dormont CMB37BP2Q48, 48” coated, lead free water hoses with quick disconnects and garden hose adapters.
14. Provide (1) water pressure regulator for wash down connection only.
15. Provide Factory Certified installation and start-up;
    a. KEC to manage installation to ensure it is done in a neat and orderly manner, per manufacturer instructions and per plans and specs.
    b. Location of Detergent and rinse aid shall be in S/S side “saddle type” brackets. Install so that both ovens are fed from a single detergent and single rinse aid.
    c. Drains shall be neatly and securely attached to the oven stand, NOT the floor and/or walls. Zip ties are NOT acceptable. Drains are to be routed per plan, not necessarily the shortest route.
    d. Provide necessary adapters, components etc., so that (1) detergent feeds both ovens and (1) rinse agent feeds both ovens.
    e. Water for steam generation is supplied by the Water Treatment System specified under item #2. KEC to coordinate and verify.
    f. KEC provide installation plan for approval after site survey but before installation.
16. Provide with mobile stand (XWARC-00EF-L+XUC012)

ITEM#: **81** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **82** DESCRIPTION: **Mini Combi Oven/Steamer – Upper**
Quantity: 1
Provided By: KEC
Manufacturer: UNOX
Model No.: XACC-0513-EPLM

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide for 208V-3P power.
3. Provide with door hinged on right.
4. Must have 316 series S/S interior.

5. Must have capacity for (5) 12x20x2.5 hotel pans.
6. Must have the ability to operate with static fan in steam mode.
7. Provide with SMART.Drain to separate & collect fats.
8. Provide with Ethernet connection in lieu of USB.
9. Provide with double stacking kit (XACQC-0013-E).
10. Provide with the following UNOX accessories:
    a. Provide with (1) extra oven rack (GRP806).
    b. Provide with (2) Steam pans (GRP815).
    c. Provide with (2) Egg pans (TG936).
    d. Provide with (2) cases of DET&Rinse ECO tablets.
11. Provide (2) Dormont CMB37BP2Q48, 48” coated, lead free water hoses with quick disconnects and garden hose adapters.
12. Provide (1) water pressure regulator for wash down connection only.
13. Provide Factory Certified installation and start-up;
    a. KEC to manage installation to ensure it is done in a neat and orderly manner, per manufacturer instructions and per plans and specs.
    b. Location of Detergent and rinse aid shall be in S/S side “saddle type” brackets. Install so that both ovens are fed from a single detergent and single rinse aid.
    c. Drains shall be neatly and securely attached to the oven stand, NOT the floor and/or walls. Zip ties are NOT acceptable. Drains are to be routed per plan, not necessarily the shortest route.
    d. Water for steam generation is supplied by the Water Treatment System specified under item #2. KEC to coordinate and verify.
    e. KEC provide installation plan for approval after site survey but before installation.

ITEM#: **83** DESCRIPTION: **Mini Combi Oven/Steamer w/Mobile Stand - Lower**

Quantity: 1
Provided By: KEC
Manufacturer: UNOX
Model No.: XACC-0513-EPLM

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide for 208V-3P power.
3. Provide with door hinged on right.
4. Must have 316 series S/S interior.
5. Must have capacity for (5) 12x20x2.5 hotel pans.
6. Must have the ability to operate with static fan in steam mode.
7. Provide with SMART.Drain to separate & collect fats.
8. Provide with Ethernet connection in lieu of USB.
9. Provide with double stacking kit (XACQC-0013-E).
10. Provide with the following UNOX accessories:
    a. Provide with (1) extra oven rack (GRP806).
    b. Provide with (2) Steam pans (GRP815).
    c. Provide with (2) Egg pans (TG936).

d. Provide with (2) cases of DET&Rinse ECO tablets.

11. Provide (2) Dormont CMB37BP2Q48, 48” coated, lead free water hoses with quick disconnects and garden hose adapters.
12. Provide (1) water pressure regulator for wash down connection only.
13. Provide Factory Certified installation and start-up;
    a. KEC to manage installation to ensure it is done in a neat and orderly manner, per manufacturer instructions and per plans and specs.
    b. Location of Detergent and rinse aid shall be in S/S side “saddle type” brackets. Install so that both ovens are fed from a single detergent and single rinse aid.
    c. Drains shall be neatly and securely attached to the oven stand, NOT the floor and/or walls. Zip ties are NOT acceptable. Drains are to be routed per plan, not necessarily the shortest route.
    d. Water for steam generation is supplied by the Water Treatment System specified under item #2. KEC to coordinate and verify.
    e. KEC provide installation plan for approval after site survey but before installation.
14. Provide with mobile stand (XWCRC-0013-L+XUC012)

ITEM#: **84** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **85** DESCRIPTION: **10 Burner Range w/Convection**
Quantity: 1
Provided By: KEC
Manufacturer: Hestan
Model No.: HOP366/HOP364/HCO36/HCO36

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide for Liquid Propane at elev above 4,000 above sea level. KEC to confirm.
3. Provide as assembly consisting of, from left to right:
    a. (1) HOP366, (6) burner range on HCO36 convection oven w/spark ignition.
    b. (1) HOP634, (4) burner range on HCO36 convection oven w/spark ignition.
4. Provide with single, 1” rear gas connection, cap on cover front manifold(s).
5. Provide with single, continuous, 9” high flue riser.
6. Provide on casters, front locking.

ITEM#: **86** DESCRIPTION: **Exhaust Hood w/MUA Plenum**
Quantity: 1
Provided By: KEC
Manufacturer: Spring Air
Model No.: FN-B-MB-ZH(D)-7.83/5

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Size and shape per plan with 3" air space in rear.
3. Provide with open ended connection to exhaust hood item #75.
4. **Static pressure at exhaust collar shall not exceed 1.0" of Water Column (WC).**
5. The DynaFlow, comfort flow, makeup air hood shall be a Spring Air Systems box canopy, high efficiency, VE hood, including makeup air plenum with three way zone control, UL/ULC listed, and built in accordance with the NFPA-96.
6. The unit casing shall be a minimum 18 GA. stainless steel on all exposed surfaces.
7. The filter hood shall include S/S, UL/ULC listed VE baffle grease filters mounted in an integral stainless steel rack inclined at 45 degrees. The filter rack shall include a full length stainless steel grease gutter and grease cup.
8. The hood shall have (3), recessed LED lights. All lights common to one section of the hood to be inter-wired by Spring Air Systems.
9. Hood shall include temperature sensor for automatic fan start per code requirements pre-mounted in exhaust duct collar(s). **KEC Coordinate with EC.**
10. The DynaFlow fresh air plenum provides all the fresh air required for the commercial kitchen. The fresh air is routed to three (3) regions within the boundaries of the appliances. Each region includes an aerodynamically designed s/s perforated discharge panel.
11. The first (1) region discharges through a full length s/s panel located at the bottom of the DynaFlow plenum. Fresh air is directed through the Comfort Tuning Blade (CTB) towards the appliances providing maximum exhaust air reduction. The second (2) Region discharges through a full length s/s angular panel located at the bottom front of the DynaFlow plenum. The fresh air is directed towards the chef to provide a more comfortable work environment in front of the hood. The third (3) region provides horizontal discharge of fresh air through a s/s perforated panel out the front of the hood into the kitchen. The third region provides the exact amount of fresh air to balance the kitchen and ensure optimum capture.
12. The S/S front makeup air plenum shall include multiple MB FRONT perforated panels every 33" (838mm) to 41" (1040mm) across the hood. The MB FRONT grills shall include a manually operated Adjustable Blade damper for individual adjustment over each appliance. The CTB damper is easily adjusted by the chef at the lower discharge to provide local adjustment of airflow to the chef by the chef.
13. Exhaust hood shall be compatible with Demand Kitchen Ventilation Control (DKVC) system as specified under item #96.
14. See item #96 for controls information.
15. Provide with matching closure panels to finished ceiling. Verify ceiling height and type prior to submittal.
16. KEC to coordinate with GC for early hanger installation and early delivery of hood.
17. Provide shop drawing for approval prior to fabrication.

ITEM#: **87** DESCRIPTION: **Cooks Table w/Sink**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. Provide 14 ga. S/S top with partial Marine edge and NSF approved sound deadening or sound deadening gaskets. Top to have die stamped, raised openings for item #88 uprights.
4. Provide with (1) 16”x20”x14” deep, formed, integrally welded S/S sink bowl with die stamped opening for drain and 14 ga. S/S bracket for lever waste handle and sink drains. Provide with Fisher model 22322 lever drain with overflow.
5. Provide with (1) Fisher model 58572, 4” OC dech mount, S/S faucet with wrist blade handles.
6. Provide (2) 4”x4”x1-3/4” deep electrical receptacle box(es) welded into brackets per drawings. Conduit, wiring, and receptacle by EC.
7. Provide S/S cross bracing and undershelves per elevations & sections.
8. Provide shop drawing for approval prior to fabrication.

ITEM#: **88** DESCRIPTION: **Overshelf w/Utensil Rack**
Quantity: 1
Provided By: KEC
Manufacturer: Integral part of item #87
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. Provide single 18 ga. S/S overshelf on 14 ga. S.S angle brackets welded to 1-1/2” dia. S/S tubular uprights. Provide with extended uprights up to 2”x1/4” thick S/S bar stock offset from uprights with same bar stock with 3” radius at ends. Uprights to have welded and polished closed tops and to pass thru table top with raised, die stamped openings, and be fully welded to table legs to prevent wobble.
4. Provide with 1/4”x2” S/S bar stock horizontal pot rack set at mid height per elevations and sections. No pot hooks required on this pot rack.
5. Provide shop drawing for approval prior to fabrication.

ITEM#: **89** DESCRIPTION: **Pot Fill Faucet w/Bracket**
Quantity: 1
Provided By: KEC
Manufacturer: Fisher/Custom
Model No.: 2928

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Must meet NSF/ANSI 61 & 372 approved for NSF-61-9.
3. Provide 14 ga. S/S bracket per plan, elevations, and detail.
4. Provide filler faucet as assembly of the following Fisher or equal components:

a. Model 11398 4” OC, deck mount (mounted vertically), S/S control valve.
b. Model 10669 S/S faucet riser with base mount and 16” swing spout with added model 54461, S/S, double joint sub assembly.
c. Include one Fisher model 2902-2301 clamp style wall bracket

5. Provide with (2) Dormont or equal model 73-3135-48, 48” water hose with quick disconnects.
6. Provide left handed version to mount on right end of item #85.
7. Provide shop drawing for approval prior to fabrication.

ITEM#: **90** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **91** DESCRIPTION: **Tilting Skillet w/Stand – Dual Pan**
Quantity: 1
Provided By: KEC
Manufacturer: Rational
Model No.: iVario® Pro 2-S with height-adjustable stand

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide boiling and frying basket.
3. Provide with strainer.
4. Provide with pan base rack.
5. Provide lockable deep fry mode.
6. Provide without WiFi module.
7. Provide with casters, front (2) locking, electronically height adjustable.
8. Provide (1) Dormont 1675KITCF2S48 48” gas quick disconnect hose with restraining device.

ITEM#: **92** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **93** DESCRIPTION: **Roll-in Refrigerator**
Quantity: 1
Provided By: KEC
Manufacturer: Utility
Model No.: RIR-30-SS-1S-H

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:

2. Provide with temperature alarm.
3. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.

ITEM#: **94** DESCRIPTION: **Mobile Sheet Pan Rack**
Quantity: 1
Provided By: KEC
Manufacturer: New Age
Model No.: 1335-M

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with all welded, Aluminum construction.
3. Provide corner bumpers.
4. Provide with all locking casters.
5. Provide with vertical pan stop.

ITEM#: **95** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **96** DESCRIPTION: **Hand Sink – UC w/Soap & Towel**
Quantity: 1
Provided By: KEC
Manufacturer: BSI
Model No.: HSD-ST

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. KEC ship to fabricator of item #87 to coordinate fit and installation of under counter, drawer type hand sink.
3. Include in shop drawing for item #87.

ITEM#: **97** DESCRIPTION: **Work Counter**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per General Specifications, plan and detail drawings and the following:
2. Provide all 304 series S/S, cabinet style construction.

3. Provide 14 ga. S/S top with NSF approved sound deadening or sound deadening gaskets. Top to have 1”x6” high backsplash and single thickness left side splash with hug edge at top.
4. Table to match depth and height of adjacent item #101.
5. Provide with 14 ga. S/S “C” slides below to accommodate 12”x20” hotel pans. Slides to have pan stops.
6. Provide shop drawing for approval prior to fabrication.

ITEM#: **98** DESCRIPTION: **POS Order Printer (NIKEC)**
Quantity: 1
Provided By: Owner’s Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner’s Vendor for proper fit & requirements.

ITEM#: **99** DESCRIPTION: **Order Printer Shelf**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per General Specifications, plan and detail drawings and the following:
2. Provide all 304 series S/S construction.
3. Provide 18 ga. S/S shelf with wall depression, with 2” turn-ups on back and sides, 2” turn-down in front.
4. Provide shop drawing for approval prior to fabrication.

ITEM#: **100** DESCRIPTION: **Exhaust Demand Control (DKVC)**
Quantity: 1
Provided By: KEC
Manufacturer: Spring Air
Model No.: TRUFLOW-TC

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer’s standard specifications, project specific drawings and the following:
2. System to interface with all grease exhaust and MUA fans, with modulation from 20% to 100% capacity based on actually, real-time usage via VFD’s per mechanical engineers drwaings, code and AHJ requirements. System shall also interface with the fire suppression system, item #74, and Building Management System (BMS) per electrical engineering drawings, code and AHJ requirements.
3. Provide with model RPD-P21PAW-TC2-3-SC-AS-BS control panel, coordinate requirements for recessed installation with GC. Panel shall include BACnet interface to BMS.

4. System shall include Thermal Start interface with sensors in each exhaust collar.
5. System shall include (2) Variable Frequency Drive (VFD) unit to be installed by EC near exhaust fans by GC electrical contractor.
6. KEC to coordinate with GC, EC and MC for wiring diagram and controls interface.
7. Provide shop drawing for approval prior to fabrication.

ITEM#: **101** DESCRIPTION: **Prep-Top Refrigerator**
Quantity: 1
Provided By: KEC
Manufacturer: Continental
Model No.: D27N12M-D

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
3. Provide composite cutting board.
4. Provide on casters, front (2) locking.

ITEM#: **102** DESCRIPTION: **Ticket Minder**
Quantity: 1
Provided By: KEC
Manufacturer: San Jamar
Model No.: CK6016KT

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Install as side mount.

ITEM#: **103** DESCRIPTION: **S/S Pass Thru Shelf & Frame**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per General Specifications, plan, detail drawings and the following
2. Provide all 304 series S/S construction.
3. Provide shop drawings for approval prior to fabrication.

ITEM#: **104** DESCRIPTION: **Clam Shell Griddle**
Quantity: 1
Provided By: KEC
Manufacturer: Vulcan
Model No.: GTS12-1GRV

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. This item is the upper part of the Clam Shell, see item #107 for griddle specification.
3. Mount on right end of Griddle, per plan.
4. This item to ship pre-mounted to item #107 by manufacturer.

ITEM#: **105** DESCRIPTION: **Exhaust Hood w/MUA Plenum**

Quantity: 1
Provided By: KEC
Manufacturer: Spring Air
Model No.: FN-B-MB-10.5/3.92

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Size and shape per plan with 3" air space in rear.
3. **Static pressure at exhaust collar not to exceed 1.0" water column.**
4. The DynaFlow, comfort flow, makeup air hood shall be a Spring Air Systems box canopy, high efficiency, VE hood, including makeup air plenum with three way zone control, UL/ULC listed, and built in accordance with the NFPA-96.
5. The unit casing shall be a minimum 18 GA. stainless steel on all exposed surfaces.
6. The filter hood shall include S/S, UL/ULC listed VE baffle grease filters mounted in an integral stainless steel rack inclined at 45 degrees. The filter rack shall include a full length stainless steel grease gutter and grease cup.
7. The hood shall have (3), recessed LED lights. All lights common to one section of the hood to be inter-wired by Spring Air Systems.
8. Hood shall include temperature sensor for automatic fan start per code requirements pre-mounted in exhaust duct collar(s). **KEC Coordinate with EC.**
9. The DynaFlow fresh air plenum provides all the fresh air required for the commercial kitchen. The fresh air is routed to three (3) regions within the boundaries of the appliances. Each region includes an aerodynamically designed s/s perforated discharge panel.
10. The first (1) region discharges through a full length s/s panel located at the bottom of the DynaFlow plenum. Fresh air is directed through the Comfort Tuning Blade (CTB) towards the appliances providing maximum exhaust air reduction. The second (2) Region discharges through a full length s/s angular panel located at the bottom front of the DynaFlow plenum. The fresh air is directed towards the chef to provide a more comfortable work environment in front of the hood. The third (3) region provides horizontal discharge of fresh air through a s/s perforated panel out the front of the hood into the kitchen. The third region provides the exact amount of fresh air to balance the kitchen and ensure optimum capture.
11. The S/S front makeup air plenum shall include multiple MB FRONT perforated panels every 33" (838mm) to 41" (1040mm) across the hood. The MB FRONT grills shall include a manually operated Adjustable Blade damper for individual adjustment over each appliance. The CTB damper is easily adjusted by the chef at the lower discharge to provide local adjustment of airflow to the chef by the chef.

12. Exhaust hood shall be compatible with Demand Kitchen Ventilation Control (DKVC) system as specified under item #96.
13. See item #96 for controls information.
14. Provide with matching closure panels to finished ceiling. Verify ceiling height and type prior to submittal.
15. KEC to coordinate with GC for early hanger installation and early delivery of hood.
16. Provide shop drawing for approval prior to fabrication.

ITEM#: **106** DESCRIPTION: **S/S Wall Paneling**
Quantity: Lot
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations and detail drawing and the following:
2. Liner to be full length and height of wall where exposed.
3. 20 ga, 304 series stainless steel with #4 mill finish.
4. Provide S/S inside/outside corners as required.
5. Provide with offset overlapping joints per detail.
6. Provide with “Z” molding at bottom to overlap tile base.
7. Coordinate with GC for transition with adjacent finishes.
8. Provide shop drawing for approval prior to fabrication.

ITEM#: **107** DESCRIPTION: **Griddle**
Quantity: 1
Provided By: KEC
Manufacturer: Vulcan
Model No.: VCCG48-IC

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide for Liquid Propane at elev above 4,000 above sea level. KEC to confirm.
3. Provide with Infrared burner and steel griddle plate.
4. Provide cutting board.

ITEM#: **108** DESCRIPTION: **Refrigerated Drawer Base**
Quantity: 1
Provided By: KEC
Manufacturer: Continental
Model No.: D48GN

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
3. Provide 16 ga. S/S top.
4. Provide integral heat shield top.
5. Provide condensing unit on left.
6. Provide on casters, front (2) locking.

ITEM#: **109** DESCRIPTION: **Pizza Oven**
Quantity: 1
Provided By: KEC
Manufacturer: Pizza Master
Model No.: PM351ED-1

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide high temperature decks.

ITEM#: **110** DESCRIPTION: **Conveyor Broiler**
Quantity: 1
Provided By: KEC
Manufacturer: Nieco
Model No.: JF62

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
17. Provide for Liquid Propane at elev above 4,000 above sea level. KEC to confirm.
2. Provide dual belt.
3. Provide product catch pan.
4. Provide with Incendalyst™ (catalyst).
5. KEC to coordinate fit on items #111.
6. Provide use, cleaning and routine maintenance demonstrations by factory authorized Agent plus:
   a. One (4) hour Chef session training after start-up as scheduled with owner and operator.
   b. One (2) hour Chef session training 30 day after initial training as scheduled with owner and operator.

ITEM#: **111** DESCRIPTION: **Mobile Broiler & Oven Stand**

Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations and detail drawing and the following:
2. Provide with 1”x2” horizontal members aligned to properly support item #110, conveyor broiler. Provide with short S/S turn-ups to prevent movement of item #110.
3. Provide with 1-5/8” dia. S/S tubular legs with Heavy-Duty, 300 Lb. per caster, Expanded-Stem mount, S/S or Polymer hub casters, front two with top foot locks.
4. Provide 18 ga., S/S undershelf with 2” turn-ups in back and sides. Set US at 9” AFF to top of shelf. Height of stand to be 32” AFF to stand top.
5. KEC coordinate proper fit of items #109 & #110.
6. Provide shop drawing for approval prior to fabrication.

ITEM#: **112** DESCRIPTION: **Fryer w/Filter**
Quantity: 1
Provided By: KEC
Manufacturer: Sapidus
Model No.: UG1100

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide with (1) large fry basket in addition to standard accessories.
3. Provide with S/S splash guard on left.
4. Provide with sliding food sperator in oil tank.

ITEM#: **113** DESCRIPTION: **Crispy Food Warmer**
Quantity: 1
Provided By: KEC
Manufacturer: Carter Hoffman
Model No.: CNH18LP

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide drop-in with removable forced air heating system.
3. KEC ship to S/S manufacturer to assure drop-in fit in item #114.

ITEM#: **114** DESCRIPTION: **Fry Dump Station Cabinet**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide all 304 series S/S, cabinet style construction.

3. Provide 14 ga. S/S top with NSF approved sound deadening or sound deadening gaskets.
4. Provide with 18 ga. S/S cabinets with adjustable height intermediate shelf.
5. Provide (4), Heavy-Duty, 300 Lb. per caster, Expanded-Stem mount, S/S or Polymer hub casters, front with top foot locks.
6. KEC to coordinate fit of item #113.
7. Provide shop drawing for approval prior to fabrication.

ITEM#: **115** DESCRIPTION: **Reach-in Refrigerator/Freezer**
Quantity: 1
Provided By: KEC
Manufacturer: Utility
Model No.: RF-30-SS-2S-D

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
3. Must be designed to meet NSF standards at 100˚ F ambient.
4. Provide temperature alarm.
5. Provide (2) additional chrome wire shelves.
6. Provide 4" casters, front (2) locking.

ITEM#: **116** DESCRIPTION: **Heated – Humidified Holding Cabinet – Pass-Thru**

Quantity: 1
Provided By: KEC
Manufacturer: FWE
Model No.: PHTT-4S-6

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with pass thru doors.
3. Provide left hand door hinging on front and back.
4. Provide use, cleaning and routine maintenance demonstrations by factory authorized Agent plus:
   a. One (4) hour Chef session training after start-up as scheduled with owner and operator.
   b. One (2) hour Chef session training 30 day after initial training as scheduled with owner and operator.

ITEM#: **117** DESCRIPTION: **Beverage Counter w/Sink & Drip Trough - Kitchen**

Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide 14 ga. S/S top with Marine edge and NSF approved sound deadening or sound deadening gaskets.
3. Provide with 1” thick by 4” high, integral back and side splashes.
4. Countertop to have integral, recessed, 4”x16”x1” deep drip-trough with, removable, screen set flush with counter top. Provide with finger pull holes. Tough to be pitched to 1/2” S/S threaded drain integrally welded at right end to allow drain line to be concealed behind mullion.
5. Provide with integral, 14 ga., formed, 10”x14”x10” deep sink with integrally welded center drain. Drain to be Component Hardware Encore® model D23-4160, S/S oversized box pattern drain. Provide with overflow.
6. Provide (1) Fisher model 53740 deck mount, S/S faucet with 6” spout and wrist blades.
7. Provide 6” high, 14 ga. Galvanized curb with S/S coved base with fully welded seams & box-out at floor sink.
8. Cabinet configured, from operators’ left to right as follows:
    a. Approx. 14” open to the floor cabinet section. This section to accommodate one “Slim Jim” size trash receptacle provided by owner.
    b. Approx. 14” open storage cabinet section with 14 ga. S/S “J” slides set for full size, 12”x20” hotel pans set depth wise.
    c. Approx. 12” section with sink. This section to have double pan door with recessed top pull.
9. Provide shop drawing for approval prior to fabrication.

ITEM#: **118** DESCRIPTION: **Coffee Brewer - Airpot**

Quantity: 1
Provided By: KEC
Manufacturer: Bunn
Model No.: AXIOM-TWIN-APS

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide with (1) case, 321130.0100, of Bunn model SST LA, 3.0L, 32130.0000 airpots.

ITEM#: **119** DESCRIPTION: **Iced Tea Brewer – Twin**
Quantity: 1
Provided By: KEC
Manufacturer: Bunn
Model No.: TB6Q

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with (6) Bunn model TDO-N-3.5, 3.5 gallon, 39600.0001 Dispensers.

ITEM#: **120** DESCRIPTION: **Ice Maker**
Quantity: 1
Provided By: KEC
Manufacturer: Follett
Model No.: HCC1010ABT

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide self-contained, air-cooled system capable of producing compressed nugget ice using an efficient, sanitary, horizontal evaporator/auger system and delivering ice directly to dispenser via a flexible, wire reinforced and insulated tube.
3. Provide with Ride® or equal system.
4. Provide Harmony™, or equal, conversion top kit.
5. Provide SafeCLEAN Plus™, or equal, ice machine cleaner with Carton of 24 x 8 oz (237 ml) bottles.

ITEM#: **121** DESCRIPTION: **Ice Bin**
Quantity: 1
Provided By: KEC
Manufacturer: Follett
Model No.: 425-30

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with poly lined interior.
3. Provide with S.S. finished font and ends.

ITEM#: **122** DESCRIPTION: **Floor Trough**
Quantity: 1
Provided By: KEC
Manufacturer: Eagle
Model No.: FT-1530-FG

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide fiberglass grating, ADA compliant.
3. KEC to coordinate with GC for location to properly align with Item #121, Ice Bin. To be centered on Ice bin and avoid Ice Bin legs.

ITEM#: **123** DESCRIPTION: **Mobile Base Racks**
Quantity: 2
Provided By: KEC
Manufacturer: Cambro
Model No.: CPMU243675DDPKG

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with full compliment of angled drying and storage cradles.

ITEM#: **124** DESCRIPTION: **Base Activator – Multi**
Quantity: 1
Provided By: KEC
Manufacturer: Cambro
Model No.: MDSCDCB9

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide without legs, seal to table as required by AHJ.
3. Provide 120 CAMBRO model MDSCDB9 Camduction Bases. KEC verify color with owner via RFI PRIOR to submittals.
4. KEC to coordinate power supplied from item #130.
5. Provide use, cleaning and routine maintenance demonstrations by factory authorized Agent plus:
   a. One (1) hour Chef session training after start-up as scheduled with owner and operator.

ITEM#: **125** DESCRIPTION: **Mobile Activator Table**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide all 304 series S/S, table style construction.
3. Provide 14 ga. S/S top with NSF approved sound deadening or sound deadening gaskets.

4. Provide double tier undershelves per elevations & sections.
5. Provide (4), Heavy-Duty, 300 Lb. per caster, Expanded-Stem mount, S/S or Polymer hub casters, all with top foot locks.
6. KEC to coordinate proper fit on top of item #124.
7. Provide shop drawing for approval prior to fabrication.

ITEM#: **126** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **127** DESCRIPTION: **Mobile Tray Dispensers**
Quantity: 2
Provided By: KEC
Manufacturer: Lakeside
Model No.: 996

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with all S/S construction, open on two sides.
3. Provide with full perimeter bumper along top edge.
4. KEC to verify tray size via RFI prior to submittal.

ITEM#: **128** DESCRIPTION: **Tray Starter Station**
Quantity: 1
Provided By: KEC
Manufacturer: Piper
Model No.: 411-1219

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per General Specifications, plan, detail drawings and the following:
2. Provide (4) casters, front (2) with brakes.

ITEM#: **129** DESCRIPTION: **Order Printers (NIKEC)**
Quantity: 3
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.
2. KEC to coordinate power and data from item #130.
3. KEC see Medical Equipment specifier's JSN list.

ITEM#: **130** DESCRIPTION: **Tray Assembly Conveyor w/UDS**
Quantity: 1
Provided By: KEC
Manufacturer: Gates Mfg.
Model No.: Tray Make-up

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction except at adjustable gussets.
3. Provide 14 ga. S/S roller bed with NSF approved sound deadening or sound deadening gaskets.
4. Conveyor with Utility Distribution System (UDS) to be fully prewired and UL approved as assembly and to bear label as such. Breaker panel to be fully and clearly labeled with machine printed text (no hand written labels). Shipping joint connections to be clearly tagged for final connection by site Electrician.
5. Provide 6” high, 14 ga. Galvanized curb with S/S coved base with fully welded seams from underside of breaker panel, water and data cabinet to finished floor. Curb to have separate compartments for main electrical, water & data per code.
6. Horizontal UDS to be slightly offset towards plan NW, receptacles to have outdoor rated covers.
7. KEC and this manufacturer are responsible to confirm and coordinate all equipment utilities that shall be connected to this UDS including existing and owner furnished items via RFI, PRIOR to submittal.
8. Overall length to be approximately 16’-9” with approx. 16” roller section made up of (7) removable, equally sized, interchangeable, roller sections. Rollers to be 1” dia. PVC tubes with S/S ball bearings. Frames to be 14 ga. S/S angle frames, fully welded. Reinforce corners to prevent warpage, twisting.
9. Cabinet for breaker panel to include separate section for water and owner’s data cables.
10. Table legs to be 1-5/8”, fully welded “H” frame style with S/S adjustable flanged feet on all legs. Legs for overshelf to be contiguous extensions of table legs on plan NE side.
11. Assembly to be pre-piped with insulated, 1/2” copper H & CW lines to run length of conveyor, concealed under conveyor bed. Include S/S brackets for support of line and of faucet. Provide with brass union at shipping joint. Provide (3) Dormont model 72-2124-48, 3/8”x48” Swirl hose, quick disconnect mounted in 14 GA S/S bracket.
12. Provide with brass union at shipping joint. Pre-pipe to (2) fill faucets specified under items #134 & #136.
13. Conveyor bed to be configured in contiguous one piece top, from plan SE left to right as follows:
    a. Approx. 12” flat table, no overshelf above. No rollers in this section.
    b. Approx. 52” section with 18 ga. S/S cabinet for pre-wired breaker panel. Breaker panel to be in NEMA 3 enclosure and be behind S/S, double pan door with horizontal recessed pull. Breaker panel to be labeled in durable, machine printed text (no hand written labels). Cabinet to have removable S/S panel on right end for access to water and Data cable chase.
    c. Balance with recessed roller bed.

14. Shipping joints shall be fully welded and polished on site to form one contiguous conveyor top. Electrical shipping joints shall be clearly tagged for reconnection on site.
15. Assembly to include double pass-shelf as specified under item #148.
16. KEC to coordinate all equipment power, hot & cold water and data requirements for equipment supported by this UDS.
17. Provide shop drawing for approval prior to fabrication. Shop drawing to include all equipment connected and immediately adjacent to this system. These items to be shown in dashed outlines only.

ITEM#: **131** DESCRIPTION: **Double Overshelf**
Quantity: 1
Provided By: KEC
Manufacturer: Vollrath
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. Provide with 1-1/2” Sq. S/S uprights with fully cosed tops and bottoms.
4. Provide with full length and width, with 18 ga S/S hat channels below shelves to mount heat strips and conceal electrical & data as required.
5. Provide 18 ga. S/S overshelves on 14 ga. S/S collars with set screws and 14 ga S/S angle brackets welded to collars. Extended uprights 4” past top shelf for individual height adjustability of shelves.
6. Provide shop drawing for approval prior to fabrication, show attachment to item #134, item #134 to be dashed outline only.

ITEM#: **132** DESCRIPTION: **Mobile Heated Plate Dispenser**
Quantity: 1
Provided By: KEC
Manufacturer: Cambro
Model No.: CHPL100

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide (1) MDSPL plate lifter.
3. Provide (150) MDSPLT9 Camtherm 9" (22,8 cm) Ceramic Plates.

ITEM#: **133** DESCRIPTION: **Heat Strip w/Light**
Quantity: 1
Provided By: KEC
Manufacturer: Hatco
Model No.: GRAL-42

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with 9" wide housing with 2700K warm incandescent bulbs with bright annealed reflector.
3. Provide indicator light.
4. Provide with integral, infinite control with toggle switch & indicator light.
5. Provide with min. 6' cord & plug. Controls and connection to be on operators left end.
6. KEC ship to manufacturer of items #131 for pre-installation.
7. KEC coordinate power from item #130.

ITEM#: **134** DESCRIPTION: **Mobile Hot Food Table**
Quantity: 1
Provided By: KEC
Manufacturer: Vollrath
Model No.: 38217

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide 3-well with individual brass drain valves.
3. Provide with Thermoset Fiber-Reinforced resin, or equal, wells that will not rust or pit.
4. Provide with thermostatic controls that self-adjusts to food volume.
5. Provide with low water indicator.
6. Provide with energy saving dome heating elements.
7. Provide with wide, no drip-lips on wells to keep surface dry.
8. Provide with operator side poly cutting board (38074).
9. Provide with 4" casters, front (2) locking, ADA height.
10. KEC to coordinate power from item #130.
11. Provide with (1) Fisher (1) 58238, S/S HW fill faucet with wrist lever handle, mounted in 14 GA S/S bracket.
12. KEC to coordinate double overshelf specified under item #135. All overshelves to have matching profiles.
13. KEC to coordinate item #133, heat strip w/lights.
14. KEC to coordinate plug configuration(s) for connection to item #130.

ITEM#: **135** DESCRIPTION: **Double Overshelf**
Quantity: 1
Provided By: KEC
Manufacturer: Vollrath
Model No.: Custom Fabrication

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. Provide with 1-1/2" Sq. S/S uprights with fully cosed tops and bottoms.

4. Provide with full length and width, with 18 ga S/S hat channels below shelves to mount heat strips and conceal electrical & data as required.
5. Provide 18 ga. S/S overshelves on 14 ga. S/S collars with set screws and 14 ga S/S angle brackets welded to collars. Extended uprights 4” past top shelf for individual height adjustability of shelves.
6. Upper shelf to be partial length to allow fit of item #137.
7. Provide shop drawing for approval prior to fabrication, show attachment to item #136, item #136 to be dashed outline only.

ITEM#: **136** DESCRIPTION: **Mobile Hot Food Table**
Quantity: 1
Provided By: KEC
Manufacturer: Vollrath
Model No.: 38218

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide 5-well with individual brass drain valves.
3. Provide with Thermoset Fiber-Reinforced resin, or equal, wells that will not rust or pit.
4. Provide with thermostatic controls that self-adjusts to food volume.
5. Provide with low water indicator.
6. Provide with energy saving dome heating elements.
7. Provide with wide, no drip-lips on wells to keep surface dry.
8. Provide with operator side poly cutting board (38074).
9. Provide with 4” casters, front (2) locking, ADA height.
10. KEC to coordinate power from item #130.
11. Provide with (1) Fisher (1) 58238, S/S HW fill faucet with wrist lever handle, mounted in 14 GA S/S bracket.
12. KEC to coordinate double overshelf specified under item #135. All overshelves to have matching profiles.
13. KEC to coordinate item #133, heat strip w/lights.
14. KEC to coordinate plug configuration(s) for connection to item #130.

ITEM#: **137** DESCRIPTION: **Food Blender**
Quantity: 1
Provided By: KEC
Manufacturer: Waring
Model No.: MX1500XTXP

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide (3) 64 oz container (CAC95).
3. Provide small sound enclosure (SE500).
4. Provide (2) blending assembly and retaining ring kits (CAC116).
5. Provide retainer ring wrench (CAC119).

6. Provide drive coupling removal tool (CAC161).
7. KEC coordinate power from item #130.

ITEM#: **138** DESCRIPTION: **Heat Strip w/Light**
Quantity: 1
Provided By: KEC
Manufacturer: HATCO
Model No.: GRAL-60

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with 9" wide housing with 2700K warm incandescent bulbs with bright annealed reflector.
3. Provide indicator light.
4. Provide with integral, infinite control with toggle switch & indicator light.
5. Provide with min. 6' cord & plug. Controls and connection to be on operators left end.
6. KEC ship to manufacturer of items #135 for pre-installation.
7. KEC coordinate power from item #130.

ITEM#: **139** DESCRIPTION: **Prep Top Refrigerator**
Quantity: 1
Provided By: KEC
Manufacturer: Continental
Model No.: SW60N18M-FB-D

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
3. Must be designed to meet NSF standards at 100˚ F ambient temperature.
4. Provide S/S interior.
5. Provide S/S back.
6. Provide crumb catcher.
7. Provide with expansion valve system.
8. KEC coordinate power from item #130.

ITEM#: **140** DESCRIPTION: **Double Overshelf**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per General Specifications, plan and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.

3. Provide with 1-1/2” Sq. S/S uprights with fully cosed tops and bottoms.
4. Provide with full length and width, with 18 ga S/S hat channels below shelves to mount heat strips and conceal electrical & data as required.
5. Provide 18 ga. S/S overshelves on 14 ga. S/S collars with set screws and 14 ga S/S angle brackets welded to collars. Extended uprights 4” past top shelf for individual height adjustability of shelves.
6. Provide shop drawing for approval prior to fabrication, show attachment to item #139, item #139 to be dashed outline only.

ITEM#: **141** DESCRIPTION: **Conveyor Toaster**
Quantity: 1
Provided By: KEC
Manufacturer: Hatco
Model No.: ITQ-1750-2C

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide with (2) independently controllable, two-directional belts with programmable touch pad control to store up to 20 product settings.
3. Provide with USB port for transfer of program changes and usage information.
4. Provide with intelligent, Toast-Qwik®, or equal, technology with individually controlled top and bottom heating elements.
5. Provide with Spot-on® or equal, energy saving technology to activate the unit when product is placed on the conveyor.
6. Provide with feed ramp.
7. Provide with 5.7” feed paddle.
8. KEC coordinate power from item #130.
9. Provide use, cleaning and routine maintenance demonstrations by factory authorized Agent plus:
   a. One (1) hour Chef session training after start-up as scheduled with owner and operator.

ITEM#: **142** DESCRIPTION: **Mobile Toast Table**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide all 304 series S/S, table style construction.
3. Provide 14 ga. S/S top with NSF approved sound deadening or sound deadening gaskets. Island configuration.
4. Provide triple tier undershelves per elevations & sections.

5. Provide (4), Heavy-Duty, 300 Lb. per caster, Expanded-Stem mount, S/S or Polymer hub casters, all with top foot locks.
6. Provide shop drawing for approval prior to fabrication.

ITEM#: **143** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **144** DESCRIPTION: **Mobile Chilled Plate Cabinet**
Quantity: 1
Provided By: KEC
Manufacturer: Norlake
Model No.: FF044

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
3. This item is an assembly of Norlake Ice Cream Freezer, Lakeside Plate dispensers and custom S/S fabrication.
4. Provide with S/S exterior finish on freezer (SVS).
5. As part of this item, provide with interior S/S frame to support two Lakeside model 922, plate dispensers. Dispensers to be located on oposite side of compressor. See detail.
6. Provide with casters, back (2) locking.
7. KEC's S/S fabricator to coordinate attachement of S/S frame with Norlake to avoid in-wall refrigeration lines (if any), etc.
8. This item will be installed so that plate dispensers are on the user's right section of the freezer.
9. Ship to S/S fabricator for coordination and installation of S/S components and item #145.
10. KEC coordinate power from item #130.

ITEM#: **145** DESCRIPTION: **Chilled Plate & Base Dispensers**
Quantity: 1
Provided By: KEC
Manufacturer: Lakeside
Model No.: 922

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. As part of this item provide with S/S interior frame to support two Lakeside model 922, plate dispensers. See detail SD-11.
3. Plate dispenser shall be installed in bay opposite the compressor.

4. KEC to verify plate size with Owner via RFI **prior** to submittal.
5. Ship to S/S fabricator for match-up to to S/S KEC coordinate.
6. Provide shop drawing to include item #144, for approval prior to fabrication.
7. KEC coordinate power from item #130.

ITEM#: **146** DESCRIPTION: **Double Overshelf**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. Provide with 1-1/2” Sq. S/S uprights with fully cosed tops and bottoms. Bottoms to have “L” shaped plates to straddle edge of item #144.
4. Provide 18 ga. S/S overshelves on 14 ga. S/S collars with set screws and 14 ga S/S angle brackets welded to collars. Extended uprights 4” past top shelf for individual height adjustability of shelves.
5. Provide shop drawing for approval prior to fabrication, show attachment to item #144, item #144 to be dashed outline only.

ITEM#: **147** DESCRIPTION: **Mobile Air Curtain Refrigerators**
Quantity: 2
Provided By: KEC
Manufacturer: FWE
Model No.: R-AS-10

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
3. Provide with minimum 90 minute door open capability.
4. Provide with temperature and door open alarms to notify user when door has been open longer than allowed time.
5. Provide digital controls and display to indicate set point temperature, actual temperature and clean coil reminder.
6. Must have space saving, sliding door.
7. Provide with (10) pairs of pan slides at 4.5” OC.
8. Provide with perimeter bumpers.
9. KEC coordinate power from item #130.

ITEM#: **148** DESCRIPTION: **Overshelf**
Quantity: 1 (Part of Item #130)
Provided By: KEC
Manufacturer: Gates Manufacturing.
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. Provide single 18 ga. S/S overshelf on 14 ga. S.S cantilevered, angle brackets welded to S/S collars with set screws for plus or minus 4” height adjustability. Uprights to be 1-5/8” dia. S/S tubular uprights. Uprights to be integral extension of table legs on plan NW side of conveyor only. Uprights to have welded and polished closed tops.
4. Provide with elec. boxes, receptacles, and data boxes prewired to item #130.
5. Provide shop drawing, as part of item #130, for approval prior to fabrication.

ITEM#: **149** DESCRIPTION: **Beverage Counter w/Drip Trough**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide all 304 series, cabinet style S/S construction.
3. Provide 14 gauge S/S, island style top with Marine edge and NSF approved sound deadening or sound deadening gaskets. Top to have 1” thick, 4” wide and 18” high. Integrally welded support column to attach wall bracket for item #155.
4. Provide fully finished back per sections and elevations.
5. Provide with (2) integral S/S drip troughs pitched to drains and removable S/S, rod type grate to be flush with countertop. Drip troughs to have fully welded, 3/4” diameter by 1” long, S/S, MPT threaded drain nipples. Drains to be welded at angle to and located to avoid interference with UC equipment & storage. This manufacturer to run drain to the funnel type drain, with proper air gap, to avoid UC equipment.
6. Provide with integral, 14 ga., formed, 12”x21”x1” deep sink with removable S/S, rod type grate, to be flush with countertop. Sink to have fully welded, 3/4” diameter by 1” long, S/S, MPT threaded drain nipple. This manufacturer to run drain the funnel type drain for Ice Maker. Route to avoid UC equipment. Drains to be welded at angle to and located to avoid interference with UC equipment & storage.
7. Provide with 18 ga. S/S cabinet base, on 6” S/S legs with adjustable feet, flanged in corners. Use 1-1/2” wide vertical mullions throughout. Configured as follows from left to right:
    a. Approximately 24” wide open to floor section for item #151, Mobile Cup/Glass Rack Dispenser.

b. Aprroximately 13-14” wide open storage section with triple tier undershelves on full extension, HD slides with S/S roller bearings.
c. Approximately 26-27” wide, open to floor section for item #154, Ice Maker w/Bin. This section to have indirect waste funnel for Ice Maker.

8. Provide with 1” Dia. Cooper drain with funnel attached to cabinet to accept IW from item #154, UC Ice Maker and allow for movement of Ice Maker for cleaning.
9. See detail SD-12.
10. Provide shop drawing for approval prior to fabrication.

ITEM#: **150** DESCRIPTION: **Coffee Brewer - Airpot**
Quantity: 1
Provided By: KEC
Manufacturer: Bunn
Model No.: AXIOM-TWIN-APS

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide with (1) case, 321130.0100, of Bunn model SST LA, 3.0L, 32130.0000 airpots.
3. KEC to coordinate power and cold water supply from item #130.

ITEM#: **151** DESCRIPTION: **Mobile Cup Rack Carts**
Quantity: 2
Provided By: KEC
Manufacturer: Lakeside
Model No.: 997-M

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following.
2. “M” designation indicates modifications required to manufacturer’s standard specifications.
3. Design intend is for this item to fit under item #149 and to hold (2) stacks of 10”x20” cup/glass racks in parallel, front to back.
4. Provide with the following modifications to standard:
   a. Provide with Turn-up along front edge of shelf in lieu of turn down.
   b. Provide with 2”x2” S/S angles on bottom platform to hold racks in place.
   c. Provide with 2”, HD casters, front two with brakes, in lieu of 4” casters. Casters to be recessed and welded to top of bottom frame in lieu of standard.
5. See detail SD-12.
6. Provide shop drawing for approval prior to fabrication.

ITEM#: **152** DESCRIPTION: **Iced Tea Brewer – Twin**
Quantity: 1
Provided By: KEC
Manufacturer: Bunn
Model No.: TB6Q

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with (2) Bunn model TDO-N-3.5, 3.5 gallon, 39600.0001 Dispensers.
3. KEC to coordinate power and cold water supply from item #130.

ITEM#: **153** DESCRIPTION: **Crystal Lite Dispenser (NIKEC)**
Quantity: 1
Provided By: Owner's Vendor - NIPS
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner's Vendor for proper fit & requirements.
2. KEC to coordinate cold water supply from item #130.

ITEM#: **154** DESCRIPTION: **U/C Ice Maker w/Bin**
Quantity: 1
Provided By: KEC
Manufacturer: Scotsman
Model No.: UN324A-1

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must meet ALL federal energy & refrigerant regulations in effect at time of installation.
3. Provide machine to make nugget style ice.
4. Provide air cooled unit.
5. Provide floor mount kit to lower to 33.5" max AFF.
6. KEC coordinate power from item #130.

ITEM#: **155** DESCRIPTION: **Water Glass Filler**
Quantity: 1
Provided By: KEC
Manufacturer: Fisher
Model No.: 32239

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide SD control valve with wall bracket.
3. Provide cross handles, circle style.
4. KEC to coordinate cold water supply from item #130.

ITEM#: **156** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **157** DESCRIPTION: **Mobile Dome Cover Racks**
Quantity: 2
Provided By: KEC
Manufacturer: Cambro
Model No.: CPMU243675DDPKG

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide angled drying and storage cradle.
3. Provide 120 MDSLD9, low profile, insulated dome covers. KEC verify height and color with owner via RFI PRIOR to submittals.

ITEM#: **158** DESCRIPTION: **Work Top Freezer**
Quantity: 1
Provided By: KEC
Manufacturer: Continental
Model No.: SWF27NBS-D

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
3. Must be designed to meet NSF standards at 100˚ F ambient.
4. Provide with expansion valve system.
5. Provide S/S interior.
6. Provide S/S back
7. Provide with (2) drawers.
8. KEC coordinate power from item #130.

ITEM#: **159** DESCRIPTION: **Double Overshelf**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan and detail drawings and the following:
2. Provide all 304 series S/S, all welded construction.
3. Provide with 1-1/2" Sq. S/S uprights with fully cosed tops and bottoms.

4. Provide with full length and width, with 18 ga S/S hat channels below shelves to mount heat strips and conceal electrical & data as required.
5. Provide 18 ga. S/S overshelves on 14 ga. S/S collars with set screws and 14 ga S/S angle brackets welded to collars. Extended uprights 4” past top shelf for individual height adjustability of shelves.
6. Provide shop drawing for approval prior to fabrication, show attachment to item #159, item #150 to be dashed outline only.

ITEM#: **160** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **161** DESCRIPTION: **Dietary Supplements Cart**
Quantity: 1
Provided By: KEC
Manufacturer: Cambro
Model No.: CPU244864SUPKG

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide 67”, full wrap mobile security cage unit.
3. Pad lock by owner.

ITEM#: **162** DESCRIPTION: **Patient Tray Delivery Carts**
Quantity: 4
Provided By: KEC
Manufacturer: Alluserv
Model No.: ST1DPT2T20

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide single unit, pass thru.
3. Provide with offset front casters, formed side panels, friction cam ledges and pivot travel pressure latch for noise control and anti-static floor strip to prevent static build-up.
4. Provide with custom exterior graphics on both sides, assume tribe logo for bid pruposes.
5. Provide standard two swival and two rgid casters with brakes on swival casters.
6. Provide with perimeter bumpers.
7. Provide with Menu card holder.
8. Provide with 4th top rail.
9. KEC to verify tray size, slide spacing and custom graphics via RFI, with Owner prior to submittal.

ITEM#: **163** DESCRIPTION: **Cook & Hold Cabinet – Dual Cavity**
Quantity: 1
Provided By: KEC
Manufacturer: FWE
Model No.: PHTT-1826-6S-9

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with 5" casters, front two locking.
3. Provide left hand hinged, pass thru doors.
4. Provide use, cleaning and routine maintenance demonstrations by factory authorized Agent plus:
   a. One (2) hour Chef session training after start-up as scheduled with owner and operator.
   b. One (1) hour Chef session training 30 day after initial training as scheduled with owner and operator.
5. Provide with (1) Dormont or equal model 73-3135-48, 48" water hose with quick disconnect.

ITEM#: **164** DESCRIPTION: **Soiled Tray Carts**
Quantity: 4
Provided By: KEC
Manufacturer: FWE
Model No.: ETC-1520-20

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. KEC to verify tray size with owner via RFI **prior** to submittals.

ITEM#: **165** DESCRIPTION: **3-Compartment Pot Scrubber Sink**
Quantity: 1
Provided By: KEC
Manufacturer: Byline
Model No.: Vortex

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, detail drawings and the following:
2. Pump motor to be fully self-draining without additional drain line or valve.
3. Provide with all 304 series S/S construction.
4. Provide with dual liquid high and low level water level sensors.
5. Prove approximately 13'-9" unit (VIF). Provide left to right, soiled to clean operation.
6. Provide back to front wash water flow in progressive output to move wares left to right within the bowl.
7. Provide with 5KW wash tank heater with automatic temperature control.
8. Provide with back, left & right end splashes with turn down.

9. Left drainboard to include placement of item #166, Scrap Collector.
10. Provide 14 GA. S/S barrier between scrap sink and wash sink. Barrier to be 1/2" higher than flood rim.
11. Provide 48", wash tank.
12. Provide sheet pan rack.
13. Provide utensil basket.
14. Provide 24" x 28-1/4" rinse and sanitize tanks.
15. Provide Approx. 30" clean drainboard.
16. Provide (3) Fisher model 24880 Rotary Waste Drains.
17. Provide (1) Fisher model 51995, 3/4" S/S faucet with 14" spout & 10" DJ, with wrist blades and brass elbows.
18. Provide fully welded and polished field joint if needed.
19. Provide welded leg sets with cross bracing per plan and elevations.
20. Provide weldment if item #166, Scrap Collector.
21. Provide shop drawing for approval prior to fabrication.

ITEM#: **166** DESCRIPTION: **Scrap Collector – Pot & Pan**
Quantity: 1
Provided By: KEC
Manufacturer: Salvajor
Model No.: S914

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide additional scrap basket.
3. Ship top to Mfg. of item #165 for weldment into left drain board.

ITEM#: **167** DESCRIPTION: **Pre-Rinse Assembly w/Faucet**
Quantity: 1
Provided By: KEC
Manufacturer: Fisher
Model No.: 52973

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must meet ASME A112.18.1, NSF/ANSI 61 and 372.
3. KEC to coordinate and verify wall backing with GC.

ITEM#: **168** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **169** DESCRIPTION: **Detergent Dispenser (NIKEC)**
Quantity: 1
Provided By: Owner's Vendor - NIPS
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & wall backing requirements.

ITEM#: **170** DESCRIPTION: **Sanitizer Dispenser (NIKEC)**
Quantity: 1
Provided By: Owner's Vendor - NIPS
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & wall backing requirements.

ITEM#: **171** DESCRIPTION: **Wall Shelf - Drying**
Quantity: 1
Provided By: KEC
Manufacturer: New Age
Model No.: 1122 T-Bar

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide all welded, Aluminum construction.
3. KEC to coordinate and verify wall backing with GC.

ITEM#: **172** DESCRIPTION: **Hose Reel**
Quantity: 1
Provided By: KEC
Manufacturer: TBD
Model No.: TBD

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must be self-contained with integral RPPV type back flow preventer.
3. KEC to include $2,800 allowance for this item.
4. KEC to coordinate and verify wall-backing requirements.

ITEM#: **173** DESCRIPTION: **Dish Scraping Table w/Roller Conveyor**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations, detail drawings and the following:
2. Provide 14 ga. S/S top with combination marine edge and 3” raised, rolled rim and NSF approved sound deadening or sound deading gaskets.
3. Provide all 304 series S/S construction.
4. Provide with 2” thick by 8” high backsplash.
5. Provide weldment of item #176, Scrap Collector – Dish.
6. Provide with recessed gravity roller system with 1.9” PVC rollers set with spring loaded, S/S axles and S/S roller bearings fo easy removal for cleaning and servicing. Roller bed & rollers to be straight, angled then straight per plan. Provide with partial length rollers at direction changes to prevent racks from falling into roller bed.
7. Provide 14 ga. S/S bracket with receptacle box welded in for Item #175. Receptacle, conduit and wiring by EC.
8. Provide holes in backsplash for cantilevered glass rack shelf. See Item #174.
9. Provide Shop drawing for approval prior to fabrication.

ITEM#: **174** DESCRIPTION: **Overhead Racking Shelf**
Quantity: 1 (Part of Item #173)
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, detail drawings and the following:
2. Provide as integral part of Items #173.
3. Provide all 304 series S/S construction.
4. Provide 1-1/2” dia. S/S tubular construction for uprights and (4) horizontal members. Horizontal members to be welded to 10 ga. S/S angle brackets welded to heavy-duty S/S collars with (3) set screws for vertical adjustability of up to ± 4”. Rack to hold dish racks at angle for loading and vertically for storage.
5. Extend uprights down thru splashes and secure to item # 173, rear table legs below to prevent wobble.
6. Provide curved rack, not segmented, per plan to allow continuous slide of dishracks from left end to right end.
7. Provide shop drawings for approval prior to fabrication.

ITEM#: **175** DESCRIPTION: **Mobile Power Soak Sink**
Quantity: 1
Provided By: KEC
Manufacturer: Powersoak
Model No.: SS-M

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Motorized soak sink to have 14 ga., 304 series S/S tank and rim.
3. 3/4 HP wash pump motor to recirculate water at 600 GPM.
4. System to use motor waste heat to tank to maintain 114˚ F in wash tank when filled with hot water, without wash tank heater.
5. Provide with (1) additional basket.
6. Provide with faucet mounted on front right corner.
7. Provide with cord & plug.

ITEM#: **176** DESCRIPTION: **Scrap Collector – Dishes**
Quantity: 1
Provided By: KEC
Manufacturer: Salvajor
Model No.: S914

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Ship top to manufacturer of item #173 for weldment.
3. Provide additional scrap basket.

ITEM#: **177** DESCRIPTION: **Detergent Dispenser (NIKEC)**
Quantity: 1
Provided By: Owner's Vendor - NIPS
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner's Vendor for proper fit & requirements.

ITEM#: **178** DESCRIPTION: **Rack Conveyor Dishwasher**
Quantity: 1
Provided By: KEC
Manufacturer: Hobart
Model No.: CLPS66eN-ADV

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with 22" power scrapper and Automatic Soil Removal (ASR).

3. Provide high temp rinse with Opti-Rinse®.
4. Machine direction of Operation to be Right to Left.
5. Machine to be provided with electric Tank Heat.
6. Provide with drain water energy recovery and water tempering kit.
7. Machine to be provided with internal, 30kw electric Booster Heater for 70˚ rise.
8. Machine to be provided with electric scroll type Blower Dryer as specified under item #181.
9. Machine to be provided with 480/60/3ph, single point electrical power connection (not including item #181, Blower Dryer).
10. Provide with vent fan control, KEC coordinate with EC.
11. Provide with maximum 126 GPH final rinse water usage.
12. Provide with hinged insulated doors.
13. Provide with taller chamber hieght.
14. Provide with (2) water hammer arrestors.
15. Provide with capless, auto-clean wash arms.
16. Machine to include Energy Recovery System to allow machine to operate with only CW feed after initial tank fill. Energy recovery system must pre-heat incoming CW with drain water.
17. Machine drain to be located on unload end, KEC provide copper or brass plug for other end.
18. Privide with Short style vent cowell on load end.
19. Provide with table limit switch.
20. Provide with Hobart installation, start-up, test, and check. **No exceptions.**
21. Provide Shop drawing for approval prior to fabrication.

ITEM#: **179** DESCRIPTION: **S/S Duct Risers**
Quantity: 2
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, detail drawings and the following:
2. Provide 4”x16” OD, welded tapper at connection point to fit inside duct connections at dishwasher. Provide 18 ga. 304 series S/S vertical duct riser to fit within item #178, dishwasher exhaust collar and extend to 4” above finished ceiling.
3. Provide fully welded trim collars at ceiling.
4. KEC to coordinate exhaust drop location with mechanical contractor so riser is straight up and down.
5. Provide shop drawing for approval prior to fabrication.

ITEM#: **180** DESCRIPTION: **Trench Drain (NIKEC)**
Quantity: 1
Provided By: PC
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with GC for location.

ITEM#: **181** DESCRIPTION: **Blower Dryer**
Quantity: 1 (Integral Part of Item #178)
Provided By: KEC
Manufacturer: Hobart
Model No.:

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, detail drawings and the following:
2. Provide for right to left operation.
3. Installation by Hobart, **no exceptions.**
4. Provide with adjustable, S/S flanged feet.
5. Provide shop drawing, as part of item #178, for approval prior to fabrication.

ITEM#: **182** DESCRIPTION: **Clean Dishtable w/Slides**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations, detail drawings and the following:
2. Provide all 304 series S/S construction.
3. Provide with 14 ga S/S top with NSF approved sound deadening or sound deadening gaskets, 3” high raised, rolled rim on front. Provide with 10” high by 2” thick back and left end splashes with top turned down for “Z” clip attachment to wall.
4. Provide holes in backsplash for cantilevered glass rack shelf. See Item #174.
5. Provide with integral 4” wide by 2” deep by approx. 24” front to back drip trough with (2) 1” dia. S/S cross rails welding in place per plan. Trough to have die stamped opening for Fisher model 10448, 3/4” brass drain to be provided as part of this item.
6. Table top to have (2) rows of approx. 7/8” high, integral, inverted “V” slides per section drawing. Slides to run parallel with rack flow. Slides to begin after drip trough and to have shallow, 20˚ rise ramps to allow smooth transition of dish racks.
7. Provide S/S legs with S/S adjustable flanged feet, cross bracing in back ends and center, open in front.
8. Provide with opening for table limit switch.
9. Provide shop drawing for approval prior to fabrication.

ITEM#: **183** DESCRIPTION: **Overhead Rack Drying Shelf**
Quantity: 1(Part of Item #182)
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, detail drawings and the following:
2. Provide as integral part of Items #182.
3. Provide all 304 series S/S construction.
4. Provide 1-1/2" dia. S/S tubular construction for uprights and (4) horizontal members. Horizontal members to be welded to 10 ga. S/S angle brackets welded to heavy-duty S/S collars with (3) set screws for vertical adjustability of up to ± 4". Rack to hold dish racks at angle for loading and vertically for storage.
5. Extend uprights down thru splashes and secure to item # 173, rear table legs below to prevent wobble.
6. Provide curved rack at wall jog, not segmented, per plan to allow continuous slide of dishracks from left end to right end.
7. Provide shop drawings for approval prior to fabrication.

ITEM#: **184** DESCRIPTION: **Spare Number**
Quantity: 1
Provided By: KEC
Manufacturer: Hobart
Model No.: WS-80

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with 60 days worth of salt.
3. KEC to coordinate connection to CW supply of item #178. Rack Conveyor Dishwasher.
4. KEC to coordinate fit under item #182, Clean Dishtable.

ITEM#: **185** DESCRIPTION: **Clean Plate Dollies**
Quantity: 2
Provided By: KEC
Manufacturer: Cambro
Model No.: ADCSCT4

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide Camlever tower, (4) each.
3. KEC to verify plate sizes with Owner, via RFI, prior to submittal.

ITEM#: **186** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **187** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **188** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **189** DESCRIPTION: **Detergent Dispenser System**
Quantity: 1
Provided By: Owner's Vendor - NIPS
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & wall backing requirements.

ITEM#: **190** DESCRIPTION: **Mop Rack (NIKEC)**
Quantity: 2
Provided By: Owner's Med Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & wall backing requirements.
2. KEC see Medical Equipment specifier's JSN list.

ITEM#: **191** DESCRIPTION: **Mop Sink w/Faucet (NIKEC)**
Quantity: 1
Provided By: PC
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with GC for location.

ITEM#: **192** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **193** DESCRIPTION: **Detergent Storage Shelf**
Quantity: 1
Provided By: KEC
Manufacturer: Cambro
Model No.: Camshelving - Premium

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with non-corrosive plastic or composite construction material with removable inlays.
3. To consist of (4) CPSK1442S1, solid shelves. Matts to be individually removable for washing.
4. Provide with (4) CPPK1456 posts to be 56" high.
5. Minimum weight capacity per shelf to be 600 Lbs.
6. Coordinate proper fit inside room prior to shipment.
7. KEC set bottom shelf 10" AFF.

ITEM#: **194** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **195** DESCRIPTION: **S/S Wall Paneling**
Quantity: Lot
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations and detail drawing and the following:
2. Liner to be full length and height of wall where exposed.
3. 20 ga, 304 series stainless steel with #4 mill finish.
4. Provide S/S inside/outside corners as required.
5. Provide with offset overlapping joints per detail.
6. Provide with "Z" molding at bottom to overlap integral coved base.
7. Coordinate with GC for transition with adjacent finishes.
8. Provide shop drawing for approval prior to fabrication.

ITEM#: **196** DESCRIPTION: **Trench Drain (NIKEC)**
Quantity: 1
Provided By: PC
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with GC for location.

ITEM#: **197** DESCRIPTION: **Portable Steam Cleaner**
Quantity: 1
Provided By: KEC
Manufacturer: Goodway
Model No.: GVC-390

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Available through Grainger, item #793Z50.
3. Must have "out of water" indicator.
4. Must produce 311˚ F, dry steam.

ITEM#: **198** DESCRIPTION: **Hose Reel**
Quantity: 1
Provided By: KEC
Manufacturer: TBD
Model No.: TBD

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must be self-contained with integral RPPV type back flow preventer.
3. KEC to include $2,800 allowance for this item.
4. KEC to coordinate and verify wall-backing requirements.

ITEM#: **199** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

SERVERY

ITEM#: **200** DESCRIPTION: **Air Curtain Display Refrigerator**
Quantity: 1
Provided By: KEC
Manufacturer: Structural Concepts
Model No.: B67R

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.

3. Must have self-cleaning or no-clean condenser coil.
4. Provide self-contained with condensate evaporator.
5. Provide laminate black exterior finish.
6. Provide with black interior finishes, verify with architect via RFI.
7. Provide with price strips on all shelves.
8. Provide roll down, locking security cover.
9. Provide digital thermometer.
10. Provide LED interior lighting.
11. Provide on casters, non-locking with levelers.
12. KEC to coordinate & verify ventilation requirements with MC.

ITEM#: **201** DESCRIPTION: **Reach-in Glass Door Assembly**
Quantity: 1 (Part of Item #206)
Provided By: KEC
Manufacturer: Anthony
Model No.: ELIMINAATOR RENU

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per General Specifications, plan, manufacturer's standard specifications and the following:
2. Provide as part of Item #206, Walk-in Cooler.
3. Provide DOE compliant assembly.
4. Provide with set of (3) 24" x 67"H doors with low E glass, triple pane, all hinged right.
5. Provide with LED lighting system.
6. Provide with factory installed cylinder locks.
7. Incorporate into shop drawing for item #206 for approval prior to fabrication.
8. Provide black frame and soft-touch black door handles.
9. Provide shop drawings for approval prior to fabrication.

ITEM#: **202** DESCRIPTION: **Gravity Feed Display Racks**
Quantity: 3 (Part of Item #201)
Provided By: KEC
Manufacturer: Anthony
Model No.: Gravity Flow Shelving System

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Furnish through Manufacturer of Item #206.
3. Provide 27" deep, gravity feed with black finish and casters.
4. Provide GFM, gravity flow merchandiser for each shelf.

ITEM#: **203** DESCRIPTION: **Dry Goods Display**
Quantity: 1
Provided By: KEC
Manufacturer: Precision Stainless Solutions, Inc.
Model No.: Millwork

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations and detail drawing and the following:
2. Assembly to include S/S curb base, Millwork cabinet with merchandising “slat” wall above.
3. Materials:
    a. Countertop to be 13-1/2” deep, 3 cm thick quartz with exposed vertical corners to be eased with 1” radius and horizontal corners to be eased with 1/8” radius. See Architects finish schedule for Quartz Manufacturer and color selection.
    b. Cabinet to be Marine grade Plywood construction.
        i. Customer side and exposed end façade: 3/4” marine grade plywood with Plastic Laminate per finish schedule on elevation drawings. Manufacturer and color selection by Architect. Bottom and exposed end edge to have 1” by full length, Boston® bumper, color selection by Architect. KEC verify all color selections **prior** to submittals.
        ii. All exposed outside vertical corners on customer side and exposed ends to have quarter round, inset mounted, aluminum corner protector moldings, such as Schlutter®, to be flush with laminate.
    c. Slat Wall back to be (2) layers of 3/4” Marine grade plywood, outer layer to have inset Aluminum tracks at 4” on center from 4” above countertop to 78” AFF. Top and sides to be finished with the same Plam and have Schlutter® quarter round, inset corner protectors. Wire shelves, baskets, etc. by owner.
    d. Curb Base: 6” high by 14 ga 304 series S/S “C” channel with box-outs at floor sinks.Curb base to be seamless, fully welded and polished where exposed. Outside radius to follow contour of customer side of cabinet. Segmented not acceptable. KEC coordinate installation of curb base per GC’s instructions.
3. Cabinet to be 18” AFF tall, 12” deep with two locking doors for storage and 1”, half-round Boston Bumper® of Architects choice of color. Cabinet interior to be white liner grade Plam. Doors to have matching Vinyl “T” moulding all around.

ITEM#: **204** DESCRIPTION: **Reach-in Display Freezer**
Quantity: 1
Provided By: KEC
Manufacturer: True
Model No.: GDM-26F-HC~TSL01

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
3. Provide black exterior.
4. Provide black interior with black shelving.
5. Provide black novelty baskets.
6. Provide pricing strips on each shelf.
7. Provide LED interior lighting.
8. Provide 2-1/2” casters, front (2) with brakes.

ITEM#: **205** DESCRIPTION: **Open Air Heated Display**
Quantity: 1
Provided By: KEC
Manufacturer: Structural Concepts
Model No.: B2432H

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide Architects choice of laminate (non-stock colors) exterior finish.
3. Provide rear loading clear glass swing doors (stainless).
4. Provide with S/S interior finishes.
5. Provide cutaway glass side on right only.
6. Provide price tag strips on all shelves.
7. Provide LED interior lighting.
8. Provide on casters, non-locking with levelers.

ITEM#: **206** DESCRIPTION: **Walk-in Display Cooler**
Quantity: 1
Provided By: KEC
Manufacturer: Thermalrite
Model No.: Custom

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan and manufacturer's standard specifications, plans, elevations and details and the following:Must meet US Energy Code, effective January 1, 2009.
2. Size and shape per plan, 9'-6" high. Provide foam, "hard-nose" type construction or equal to match plan sizes. **Nominal sizes are not acceptable.**
3. Wall and ceiling panel insulation shall be a full 4" Class 1 foamed-in-place urethane with a K factor of at least .125. All panels to be built with 4" high density rails at the perimeter with 3 cam locks along each side and two cam locks at the ceilings and floor connections (CFC Free).
4. Provide vertical wall backing on hinge side of door panel for Air Curtain specified under item #210.
5. Provide J-box with pre-wired conduit inside wall panel at human doors for air curtain per electrical plan; provide appropriate micro switch built into door frame. Air curtain to automatically start when door opens and stop when door closes.
6. Interior and ceiling shall be 26 ga. Aluminum with black finish with embossed vertical "Mesa" rib pattern on walls only.
7. Unexposed exterior shall be 26 ga. galvanized steel.
8. Exposed exterior at display doors to be S/S, at human door to be painted to match adjacent walls, Architect to select color. No rib pattern.
9. Provide (1) 36" x 78" flush mounted, self-closing door with 14"x24" triple panel vision panel (heated in cooler and freezer), with third hinge, 36" high aluminum thread plate kick plates on both sides, dead bolt lock with interior safety release. **No threshold.**
10. Human door sections shall include flush mounted Modularm model 75LC multi-monitor alarm and light control on latch side of door with the Modularm IP-1 internal

switch flush mounted with occupancy detector. Provide with 3-way manual light switches. System to have output to Building Management System for temperature alarm.

11. Provide with buck opening for reach-in doors as specified under item #201. Provide with foamed in place j-box 6” below to of wall panel with 1/2” conduit up through wall and ceiling panel for power for door lights.
12. Provide (1) Kason 26” LED fixture with LED bulbs. Lights to be shipped loose for field installation by electrical contractor.
13. Provide matching trim to adjacent building walls and closure panels (No Mesa Rib Pattern) to ceiling at human door. Provide S/S trim to wall opening at display doors. KEC to coordinate with GC for trim detail.
14. Provide with 48” high, Aluminum diamond treadplate wall liners on all interior panels).
15. Box must be assembled by a factory authorized/approved installation contractor, no exceptions. **Letter of approval from manufacturer is required-NO EXCEPTIONS.**
16. KEC to verify thermal barrier locations and slab conditions and advise GC if they are not within normal tolerances prior to fabrication.
17. KEC coordinate wall openings and clearances with GC.
18. Provide shop drawing to include Item #201 & #202, for approval prior to fabrication.

ITEM#: **207** DESCRIPTION: **Display Cooler Evap. Coil**
Quantity: 1 (Part of Item #1)
Provided By: KEC
Manufacturer: RDT
Model No.: BEL0190

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Must include Ecosmart® demand defrost system.
3. Provide thru RDT or approved equal refrigeration system manufacturer.
4. Must meet ALL federal energy & refrigerant regulations in effect at time of installation.
5. Secure with Nylon through bolts.
6. Provide shop drawing prior to fabrication.

ITEM#: **208** DESCRIPTION: **Dunnage Shelving Unit**
Quantity: 1
Provided By: KEC
Manufacturer: Channel
Model No.: Aluminum Cantilevered

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Cantilever design without front posts.
3. All welded, aluminum or other non-corrosive finish.

4. Provide sizes per plan, each unit to have solid shelf on bottom, (3) T-Bar Shelves, Cross Supports and Hardware. Shelves, to be adjustable without tools.
5. Provide with lifetime guarantee against rust.

ITEM#: **209** DESCRIPTION: **Cooler Shelving Unit**
Quantity: 1
Provided By: KEC
Manufacturer: Cambro
Model No.: CPU184872VS4

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide (3) vented shelves, (1) solid bottom shelf.
3. Provide 72" posts.

ITEM#: **210** DESCRIPTION: **Air Curtain – Display Cooler**
Quantity: 1
Provided By: KEC
Manufacturer: Kolpak
Model No.: HAR-C2-N1

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with appropriate microswitch provided as part of item #206.
3. KEC coordinate switch location and type with walk-in manufacturer.
4. KEC to attach to interior cooler walls with S/S screws.

ITEM#: **211** DESCRIPTION: **Hand Sink w/Splash Guards**
Quantity: 1
Provided By: KEC
Manufacturer: John Boos
Model No.: PBHS-W-1410-P

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. KEC provide Component Hardware, Encore model KE19-1002-SB1 hands free, electronic faucet with AC adapter.
3. Provide 7" high S/S side splashes.
4. KEC to coordinate and verify wall backing requirements.

ITEM#: **212** DESCRIPTION: **Soap & Towel Dispensers (NIKEC)**
Quantity: 2
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner's Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier's JSN list.

ITEM#: **213** DESCRIPTION: **Trash Receptacle (NIKEC)**
Quantity: 1
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner's Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier's JSN list.

ITEM#: **214** DESCRIPTION: **Front Serving Counter – Salad/ Soup**
Quantity: 1
Provided By: KEC
Manufacturer: Precision Stainless Solutions, Inc.
Model No.: Millwork & S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations, detail drawings and the following:
2. Provide with full length utility chase in rear of cabinet (customer side).
3. ALL millwork doors to have (3), recessed, HD, S/S hinges and matching vinyl "T" molding all around.
4. This manufacturer to adhere to selected quartz manufacturer recommendations and requirements for cut-outs and thermal barriers for heated and/or chilled drop-ins.
5. Counter to be pre-wired to breaker panel to greatest extent possible. Counter to be **UL listed as complete assembly and bear label as such**. Breaker panel to be fully and clearly labeled with machine printed text (no hand written labels). Shipping joint connections to be clearly tagged for final connection by site Electrician.
6. Provide grommeted holes as needed.
7. Materials:
    a. Countertop to be 3 cm thick quartz with exposed vertical corners to be eased with 1" radius and as per plan at 12". Horizontal corners to be eased with 1/8" radius. See Architects finish schedule for Quartz Manufacturer and color selection. Verify color section via RFI, **prior** to submittals. Provide with 2 cm matching quartz end splash. KEC provide grommeted holes on site as required for cords & plugs, etc. Countertop to include cut-outs, per quartz manufacturer requirements, for all drop-ins.
    b. Cabinet to be 18 ga., 304 series S/S and Marine grade Plywood construction.
        i. Customer side and exposed end façade: 3/4" marine grade plywood with Plastic Laminate per finish schedule on elevation drawings. Manufacturer and color selection by Architect. Bottom and exposed end edge to have 1" by full length, Boston® bumper, color selection

by Architect. KEC verify all color selections **prior** to submittals. Outside radius per plan and elevations.

ii. All exposed outside vertical corners on customer side and exposed ends to have quarter round, inset mounted, aluminum corner protector moldings, such as Schlutter®, to be flush with laminate.

iii. Provide fully finished, recessed tray shelves and equipment shelves where shown on customers' side. Shelf to be 2cm quartz, color, and finish to match countertop.

iv. Operators' side to be 18 ga. S/S cabinet construction. Use 1-1/2" wide mullions unless specifically shown otherwise.

v. Cabinet to have full length utility chase, with access panels inside, operators side of cabinet.

c. Curb Base: 14 ga 304 series S/S "C" channel with box-outs at floor sink(s). Curb base to be seamless, fully welded and polished where exposed. Outside radius to follow contour of customer side of cabinet. Segmented not acceptable. KEC coordinate installation of curb base per GC's instructions.

8. Counter configured as follows; Operator side, left to right:
   a. Approx. 24" closed section with hinged, double pan door with recessed pull. This section to house pre-wired breaker panel.
   b. Approx. 14" closed section with removable panel for controls, switches, etc.
   c. Approx. 24" open storage section with full length, recessed, S/S plate shelf with full height S/S back turn-up. Plate Shelf to be removable, with tools for access to inner cabinet. This closed cabinet to house refrigeration system for item #218. Section to have double pan, S/S, louvered door for intake with recessed pull. Provide pull-out shelf on heavy-duty, S/S roller bearing slides for compressor. Partial depth partition on right to allow exhaust air to circulate behind.
   d. Approx. 24" open storage section with full length, recessed, S/S plate shelf with full height S/S back turn-up. Provide with finished S/S storage with removable bottom shelf. This storage section to be partial depth with finished back to allow exhaust circulation.
   e. Approx. 24" closed section with full length, recessed, S/S plate shelf with full height S/S back turn-up. Section to have double pan, S/S, louvered door for exhaust with recessed pull.
   f. Approx. 36" open storage section with full length, recessed, S/S plate shelf with full height S/S back turn-up. Provide with finished S/S storage with removable bottom shelf.
   g. Balance to be closed with S/S panel.
9. Counter configured as follows; customer side, left to right:
   a. Approx. 22" section with finished recessed for item #21, Bread Bins. Top to be notched back, bottom to be 2cm quartz. All vertical and horizontal Plam to PLam to have quarter round, inset mounted, aluminum corner protector moldings, such as Schlutter®, to be flush with laminate. Provide with fished Plan left end.
   b. Approx. 9" section for owner provided trash receptacle. Inside of this section to be fully finished with 20 ga. S/S liner. This section to have tight fitting hinged door with lock and S/S pull. Door to have (3) hinges and vinyl "T" molding all around. Countertop to have 4" diameter finished hole for trash.

c. Front façade of counter to have (2) approx. 60” recessed plate shelves with 6” radius sides and center. Recess to be fully finished with matching Plam. Shelf to be matching 2cm quartz.
d. Approx. 9” section for owner provided trash receptacle. Inside of this section to be fully finished with 20 ga. S/S liner. This section to have tight fitting hinged door with lock and S/S pull. Door to have (3) hinges and vinyl “T” molding all around. Countertop to have 4” diameter finished hole for trash.

10. All utilities to be concealed to greatest extent possible. Fabricator to run copper drain, concealed, to FS recess in curb base. Final connection the item #218, refrigerated cold pan by site PC.
11. KEC to coordinate fit and electrical requirements of all buy-out Items.
12. See Architectural drawings for additional details, Hardware Specs, Finishes, etc.
13. Provide shop drawing, to include all buyouts, for approval prior to fabrication. Verify materials and color selections **prior** to shop drawing submittal.

ITEM#: **215** DESCRIPTION: **Sneeze Guard w/Lights – Deli/ Salad**

Quantity: 1
Provided By: KEC
Manufacturer: Spring USA
Model No.: Versa-Gard Captur

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Provide single tier, self-serve style VGCP15-sk configuration to include full length LED light.
3. Asemmbly to include approx. 36” long, by 9” deep, 3/8” thick, tempered glass overshelf at soup wells. This not a breath gard as that is not required over soup wells with covers.
4. Must meet NSF-2 for self-serve applications.
5. Must be UL approved as assembly and bear label as such.
6. Top glass to be 3/8” tempered glass panels with horizontal edges eased with 1/8” radius and vertical edges eased with 1” radius.
7. This manufacture and manufacturer of serving counter to coordinate fit and requirements for holes for fasteners and electrical leads. Counter manufacturer to provide holes and access below counter for attachment.
8. Provide with 1” diamenter brushed Aluminum or S/S post to conceal power to LED lights.
9. KEC coordinate power supply from item #214.
10. This manufacturer to provide CAD drawings to counter manufacturer for coordination.
11. Provide Shop drawing for approval prior to fabrication.

ITEM#: **216** DESCRIPTION: **Utility Carts**
Quantity: 2
Provided By: KEC
Manufacturer: Lakeside
Model No.: 411-M

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. "M" after model number means modify handle height to 32" max.

ITEM#: **217** DESCRIPTION: **Bread Bins – Self Serve**
Quantity: 1
Provided By: KEC
Manufacturer: Rosseto
Model No.: BK011

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. KC coordinate fit into item #214, Front Serving Counter – Salad/Soup.

ITEM#: **218** DESCRIPTION: **Refrigerated Cold Pan**
Quantity: 1
Provided By: KEC
Manufacturer: Cooltek Refrigeration
Model No.: Custom Cold Pan

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
3. Must be NSF-7 approved with pans no more than 1" below pan rim without the use of ice.
4. Provide slim line configuration, approx. 112" OD long, 18" front to back, with 9" deep pan. Pan to be pitched to center drain. Provide removable plug for drain.
5. Locate compressor to align with louvers in serving counter.
6. KEC coordinate for fit in Item #214.
7. KEC coordinate with item #214 manufacturer for proper ventilation prior to submittal.
8. Provide with remote control panel, ship control panel to counter manufacturer for pre-installation in item #214.

ITEM#: **219** DESCRIPTION: **Salad Dressing Dispensers**
Quantity: 6
Provided By: KEC
Manufacturer: Server
Model No.: CP-1/6 Tall 83433

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications he following:
2. Provide with (12) 90089, S/S, 6" deep 1/6th size pans.

ITEM#: **220** DESCRIPTION: **Soup Wells – Drop-in**
Quantity: 2
Provided By: KEC
Manufacturer: Vollrath
Model No.: 741101DW

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide S/S decorative ring for 11 Qt. drop in.
3. Provide with (4) Vollrath, induction ready, 11 Qt. S/S inserts.

ITEM#: **221** DESCRIPTION: **Soup Cup Dispensers**
Quantity: 2
Provided By: KEC
Manufacturer: San Jamar
Model No.: C2210C

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with EZ-Fit, C22XC metal finish rings.
3. KEC to verify cup sizes and types with Owner via RFI **prior** to submittal.

ITEM#: **222** DESCRIPTION: **Pop-up Bread/Bagel Toaster**
Quantity: 1
Provided By: KEC
Manufacturer: Toastmaster
Model No.: HT409

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide combo model to accept toast and bagels.

ITEM#: **223** DESCRIPTION: **Front Serving Counter – Hot Entrée**
Quantity: 1
Provided By: KEC
Manufacturer: Precission Stainless Solutions, Inc.
Model No.: Millwork & S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations, detail drawings and the following:
2. Provide with full length utility chase in rear of cabinet (customer side).
3. ALL millwork doors to have (3), recessed, HD, S/S hinges and matching vinyl “T” molding all around.
4. This manufacturer to adhere to selected quartz manufacturer recommendations and requirements for cut-outs and thermal barriers for heated and/or chilled drop-ins.
5. Provide with grommeted holes as required.
6. Counter to be pre-wired to breaker panel to greatest extent possible. Counter to be **UL listed as complete assembly and bear label as such**. Breaker panel to be fully and clearly labeled with machine printed text (no hand written labels). Shipping joint connections to be clearly tagged for final connection by site Electrician.
7. Materials:
    a. Countertop to be 3 cm thick quartz with exposed vertical corners to be eased with 1” radius and as per plan at 12”. Horizontal corners to be eased with 1/8” radius. See Architects finish schedule for Quartz Manufacturer and color selection. Verify color section via RFI, **prior** to submittals. Provide with 2 cm matching quartz end splash. KEC provide grommeted holes on site as required for cords & plugs, etc. Countertop to include cut-outs, per quartz manufacturer requirements, for all drop-ins.
    b. Cabinet to be 18 ga., 304 series S/S and Marine grade Plywood construction.
        i. Customer side and exposed end façade: 3/4” marine grade plywood with Plastic Laminate per finish schedule on elevation drawings. Manufacturer and color selection by Architect. Bottom and exposed end edge to have 1” by full length, Boston® bumper, color selection by Architect. KEC verify all color selections **prior** to submittals. Outside radius per plan and elevations.
        ii. All exposed outside vertical corners on customer side and exposed ends to have quarter round, inset mounted, aluminum corner protector moldings, such as Schlutter®, to be flush with laminate.
        iii. Provide fully finished, recessed tray shelves and equipment shelves where shown on customers’ side. Shelf to be 2cm quartz, color, and finish to match countertop.
        iv. Operators’ side to be 18 ga. S/S cabinet construction. Use 1-1/2” wide mullions unless specifically shown otherwise.
        v. Cabinet to have full length utility chase, with access panels inside, operators side of cabinet.
    c. Curb Base: 14 ga 304 series S/S “C” channel with box-outs at floor sink(s). Curb base to be seamless, fully welded and polished where exposed. Outside radius to follow contour of customer side of cabinet. Segmented not acceptable. KEC coordinate installation of curb base per GC’s instructions.
8. Counter configured as follows; Operator side, left to right:
    a. Approx. 27” finished open section with 14 ga. S/S “J” slides. Top slides to be set 3” on center below horizontal support, 6” on center below that.
    b. Approx. 11” open trash section, with raised bottom.
    c. Approx. 24” open storage section with full length, recessed, S/S plate shelf with full height S/S back turn-up. Provide with finished S/S storage with

removable bottom shelf. This storage section to be partial depth with finished back to allow exhaust circulation.

d. Approx. 49” closed section with full length, recessed, S/S plate shelf with full height S/S back turn-up. Plate shelf to be removable for access. This section to be split into three cabinets, all to have double pan, S/S, louvered doors for ventilation with recessed pulls. The louvers to be vertical with slats pointing away from the intake. The horizontal slats in the center door shall face down.
e. Approx. 17” closed section with removable, with tools, S/S panel for remote controls. Controls for heat strips with lights, hot & cold wells, etc. This section to have recessed drain control for hot food well in panel.
f. Approx. 32” open to floor section for item #216, Utility Cart & #233, Trash Recptacle. KEC to coordinate fit. This section to have S/S, fully finished interior.
g. Approx. 27” open storage section with recessed plate shelf. This section to include S/S appron to support drain valves for item #227, Hot Food Wells in easily accessible location. This includes extending manufacturer drains, idependently, towards operator. Open storage below plate shelf to be finished S/S.
h. Approx. 41” open storage section with recessed plate shelf. This section to include S/S appron to support drain valves for item #227, Hot Food Wells in easily accessible location. This includes extending manufacturer drains, idependently, towards operator. Open storage below plate shelf to be finished S/S.
i. Approx. 17” closed section with removable, with tools, S/S panel for remote controls. Controls for heat strips with lights, hot & cold wells, etc. This section to have recessed drain control for hot food well in panel. This section to house pre-wired breaker panel facing to the right.

9. Counter configured as follows; customer side, left to right:
   a. Approx. 10” radiused section with Plam finish. Provide with fished left end.
   b. Front façade of counter to have (3) approx. 42” recessed plate/tray shelves with 6” radius sides. Recess to be fully finished with matching Plam. Shelf to be matching 2cm quartz.
   c. Approx. 10” radiused section with Plam finish. Provide with fished right end.
10. All utilities to be concealed to greatest extent possible.
11. KEC to coordinate fit and electrical requirements of all buy-out Items.
12. See Architectural drawings for additional details, Hardware Specs, Finishes, etc.
13. Provide shop drawing, to include all buyouts, for approval prior to fabrication. Verify materials and color selections **prior** to shop drawing submittal.

ITEM#: **224** DESCRIPTION: **Sneeze Guard – Hot Entrée**
Quantity: 1
Provided By: KEC
Manufacturer: Spring USA
Model No.: Versa-Gard Captur

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevation and detail drawings and the following:
2. Must meet NSF-2 for served and self-serve applications.

3. Must be UL approved as assembly and bear label as such.
4. Provide as assembly of (2) readily convertible VGCP-15-sk series, from served to self-serve, sections and VGCP1 vertical only in center. Vertical only to be split vertically into to equal sections, hinged to open for cleaning with lock to prevent customer opening.
5. Each readily convertible section to have heat strips with lights as specified under item #225. Provide with 1” diamenter brushed Aluminum or S/S post to conceal power to LED lights. One at each end.
6. Top glass to be 3/8” tempered glass panels with horizontal edges eased with 1/8” radius and vertical edges eased with 1” radius.
7. This manufacture and manufacturer of serving counter to coordinate fit and requirements for holes for fasteners and electrical leads. Counter manufacturer to provide holes and access below counter for attachment.
8. KEC coordinate power supply from item #225.
9. Top glass to be 3/8” tempered glass panels with horizontal edges eased with 1/8” radius and vertical edges eased with 1” radius.
10. This manufacturer to provide CAD drawings to counter manufacturer for coordination.
11. Provide Shop drawing for approval prior to fabrication.

ITEM#: **225** DESCRIPTION: **Heat Strips w/Light**
Quantity: 1
Provided By: KEC
Manufacturer: Hatco
Model No.: GR5AH-42

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide 15’ long power wire lead.
3. Provide (1) RMB2-1R for each fixture.
4. Ship to sneeze guard manufacturer for coordination and installation.

ITEM#: **226** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **227** DESCRIPTION: **Hot Food Wells**
Quantity: 2
Provided By: KEC
Manufacturer: Vollrath
Model No.: 3640571HD

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:

2. Wells must be 316 series S/S, fully insulated including between wells.
3. Provide with removable panel under each well for easy service access.
4. Provide with individual, thermostatic controls in remote located control panel.
5. Provide with manifolded drains. KEC install so that drains are on operators side for easier access.
6. KEC to coordinate for fit into Item #223.

ITEM#: **228** DESCRIPTION: **Operable Heat Lamps**
Quantity: 2
Provided By: KEC
Manufacturer: Hatco
Model No.: DSC400-1CM

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide post mount.
3. Provide bright nickel finish.

ITEM#: **229** DESCRIPTION: **Hot Food Wells**
Quantity: 1
Provided By: KEC
Manufacturer: Vollrath
Model No.: 3640571HD

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Wells must be 316 series S/S, fully insulated including between wells.
3. Provide with removable panel under each well for easy service access.
4. Provide with individual, thermostatic controls in remote located control panel.
5. Provide with manifolded drains. KEC install so that drains are on operators side for easier access.
6. KEC to coordinate for fit into Item #223.

ITEM#: **230** DESCRIPTION: **Multi-Temp Food Wells**
Quantity: 1
Provided By: KEC
Manufacturer: Low Temp Industries
Model No.: QSCHFP-3

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
3. Must be able to independently control each well to operate as medium temp, low temp or hot modes in any combination.

4. Must be NSF-7 approved with pans flush when in refrigeration mode.
5. KEC coordinate for fit in Item #223.
6. KEC coordinate with counter manufacturer for proper ventilation prior to submittal.
7. Provide with remote control panel, ship to counter manufacturer for pre-installation.

ITEM#: **231** DESCRIPTION: **Heat Strips w/Lights**
Quantity: 2
Provided By: KEC
Manufacturer: HATCO
Model No.: GR5A-42

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide 15' long power wire lead.
3. Provide (1) RMB2-1R for each fixture.
4. Ship to Sneeze Guard Manufacturer for installation.

ITEM#: **232** DESCRIPTION: **Trash Receptacles (NIKEC)**
Quantity: 4
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.

ITEM#: **233** DESCRIPTION: **Trash Receptacle (NIKEC)**
Quantity: 1
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.

ITEM#: **234** DESCRIPTION: **Heated Surface – Drop-in**
Quantity: 1
Provided By: KEC
Manufacturer: HATCO
Model No.: HSBF-GL-3018

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide small flush mount thermostatic control box.
3. Provide 10' conduit.
4. KEC to coordinate fit into item #223.

ITEM#: **235** DESCRIPTION: **Order Printer (NIKEC)**
Quantity: 1
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier's JSN list.

ITEM#: **236** DESCRIPTION: **Fill Faucets**
Quantity: 4
Provided By: KEC
Manufacturer: Fisher
Model No.: 58211

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with S/S construction and components.
3. Must meet NSF/ANSI 61 & 372 and approved for NSF-61-9.

ITEM#: **237** DESCRIPTION: **Hand Sink w/Soap & Towel**
Quantity: 1
Provided By: KEC
Manufacturer: Eagle
Model No.: HWC-E

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with S/S side splashes to match height of back splash.
3. KEC provide Component Hardware, Encore model KE19-1002-SB1 hands free, electronic faucet with AC adapter.
4. KEC to coordinate and verify fit into wall recess and wall backing with GC.

ITEM#: **238** DESCRIPTION: **Trash Receptacle (NIKEC)**
Quantity: 1
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.

ITEM#: **239** DESCRIPTION: **Swing Gate – Double Acting**
Quantity: 1 (Part of Item #223)
Provided By: KEC
Manufacturer: Precision Stainless Solutions, Inc.
Model No.: Millwork & S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, detail drawings and the following:
2. Approx. 42” swing gate section. This section to include left and right mullion attached to counter and wall. Mullions and gate panels to be 3/4” marine grade plywood with matching Plam exterior finishes. All exposed outside vertical corners and exposed ends to have quarter round, inset mounted, aluminum corner protector moldings, such as Schlutter®, to be flush with laminate. Provide with triple, S/S, double-acting hinges.
3. KEC to coordinate and verify wall backing for hinge mount to wall.
4. Provide Shop drawing for approval prior to fabrication.

ITEM#: **240** DESCRIPTION: **Beverage Counter w/Drip Troughs - Servery**
Quantity: 1
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: Millwork & S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations, detail drawings and the following:
2. Provide with full length utility chase in rear of cabinet (customer side).
3. ALL millwork doors to have (3), recessed, HD, S/S hinges and matching vinyl “T” molding all around.
4. This manufacturer to adhere to selected quartz manufacturer recommendations and requirements for cut-outs and thermal barriers for heated and/or chilled drop-ins.
5. Materials:
    a. Countertop to be 3 cm thick quartz with exposed vertical corners to be eased with 1” radius and as per plan at 12”. Horizontal corners to be eased with 1/8” radius. See Architects finish schedule for Quartz Manufacturer and color selection. Verify color section via RFI, **prior** to submittals. Provide with 2 cm matching quartz end splash. KEC provide grommeted holes on site as required for cords & plugs, etc. Countertop to include cut-outs, per quartz manufacturer requirements, for all drop-ins.
    b. Back and side splashes to be 2cm x 4” high quartz to match countertop.
    c. Cabinet to be Marine grade Plywood construction.
        i. Customer side and exposed end façade: 3/4” marine grade plywood with Plastic Laminate per Architects finish schedule and elevation drawings. Manufacturer and color selection by Architect. Bottom and exposed end edge to have 1” by full length, Boston® bumper, color

selection by Architect. KEC verify all color selections **prior** to submittals. Outside radius per plan and elevations.

ii. All exposed outside vertical corners on customer side and exposed ends to have quarter round, inset mounted, aluminum corner protector moldings, such as Schlutter®, to be flush with laminate.

iii. Cabinet to have full length utility chase, with access panels inside, operators side of cabinet.

d. Curb Base: 14 ga 304 series S/S “C” channel with box-outs at floor sink(s). Curb base to be seamless, fully welded and polished where exposed. Outside radius to follow contour of customer side of cabinet. Segmented not acceptable. KEC coordinate installation of curb base per GC’s instructions.

6. Counter configured as follows; Customer side, left to right:
   a. Approx. 27” finished storage section with locking door and adjustable intermediate shelf. Cabinet interior to be white, cabinet liner grade PLam. Countertop to have approx. 4”x16”x1” deep, S/S, drop-in drip trough pitched to 3/4” drain. Drip trough to have removable, S/S rod type grate to be flush with countertop. Drip troughs to have fully welded, 3/4” diameter by 1” long, S/S, MPT threaded drain nipple. Drains to be welded at angle to and located to avoid interference with UC equipment & storage. This manufacturer to run drain to the FS box-out. Avoid UC equipment and storage.
   b. Approx. 12” closed section with hinged, locking door for trash receptacle provided by owner. This section to be lined in 20 ga. S/S, countertop to have 6” diameter, finished hole aligned with trash receptacle.
   c. Approx. 27” finished storage section with locking door and adjustable intermediate shelf. Cabinet interior to be white, cabinet liner grade PLam.
   d. Approx. 55” finished storage section with locking doors and adjustable intermediate shelf. Cabinet interior to be white, cabinet liner grade PLam. Countertop to have approx. 4”x16”x1” deep, S/S, drop-in drip trough pitched to 3/4” drain. Drip trough to have removable, S/S rod type grate to be flush with countertop. Drip troughs to have fully welded, 3/4” diameter by 1” long, S/S, MPT threaded drain nipple. Drains to be welded at angle to and located to avoid interference with UC equipment & storage. This manufacturer to run drain to the FS box-out. Avoid UC equipment and storage.
7. All utilities to be concealed to greatest extent possible.
8. KEC to coordinate fit and requirements of all buy-out Items.
9. See Architectural drawings for additional details, Hardware Specs, Finishes, etc.
10. Provide shop drawing, to include all buyouts (dashed lines), for approval prior to fabrication. Verify materials and color selections **prior** to shop drawing submittal.

ITEM#: **241** DESCRIPTION: **Cup & Lid Dispensers – Counter**
Quantity: 2
Provided By: KEC
Manufacturer: San Jamar
Model No.: C2854-M

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:

2. “M” after model means provide S/S cabinet with (3) cup and (1) lid tubes in lieu of standard.
3. KEC to verify cup sizes and types with Owner, via RFI, prior to submittal.

ITEM#: **242** DESCRIPTION: **Ice/Water Maker-Dispenser**
Quantity: 1
Provided By: KEC
Manufacturer: Follett
Model No.: 50C1414A-L

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Furnish with Sensor
3. Provide SafeCLEAN Plus™ ice machine cleaner, carton of 24 x 8 oz (237 ml) bottles.
4. Provide Nu-Calgon® IMS-III sanitizer, 10 oz bottle.

ITEM#: **243** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **244** DESCRIPTION: **Iced Tea Dispensers**
Quantity: 2
Provided By: KEC
Manufacturer: BUNN
Model No.: TDO-N-3.5

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer’s standard specifications.
2. Provide with (2) Bunn model TDO-N-3.5, 3.5 gallon, 39600.0001 Dispensers.

ITEM#: **245** DESCRIPTION: **Crystal Light Dispenser (NIKEC)**
Quantity: 1
Provided By: Owner’s Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner’s Vendor for proper fit & requirements.

ITEM#: **246** DESCRIPTION: **Cappuccino/Hot Chocolate Machine**
Quantity: 1
Provided By: KEC
Manufacturer: BUNN
Model No.: iMIX-5S+

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications.

ITEM#: **247** DESCRIPTION: **Cup & Lid Dispenser**
Quantity: 1
Provided By: KEC
Manufacturer: San Jamar
Model No.: C2854-M

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. "M" after model means provide S/S cabinet with (3) cup and (1) lid tubes in lieu of standard.
3. KEC to verify cup sizes and types with Owner, via RFI, prior to submittal.

ITEM#: **248** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **249** DESCRIPTION: **Condiment Bin Tower**
Quantity: 1
Provided By: KEC
Manufacturer: Cambro
Model No.: 8RS8

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications.

ITEM#: **250** DESCRIPTION: **Coffee Airpots w/Stand**
Quantity: 1
Provided By: KEC
Manufacturer: BUNN
Model No.: SST LA, 3.0L

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with (2) Bunn model SST LA, 3.0L, Lever Action Airpots 32130.0000 airpots.
3. Provide rack assembly,UNIV-4 APR-2 L/2U.

ITEM#: **251** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **252** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **253** DESCRIPTION: **Cashier Stand**
Quantity: 1
Provided By: KEC
Manufacturer: Precisions Stainless Solutions, Inc.
Model No.: Millwork

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations, detail drawings and the following:
2. Provide with full width utility chase in fornt of cabinet (customer side).
3. ALL millwork doors to have (3), recessed, HD, S/S hinges and matching vinyl “T” molding all around.
4. Provide with grommeted holes for POS cords and cables. KEC coordinate requirements with owner.
5. Materials:
   a. Countertop to be 3 cm thick quartz with exposed vertical corners to be eased with 1/2” radius and as per plan at 12”. Horizontal corners to be eased with 1/8” radius. See Architects finish schedule for Quartz Manufacturer and color selection.Provide with 2 cm matching quartz end splash. KEC provide grommeted holes on site as required for cords & plugs, etc.
   b. Cabinet to be Marine grade Plywood construction.
   c. Customer side façade: 3/4” marine grade plywood with Plastic Laminate per finish schedule on elevation drawings. Manufacturer and color selection by Architect. Bottom edge to have 1” by full length, Boston® bumper, color selection by Architect. KEC verify all color selections **prior** to submittals. Outside radius per plan and elevations. Interior storage sections to be finished with white, cabinet liner grade plastic laminate.
   d. Operators’ side to be same plastic laminate finish as customer side.
6. All exposed outside vertical corners on customer and operator side to have quarter round, inset mounted, aluminum corner protector moldings, such as Schlutter®, to be flush with laminate.
7. Curb Base: 14 ga 304 series S/S “C” channel with box-outs at floor sinks. Curb base to be seamless, fully welded and polished where exposed. Outside radius to follow contour of customer side of cabinet. Segmented not acceptable.
8. Counter shall include a recessed “Impulse” sales area with slat wall at back. This section to be raised 8” above counter height, top to be 3cm Quartz notched back per

plan. Bottom shelf to be 2cm Quartz set 18” AFF. All vertical srfaces to be finished with matching Plam.

9. Cabinet configured as follows; Operator side, “L” shaped, from right to left;
10. Provide approximately 36” storage section with locking doors. Storage area to have (1) adjustable, 3/4” plywood shelf with plastic laminate top and front, balance to be cabinet liner. No exposed wood finishes.
11. Provide approximately 66” cashier section with (2) locking cashier drawer on S/S roller bearing slides. Provide storage area below with locking doors to have (1) adjustable, 3/4” plywood shelf with plastic laminate top and front, balance to be cabinet liner. No exposed wood finishes.
12. Provide Shop drawing for approval prior to fabrication.

ITEM#: **254** DESCRIPTION: **POS Scales (NIKEC)**
Quantity: 2
Provided By: Owner’s Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner’s Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier’s JSN list.

ITEM#: **255** DESCRIPTION: **POS Cash Registers (NIKEC)**
Quantity: 2
Provided By: Owner’s Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner’s Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier’s JSN list.

ITEM#: **256** DESCRIPTION: **Trash Receptacle (NIKEC)**
Quantity: 1
Provided By: Owner’s Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner’s Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier’s JSN list.

ITEM#: **257** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **258** DESCRIPTION: **Cashier Chairs (NIKEC)**
Quantity: 2
Provided By: Owner's Furniture Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner's Vendor for proper fit & requirements.

ITEM#: **259** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **260** DESCRIPTION: **Condiment/Trays & Trash Counter**
Quantity: 1
Provided By: KEC
Manufacturer: Precission Stainless Solutions, Inc.
Model No.: Millwork

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations, detail drawings and the following:
2. ALL millwork doors to have (3), recessed, HD, S/S hinges and matching vinyl "T" molding all around.
3. Materials:
   a. Countertop to be 3 cm thick quartz with exposed vertical corners to be eased with 1" radius and 12" per plan. Horizontal corners to be eased with 1/8" radius. See Architects finish schedule for Quartz Manufacturer and color selection.
   b. Back and right side splash to be 2cm x 4" high quartz to match countertop.
   c. Cabinet to be Marine grade Plywood construction.
   d. Customer side façade: 3/4" marine grade plywood with Plastic Laminate per finish schedule on elevation drawings. Manufacturer and color selection by Architect. Bottom edge to have 1" by full length, Boston® bumper, color selection by Architect. KEC verify all color selections **prior** to submittals. Outside radius per plan and elevations. Interior storage sections to be finished with white, cabinet liner grade plastic laminate.
   e. Curb Base: 14 ga 304 series S/S "C" channel with box-outs at floor sinks. Curb base to be seamless, fully welded and polished where exposed. Outside radius to follow contour of customer side of cabinet. Segmented not acceptable.
4. All exposed outside vertical corners on customer and operator side to have quarter round, inset mounted, aluminum corner protector moldings, such as Schlutter®, to be flush with laminate.
5. Counter configured as follows; Customer side, left to right:
   a. Approx. 27" finished storage section with locking door and adjustable intermediate shelf. Cabinet interior to be white, cabinet liner grade PLam.

b. Approx. 27” finished trash section to accommodate two Slim Jim trash receptacles. Cabinet interior to be lined with 20 ga S/S with (2) 4”x9” rectangular, integral, polished trash holes in countertop. KEC to coordinate fit of trash receptacles provided by owner, **prior** to submittals. Door for this section to have a “mock” S/S flange held 1/2” AFF to appear as extension of curb base.

6. Provide Shop drawing for approval prior to fabrication.

ITEM#: **261** DESCRIPTION: **Napkin Dispensers (NIKEC)**
Quantity: 2
Provided By: Owner’s Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner’s Vendor for proper fit & requirements.

ITEM#: **262** DESCRIPTION: **Condiment Bin Towers**
Quantity: 2
Provided By: KEC
Manufacturer: Cambro
Model No.: 12RS12

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications.

ITEM#: **263** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **264** DESCRIPTION: **Trash Receptacles (NIKEC)**
Quantity: 2
Provided By: Owner’s Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner’s Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier’s JSN list.

ITEM#: **265** DESCRIPTION: **Plastic Cutlery Dispenser - Countertop (NIKEC)**
Quantity: 1
Provided By: Owner’s Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.

ITEM#: **266** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **267** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **268** DESCRIPTION: **Trash Receptacles (NIKEC)**
Quantity: 4
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier's JSN list.

ITEM#: **269** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **270** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **271** DESCRIPTION: **Trash & Tray Cabinets**
Quantity: 2
Provided By: KEC
Manufacturer: Precission Stainless Solutions, Inc.
Model No.: Millwork

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per General Specifications, plan, elevations, detail drawings and the following:
2. ALL millwork doors to have (3), recessed, HD, S/S hinges and matching vinyl "T" molding all around.

3. Materials:
   a. Countertop to be 3 cm thick quartz with exposed vertical corners to be eased with 1” radius and 12” per plan. Horizontal corners to be eased with 1/8” radius. See Elevations for Quartz Manufacturer and color selection. Provide with 2 cm matching quartz end splash. KEC provide grommeted holes on site as required for cords & plugs, etc.
   b. Back and right side splash to be 2cm x 4” high quartz to match countertop.
   c. Cabinet to be Marine grade Plywood construction.
   d. Customer side façade: 3/4” marine grade plywood with Plastic Laminate per finish schedule on elevation drawings. Manufacturer and color selection by Architect. Bottom edge to have 1” by full length, Boston® bumper, color selection by Architect. KEC verify all color selections **prior** to submittals. Outside radius per plan and elevations. Interior storage sections to be finished with white, cabinet liner grade plastic laminate.
   e. Curb Base: 14 ga 304 series S/S “C” channel with box-outs at floor sinks. Curb base to be seamless, fully welded and polished where exposed. Outside radius to follow contour of customer side of cabinet. Segmented not acceptable.
4. All exposed outside vertical corners on customer and operator side to have quarter round, inset mounted, aluminum corner protector moldings, such as Schlutter®, to be flush with laminate.
5. Counter configured as follows; Customer side, left to right:
   a. Approx. 27” finished storage section with locking door and adjustable intermediate shelf. Cabinet interior to be white, cabinet liner grade PLam.
   b. Approx. 27” finished trash section to accommodate two Slim Jim trash receptacles. Cabinet interior to be lined with 20 ga S/S. with (2) 4”x9” rectangular, integral, polished trash holes in countertop, KEC to coordinate fit of trash receptacles provided by owner, **prior** to submittals. Door for this section to have a “mock” S/S flange held 1/2” AFF to appear as extension of curb base. Countertop to have 2cm by 4” high, matching quartz divider to accommodate trays. KEC verify size of retail trays prior to submittal.
6. Provide Shop drawing for approval prior to fabrication.

ITEM#: **272** DESCRIPTION: **Condiment Counter**
Quantity: 1
Provided By: KEC
Manufacturer: Precission Stainless Solutions, Inc.
Model No.: Millwork

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per General Specifications, plan, elevations, detail drawings and the following:
2. ALL millwork doors to have (3), recessed, HD, S/S hinges and matching vinyl “T” molding all around.
3. Materials:
   a. Countertop to be 3 cm thick quartz with exposed vertical corners to be eased with 1” radius and 12” per plan. Horizontal corners to be eased with 1/8” radius. See Elevations for Quartz Manufacturer and color selection. Provide with 2 cm matching quartz end splash. KEC provide grommeted holes on site as required for cords & plugs, etc.

   b. Back and right side splash to be 2cm x 4” high quartz to match countertop.
   c. Cabinet to be Marine grade Plywood construction.
   d. Customer side façade: 3/4” marine grade plywood with Plastic Laminate per finish schedule on elevation drawings. Manufacturer and color selection by Architect. Bottom edge to have 1” by full length, Boston® bumper, color selection by Architect. KEC verify all color selections **prior** to submittals. Outside radius per plan and elevations. Interior storage sections to be finished with white, cabinet liner grade plastic laminate.
   e. Curb Base: 14 ga 304 series S/S “C” channel with box-outs at floor sinks. Curb base to be seamless, fully welded and polished where exposed. Outside radius to follow contour of customer side of cabinet. Segmented not acceptable.
4. All exposed outside vertical corners on customer and operator side to have quarter round, inset mounted, aluminum corner protector moldings, such as Schlutter®, to be flush with laminate.
5. Counter configured as follows; Customer side, left to right:
   a. Approx. 27” finished storage section with locking door and adjustable intermediate shelf. Cabinet interior to be white, cabinet liner grade PLam.
   b. Approx. 18” finished trash section to accommodate small trash receptacle. Cabinet interior to be lined with 20 ga S/S. with (1) 4” diameter, integral, polished trash hole in countertop, KEC to coordinate fit of trash receptacle provided by owner, **prior** to submittals. Provide with shelf support to raise of trash receptacle.
6. Provide Shop drawing for approval prior to fabrication.

ITEM#: **273** DESCRIPTION: **Plastic Cutlery Dispenser – Countertop (NIKEC)**

Quantity: 1
Provided By: Owner’s Med. Eq. Supplier
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner’s Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier’s JSN list.

ITEM#: **274** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **275** DESCRIPTION: **Microwave Counter**
Quantity: 1
Provided By: KEC
Manufacturer: Precission Stainless Solutions, Inc.
Model No.: Millwork

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations, detail drawings and the following:
2. ALL millwork doors to have (3), recessed, HD, S/S hinges and matching vinyl “T” molding all around.
3. Materials:
   a. Countertop to be 3 cm thick quartz with exposed vertical corners to be eased with 1” radius and horizontal corners to be eased with 1/8” radius. See Architects finish schedule for Quartz Manufacturer and color selection. Provide with 2 cm matching quartz end splash. KEC provide grommeted holes on site as required for cords & plugs, etc.
   b. Back and side splashes to be 2cm x 4” high quartz to match countertop.
   c. Cabinet to be Marine grade Plywood construction.
   d. Customer side façade: 3/4” marine grade plywood with Plastic Laminate per finish schedule on elevation drawings. Manufacturer and color selection by Architect. Bottom edge to have 1” by full length, Boston® bumper, color selection by Architect. KEC verify all color selections **prior** to submittals. Outside radius per plan and elevations. Interior storage sections to be finished with white, cabinet liner grade plastic laminate.
   e. Curb Base: 14 ga 304 series S/S “C” channel with box-outs at floor sinks. Curb base to be seamless, fully welded and polished where exposed. Outside radius to follow contour of customer side of cabinet. Segmented not acceptable.
4. All exposed outside vertical corners on customer and operator side to have quarter round, inset mounted, aluminum corner protector moldings, such as Schlutter®, to be flush with laminate.
5. Counter configured as follows; Customer side, left to right:
   a. Approx. 36” finished, open to floor section to accommodate ADA clearance to public use hand sink. Assembly to be canlivered off the wall on left, no base cabinet. KEC to coordinate and verify wall backing. Countertop in this section to have polished opening for undermount hand sink specified under item #276.
   b. Approx. 13” finished trash section to accommodate small trash receptacle. Cabinet interior to be lined with 20 ga S/S. Countertop to have (2) 4”x9” rectangular, integral, polished trash holes. KEC to coordinate fit of trash receptacle provided by owner, **prior** to submittals. Provide with shelf support to raise of trash receptacle.
   c. Approx. 24” section with finished storage below below open shelf for one of two microwave ovens. KEC to coordinate fit with owner provided microwave. Provide (5) approximately 1” diameter finished holes in countertop for ventilation.
6. Provide Shop drawing for approval prior to fabrication.

ITEM#: **276** DESCRIPTION: **Hand Sink w/Splash Guards – Public Use**

Quantity: 1
Provided By: KEC
Manufacturer: Advance Tabco
Model No.: 1014B-05

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Prodide (1) Fisher 53740 S/S deck faucet with wrist blades and 6" fixed spout.

ITEM#: **277** DESCRIPTION: **Soap & Towel Dispenser (NIKEC)**
Quantity: 1
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner's Vendor for proper fit & requirements.

ITEM#: **278** DESCRIPTION: **Napkin Dispenser (NIKEC)**
Quantity: 1
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner's Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier's JSN list.

ITEM#: **279** DESCRIPTION: **Condiment Bins – Stacked**
Quantity: 6
Provided By: KEC
Manufacturer: Cambro
Model No.: 5412CBP

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide bins only to be stacked (6) high.

ITEM#: **280** DESCRIPTION: **Trash Receptacles (NIKEC)**
Quantity: 2
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC to coordinate with Owner's Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier's JSN list.

ITEM#: **281** DESCRIPTION: **Plastic Cutlery Dispenser – Countertop (NIKEC)**
Quantity: 1
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier's JSN list.

ITEM#: **282** DESCRIPTION: **Microwave Ovens (NIKEC)**
Quantity: 2
Provided By: Owner's Med. Eq. Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC to coordinate with Owner's Vendor for proper fit & requirements.
2. KEC see Medical Equipment specifier's JSN list.

ITEM#: **283** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **284** DESCRIPTION: **Vending Machine – Freezer**
Quantity: 1
Provided By: KEC
Manufacturer: Vending.com
Model No.: MarketOne Frozen Food Glass Front Merchandiser

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
3. Provide with Credit, Debit card reader.
4. Coordinate data interface with owner's IT.
5. Provide start-up training with Dietary and IT.

ITEM#: **285** DESCRIPTION: **Vending Machine – Cold Beverage/Cold Food**
Quantity: 1
Provided By: KEC
Manufacturer: Vending.com
Model No.: MarketOne 3W

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2.
3. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
4. Provide with Credit, Debit card reader.
5. Coordinate data interface with owner's IT.
6. Provide start-up training with Dietary and IT.

ITEM#: **286** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **287** DESCRIPTION: **Vending Machine – Snacks**
Quantity: 1
Provided By: KEC
Manufacturer: Vending.com
Model No.: AB32/400

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide with Credit, Debit card reader.
3. Coordinate data interface with owner's IT.
4. Provide start-up training with Dietary and IT.

ITEM#: **288** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **289** DESCRIPTION: **Coffee/Condiment Counter**
Quantity: 1
Provided By: KEC
Manufacturer: Precission Stainless Solutions, Inc.
Model No.: Millwork

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, elevations, detail drawings and the following:
2. Materials:
3. ALL millwork doors to have (3), recessed, HD, S/S hinges and matching vinyl "T" molding all around.

4. Materials:
   a. Countertop to be 3 cm thick quartz with exposed vertical corners to be eased with 1” radius and angled per plan.Horizontal corners to be eased with 1/8” radius. See Architects finish schedule for Quartz Manufacturer and color selection. Provide with 2 cm matching quartz end splash. KEC provide grommeted holes on site as required for cords & plugs, etc.
   b. Back splash to be 2cm x 4” high quartz to match countertop.
   c. Cabinet to be Marine grade Plywood construction.
   d. Customer side façade: 3/4” marine grade plywood with Plastic Laminate per finish schedule on elevation drawings. Manufacturer and color selection by Architect. Bottom edge to have 1” by full length, Boston® bumper, color selection by Architect. KEC verify all color selections **prior** to submittals. Outside radius per plan and elevations. Interior storage sections to be finished with white, cabinet liner grade plastic laminate.
   e. Curb Base: 14 ga 304 series S/S “C” channel with box-outs at floor sinks. Curb base to be seamless, fully welded and polished where exposed. Outside radius to follow contour of customer side of cabinet. Segmented not acceptable.
5. All exposed outside vertical corners on customer and operator side to have quarter round, inset mounted, aluminum corner protector moldings, such as Schlutter®, to be flush with laminate.
6. Counter configured as follows; Customer side, left to right:
   a. Approx. 15” finished, closed equipment section with locking door on cabinet corner. This section to house the water heater components of item #290, Hot Water Dispenser.
   b. Approx. 17” section with finished storage below with locing doors and adjustable intermediate shelf. Cabinet liner interior finish.
   c. Approx. 15” finished trash section with locking door on cabinet corner. This section to accommodate a small trash receptacle. Cabinet interior to be lined with 20 ga S/S. Countertop to have (1) 4”x9” rectangular, integral, polished trash holes. KEC to coordinate fit of trash receptacle provided by owner, **prior** to submittals. Provide with shelf to raise height of trash receptacle.
7. Provide Shop drawing for approval prior to fabrication.

ITEM#: **290** DESCRIPTION: **Hot Water Dispenser**
Quantity: 1
Provided By: KEC
Manufacturer: Marco
Model No.: MIX UC3

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Dispenser to have multi temp water dispensing head.
3. KEC to coordinate fit and requirements in item #289.

ITEM#: **291** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **292** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **293** DESCRIPTION: **Coffee/Cappuccino Machine**
Quantity: 1
Provided By: KEC
Manufacturer: FRANKE
Model No.: A400

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. As part of this item provide self-pay interface by Canop Tree Coffee. System to include all necessary hardware and software to allow self-service/self Pay and mobile app ordering with QR code. Provide (1) year of customer payment services service thru Canopy Tree Coffee.
3. KEC to provide water sample to FRANKE after building's new water system is operational.
4. Provide full start up package thru FRANKE.

ITEM#: **294** DESCRIPTION: **Cup & Lid Dispenser**
Quantity: 1
Provided By: KEC
Manufacturer: San Jamar
Model No.: C2854

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Provide (3) cup and (1) lid tubes.
3. KEC to verify cup sizes and types with Owner prior to submittal.

ITEM#: **295** DESCRIPTION: **Coffee Condiment Bins – Stacked**
Quantity: 1
Provided By: KEC
Manufacturer: Cambro
Model No.: 5412CBP

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:

ITEM#: **296-299** DESCRIPTION: **Not Used**

Quantity:
Provided By:
Manufacturer:
Model No.:

MATERIALS MANAGEMENT

ITEM#: **300** DESCRIPTION: **Walk-in Cooler - MM**
Quantity: 1
Provided By: KEC
Manufacturer: Thermalrite
Model No.: Custom

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer's standard specifications and the following:
2. Must meet US Energy Code, effective January 1, 2009.
3. Size and shape per plan, 8'-6" high. Provide foam, "hard-nose" type construction or equal to match plan sizes. **Nominal sizes are not acceptable.**
4. Wall and ceiling panel insulation shall be a full 4" Class 1 foamed-in-place urethane with a K factor of at least .125. All panels to be built with 4" high density rails at the perimeter with 3 cam locks along each side and two cam locks at the ceilings and floor connections (CFC Free).
5. Box shall have 2-5/8" thick, lightly reinforced floor panels with Sanisteel® grey finish with interior ramp. Interior ramp to have anti slip strips.
6. Provide heavy duty wall backing above door panel for Air Curtains.
7. Provide J-box with pre-wired conduit inside wall panel at man doors for air curtains per electrical plan; provide appropriate micro switch built into door frame.
8. Interior and ceiling shall be 26 ga. Sanisteel ® Antimicrobial white finish with embossed vertical "Mesa" rib pattern on walls only.
9. Unexposed exterior shall be 26 ga. galvanized steel.
10. Exposed exterior to be 26 ga. Sanisteel ® Antimicrobial white finish with embossed vertical "Mesa" rib pattern.
11. Provide with 3"x3"x48" tall, 14 ga. S/S corner guard on exposed corner.
12. Provide (2) 36" x 78" flush mounted, self-closing door with 14"x24" triple panel vision panel (heated in cooler and freezer), with third hinge, 36" high aluminum thread plate kick plates on both sides, dead bolt lock with interior safety release. No threshold.
13. Man door sections shall include flush mounted Modularm model 75LC multi-monitor alarm and light control on latch side of door with the Modularm IP-1 internal switch flush mounted with occupancy detector. Provide with 3-way manual light switches.
14. Provide (2) Kason 26" LED fixture with LED bulbs. Lights to be shipped loose for field installation by electrical contractor.

15. Provide matching trim to adjacent building walls and removable closure panels (No Mesa Rib Pattern) to ceiling.
16. Provide 1-1/2” thick by 8” high, horizontally mounted, S/S bumper guards on exterior and interior per plan. Mount at 10” AFF on center. Bumper guards to be mitered at corners with all ends closed.
17. Box must be assembled by a factory authorized/approved installation contractor, no exceptions. **Letter of approval from manufacturer is required-NO EXCEPTIONS.**
18. KEC coordinate wall openings and clearances with GC.

ITEM#: **301** DESCRIPTION: **Air Curtain – MM Cooler**
Quantity: 1
Provided By: KEC
Manufacturer: Kolpak
Model No.: HAR-C2-N1

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide with appropriate microswitch provided as part of item #300.
3. KEC coordinate switch location and type with walk-in manufacturer.

ITEM#: **302** DESCRIPTION: **Cooler Shelving – 24x60 (NIKEC)**
Quantity: 4
Provided By: By Med. Equipment Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:
1. KEC coordinate fit within walk-in.
2. KEC see Medical Equipment specifier’s JSN list.

ITEM#: **303** DESCRIPTION: **Cooler Refrigerator Condenser**
Quantity: 1
Provided By: KEC
Manufacturer: RDT
Model No.: IRW1-01Z-CT3-AST

ADDITIONAL REQUIREMENTS:
1. Furnish and set in place per General Specifications, plan, detail drawings and the following:
2. To be located on top of walk-in cooler.
3. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.

ITEM#: **304** DESCRIPTION: **Cooler Evap Coil**
Quantity: 1 (Part of Item #303)
Provided By: KEC
Manufacturer: RDT
Model No.: COAX-7151

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, detail drawings and the following:
2. Must include Ecosmart® demand defrost system.
3. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.

ITEM#: **305** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **306** DESCRIPTION: **Cooler Shelving – 24x54 (NIKEC)**
Quantity: 1
Provided By: Med. Equipment Vendor
Manufacturer:
Model No.:

ADDITIONAL REQUIREMENTS:

1. KEC coordinate fit within walk-in.
2. KEC see Medical Equipment specifier's JSN list.

ITEM#: **307** DESCRIPTION: **Miscelaneous S/S Componants**
Quantity: Lot
Provided By: KEC
Manufacturer: Custom Fabrication
Model No.: S/S

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per General Specifications, plan, sections and detail drawings and the following:
2. NOTE: No item number tags on plan. Equipment which includes trim, closures, wall caps, etc. are covered in those item specifications.
3. Provide S/S components as follows:
    a. Approx. (19) 2"x2"x48" tall, 14 ga. S/S corner Guards. See Building Conditions Plans, tagged as C-1.
    b. Approx. (2) 2"x2"x96" tall, 14 ga. S/S corner guards. See Building Conditions Plans, tagged as C-2.
    c. Full height by 14 ga. S/S Wall end caps. See Building Conditions Plans, tagged as C-4.

d. Approx. (2) 1” thick, double pan, by 72” tall partitions between mobile soiled and clean wares racks. Include mounting hardware.

ITEM#: **308** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

ITEM#: **309** DESCRIPTION: **Spare Number**
Quantity:
Provided By:
Manufacturer:
Model No.:

EMERGENCY DEPARTMENT

ITEM#: **310** DESCRIPTION: **Vending Machine – Cold Beverage & Snack**
Quantity: 1
Provided By: KEC
Manufacturer: Vending.com
Model No.: MarketOne 5W

ADDITIONAL REQUIREMENTS:

1. Furnish and set in place per plan, manufacturer’s standard specifications and the following:
2. Provide with touch screen control.
3. Must meet ALL applicable energy & refrigerant regulations in effect at time of installation.
4. Provide with Credit, Debit card reader.
5. Coordinate data interface with owner’s IT.
6. Provide start-up training with Dietary and IT.

END OF SECTION

SECTION 117000 - HEALTHCARE EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Healthcare equipment as indicated in the Medical Equipment Schedule furnished and installed as follows:
   a. Contractor Furnished, Contractor Installed (CFCI).
   b. Owner Furnished, Contractor Installed (OFCI).
   c. Owner Furnished, Owner Installed (OFOI)
2. Equipment supports, anchorage.
3. Water, medical gas, electrical service, and other utility service requirements.

B. Related Requirements:
1. Division 13 Section "Seismic Control Assemblies" for seismic anchorage of healthcare equipment.
2. Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment" for seismic anchorage of plumbing piping and equipment for healthcare equipment.
3. Division 22, Plumbing, for piping systems for healthcare equipment.
4. Division 23, Heating, Ventilating, and Air Conditioning (HVAC) for HVAC systems for healthcare equipment.
5. Division 26, Electrical, for electrical system connections for healthcare equipment.
6. Division 28, Communications, for communications connections for healthcare equipment.

1.2 CONTRACTOR FURNISHED EQUIPMENT

A. Contractor’s Responsibilities:
1. Confirm and review with Owner final equipment manufacturers, models, configurations, accessories, options, colors, and finishes.
2. Arrange for and deliver Contractor reviewed Shop Drawings, Product Data, and Samples to Owner for final approval.
3. Arrange and pay for Product delivery to site.
4. On delivery, inspect Products.
5. Submit requests for transportation damage and replace damaged, defective, or deficient items.
6. Arrange for and coordinate all aspects of equipment installation.
7. Arrange for manufacturers' warranties, inspections, and staff training.
8. Equipment manufacturers and models listed are Basis of Design only. All final selections must be of equal or better fit, functionality, and quality. Submit substitutions to Owner for final approval.

B. Owner’s Responsibilities:
1. Review and approve final equipment configuration, accessories, options, colors, and finishes with Contractor.

2. Review and approve Contractor reviewed Shop Drawings, Product Data and Samples.

1.3 OWNER FURNISHED, CONTRACTOR INSTALLED EQUIPMENT

A. Owner's Responsibilities:
1. Arrange for and deliver Owner reviewed Shop Drawings, Product Data, and Samples, to Contractor.
2. Arrange and pay for Product delivery to site.
3. On delivery, inspect Products jointly with Contractor.
4. Submit requests for transportation damage and replace damaged, defective, or deficient items.
5. Arrange for manufacturers' warranties, inspections, and service.

B. Contractor's Responsibilities:
1. Review Owner reviewed Shop Drawings, Product Data and Samples.
2. Receive and unload Products at site; inspect for completeness or damage, jointly with Owner.
3. Handle, store, install and finish Products.
4. Repair or replace items damaged after receipt.
5. Furnish and install required fasteners for items as noted below.
6. Make final utility connections as required.

1.4 OWNER FURNISHED, OWNER INSTALLED EQUIPMENT

A. Contractor's Responsibilities for OFOI Equipment:
1. Cooperate and coordinate with Owner for delivery, storage, and installation.
2. See equipment schedule/design binder for equipment details.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for equipment.
2. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Sustainable Design Submittals:
1. ENERGY STAR: When applicable, show compliance with requirements for ENERGY STAR product labeling.
2. Samples: Fore each exposed product and for each color and texture specified, in manufacture’s standard size.

C. Shop Drawings:
1. Include plans, elevations, sections, and attachment details.
2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.

3. Include diagrams for power, signal, and control wiring.

1.7 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Healthcare equipment and other details, drawn to scale, on which the equipment is shown and coordinated with each other, using input from installers of the equipment.

1.8 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For healthcare equipment to include in operation and maintenance manuals.

1.9 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Mockups: Build mockups to set quality standards for multiple installations of healthcare equipment if deemed relevant or required by Owner.
   1. Build mockup of one typical healthcare equipment as shown on Drawings.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original containers, dry and undamaged, with seals and labels intact.

B. Storage and Protection: Store materials in a dry secure place. Protect from weather, surface contaminants, corrosion, construction traffic, and other potential damage.

1.11 FIELD CONDITIONS

A. Field Measurements: Verify actual dimensions for installation of healthcare equipment by field measurements.

1.12 WARRANTY

A. Special Warranties: Manufacturer agrees to repair or replace equipment or components that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: Two years from date of Substantial Completion

B. General Warranties: Full warranty, including parts and labor for on-site service
   1. Warranty Period: Manufacturer’s warranty period or Two Years from date of substantial completion, whichever is greater.

PART 2 - PRODUCTS

All equipment manufacturers and models listed are Basis of Design only. Actual equipment selected shall be of equal or better fit, and functionality, including any

certifications, regulatory compliance, and registrations. Submit all selections to Owner for final approval of model, configurations, options, and accessories.

2.1 CFCI MEDICAL EQUIPMENT

A. Dental Operatories

The Dental Operatory equipment shall be a complete fixed equipment solution provided and installed by a qualified manufacturer certified dental equipment supplier. All drawer configurations, colors, and finishes are to be coordinated with the equipment supplier and final selections approved by the owner.

1. Dental Console
   a. Basis-of-Design: A-dec Inc, Inspire 591 Full Treatment Console 42 in, (JSN D0670, QTY=28)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications recommended by the manufacturer for proper installation and performance of products, for the intended building construction and utilities; 2) coordination required to perform the modifications.
      1) A-dec, Inc
      2) Midmark Corp
   c. Configuration and Features
      1) Dimensions: 88" H (30" countertop H) x 22" D x 42" W.
      2) Quiet soft-close drawers and doors.
      3) Task lighting matches color temperature of the LED dental light.
      4) Easy-reach dispensers for cups, towels, masks, and gloves.
      5) Sink modules include hands-free soap dispensing, foot-activated faucet, trash drop.
      6) Drawer modules with intuitive and self-tailored bin system.
      7) USA and Canada UL approved power panels with hospital-grade GFCI tamper resistant outlets.
      8) O2 and N2O flowmeters for closed operatories.
      9) USB port and cord drops for easy cable management.
   d. Utility Requirements
      1) Air: 80-125 psi (550 to 860 KPa), 2.5 scfm (71 sL/min) minimum, during normal use (7.5 scfm [210 sL/min] peak intermittent flow). Flush lines prior to making connections to dental equipment.
      2) Water: 60 ± 20 psi (410 ±140 KPa), 1.5 gpm (5.7 L/min) minimum, not to exceed 40°C (104°F). Flush lines prior to making connections to dental equipment.
      3) Central Vacuum: Wet Systems, 10 ± 2 inches of Hg (34 ± 7 KPa) and 9 scfm (255 sL/min) minimum; Dry/Semi-dry Systems, 4.5 ± 1 inches of Hg (16 ± 3.5 KPa) and 12 scfm (340 sL/min) minimum.
      4) Electrical: Make connection to junction box using 1/2" (13 mm) flexible conduit as needed. Wire box per code.
      5) Gravity Drain: Basket strainer connects to 1-1/4" or 1-1/2" flanged tailpiece.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2. Central Console
   a. Basis-of-Design: A-dec Inc, 5543 Central Console, (JSN D0675, QTY=11)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
      1) A-dec Inc.
      2) Midmark Corp
   c. Configuration and Features
      1) Door windows with 3/8" tempered glass.
      2) Adjustable glass shelves.
      3) Pass-through X-Ray mount
      4) Programmable clock/timer.
      5) Soft-white, fluorescent task light, 120V.
      6) Pretreated steel reinforcement in X-ray column.
      7) Built-in electrical outlets, 120V only.
      8) Stack switch with one on/off control for task lighting and two on/off controls for accessories.
      9) Routing channels for cord drop/cable management.
      10) ICV vacuum line cleaning system.
      11) Dimensions: 24" W x 88.37" H x 113" D.
      12) Weight: 1800 lb (816.47 kg).
      13) Sink and cabinet will be split, and sink mounted on chase wall.
   d. Utility Requirements
      1) Standard: USA UL approved 120V wiring 20A.
      2) Electrical: 1/2" conduit and box with a hospital-grade quad receptacle or equivalent. Wired to conform to local codes. Requires 120 volts, 3-wire, 110-120 VAC, 50-60 Hz, and a 15 Amp minimum mains breaker. Electrical connections must be evaluated to IEC 60601-1 standards and national deviations.
      3) Gravity Drain: Basket strainer connects to a 1-1/4" or 1-1/2" flanged tailpiece, with a minimum slope of 1/4" per foot (21 mm per meter).
   e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.
3. Side Console
   a. Basis-of-Design: A-dec Inc, 593 Inspire Side Console, (JSN D0680.1L, QTY=26)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper

installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
1) A-dec Inc.
2) Midmark Corp

c. Configuration and Features
1) Weight: 1800 lb (816.47 kg).
2) Extra-wide drawers.
3) LED task lighting.
4) Integrated dispenser.
5) Modular power panel.
6) Foot activated faucets.
7) Quiet soft-close drawers and doors.
8) Task lighting matches color temperature of the A-dec LED dental light.
9) Easy-reach holders for cups, towels, masks, and gloves.
10) Sink modules include hands-free soap dispensing, foot-activated faucet, trash drop. Faucets to match other sink fixtures for offset drain.
11) Drawer modules with intuitive and self-tailored bin system.
12) Power panels with hospital-grade GFCI tamper-resistant outlets.
13) Robust support for mounting dental light or monitor.

d. Utility Requirements
1) Air: 80-125 psi (550 to 860 kPa), 2.5 scfm (71 sL/min) minimum, during normal use (7.5 scfm [210 sL/min] peak intermittent flow). Flush lines prior to making connections to dental equipment.
2) Water: 60 ± 20 psi (410 ±140 kPa), 1.5 gpm (5.7 L/min) minimum, not to exceed 40°C (104°F). Flush lines prior to making connections to dental equipment.
3) Electrical: Make connection to junction box using 1/2" (13 mm) flexible conduit as needed. Wire box per code.
4) Gravity drain: Basket strainer connects to 1-1/4" or 1-1/2" flanged tailpiece.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

4. Side Console
a. Basis-of-Design: A-dec Inc, 593 Inspire Side Console, (JSN D0680.2R, QTY=8)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
1) A-dec Inc.
2) Midmark Corp

c. Configuration and Features
1) Weight: 1800 lb. (816.47 kg).

2) Extra-wide drawers.
3) LED task lighting.
4) Integrated dispenser.
5) Modular power panel.
6) Foot activated faucets.
7) Quiet soft-close drawers and doors.
8) Task lighting matches color temperature of the A-dec LED dental light.
9) Easy-reach holders for cups, towels, masks, and gloves.
10) Sink modules include hands-free soap dispensing, foot-activated faucet, trash drop. Faucets to match other sink fixtures for offset drain.
11) Drawer modules with intuitive and self-tailored bin system.
12) Power panels with hospital-grade GFCI tamper-resistant outlets.
13) Robust support for mounting dental light or monitor.

d. Utility Requirements
1) Air: 80-125 psi (550 to 860 kPa), 2.5 scfm (71 sL/min) minimum, during normal use (7.5 scfm [210 sL/min] peak intermittent flow). Flush lines prior to making connections to dental equipment.
2) Water: 60 ± 20 psi (410 ±140 kPa), 1.5 gpm (5.7 L/min) minimum, not to exceed 40°C (104°F). Flush lines prior to making connections to dental equipment.
3) Electrical: Make connection to junction box using 1/2" (13 mm) flexible conduit as needed. Wire box per code.
4) Gravity drain: Basket strainer connects to 1-1/4" or 1-1/2" flanged tailpiece.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

5. Wall Mounted Dispensing Cabinet
a. Basis-of-Design: A-dec Inc, 595 Inspire Wall Mounted Dispensing Unit (56”), (JSN D0685, QTY=34)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
1) A-dec Inc
2) Midmark Corp

c. Configuration and Features
1) Wall Mounted Clinical Storage Cabinet.
2) Dual Module 56 Inch Wall Hung Upper.
3) Aluminum or Laminate Doors.
4) Dimensions: 56" W x 23" H x 13" D.

d. Utility Requirements
1) Electrical: None required.
2) Water/Spray: Not applicable.

3) Drain/Ventilation: Not applicable.
4) Air Supply: Not applicable.
5) Refer to manufacturer's documentation for required wall backing.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

6. Delivery System Chair/Console Mount
   a. Basis-of-Design: A-dec Inc, 541 12 O'clock Duo Delivery (console mount) and 500 Pro Radius Delivery System (chair mount).
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
      1) A-dec Inc.
      2) Midmark Corp
   c. Console Mount Dental Delivery System (JSN D8250.1, QTY=12)
      1) Configuration and Features
         a) Gibraltar solid surface worksurface.
         b) Optional standard or deluxe multi-function touchpad.
         c) 2-liter self-contained water system with quick-disconnect water bottle.
         d) Four handpiece position control block (three wet, one dry). Confirm final configuration with owner.
         e) Autoclavable syringe.
         f) Control center provides room to house integrated accessories.
         g) Multi-voltage intraoral light source with independent adjustable settings for up to four positions.
         h) Wet/dry foot control with chip blower/accessory button, 16' (4877 mm) tubing.
         i) Height-adjustable doctor's instrumentation.
         j) Mounting bracket.
      2) Utility Requirements
         a) Air: 1/2" (13 mm) compression fitting; Right-angle manual shutoff valve; 80-125 psi (550 to 860 kPa); 2.5 scfm (71 SL/min) minimum; Air lines must be flushed clean before connecting.
         b) Water: 1/2" (13 mm) nominal pipe compression fitting; Right-angle manual shutoff valve; 60 ± 20 psi (410 ± 140 kPa); 1.5 gpm (5.7 L/min), not to exceed 40°C (104°F); Water lines must be flushed clean before connecting; The system includes a 2-liter self-contained water system with a quick-disconnect (QD) water bottle.

c) Central Vacuum: 1" PVC pipe (1.315" OD); 10 ± 2 inches of Hg (34 ± 7 kPa); 9 scfm (255 SL/min) minimum; The vacuum system requires plumbing to terminate with a 5/8" (16 mm) O.D. tube.
d) Electrical: Requires power cables and data lines; Low voltage communication cables should be routed away from mains voltage; Refer to the Pre-Installation Guide for specific electrical specifications.

d. Chair Mount Dental Delivery System (JSN D8250, QTY=16)
1) Configuration and Features
a) Chair-mounted Radius design that rotates around the dental chair, providing full left/right conversion and compatibility with the A-dec 511 dental chair.
b) Available in Continental or Traditional configurations.
c) Arm system: Positive-positioning balanced FlexArm with air brake, enabling smooth adjustment and secure positioning.
d) Instrument holders: Accommodates up to 6 handpiece/unit attachments; standard includes five handpiece holders plus one syringe.
e) User interface: Dynamic Screen 7 (DS7) 7″ glass touchscreen.
f) Integration options: USB-powered hub, electric motors, intraoral optics, scalers, curing lights. Supports 15′ (4.5 m) USB connection.
g) Foot control: Standard wet/dry disc with optional chip-blower accessory; lever foot control option available.
h) Additional features: Timed handpiece flush, quad-voltage intraoral light, built-in water coolant vaporizer, time display, integrated workflow diagnostics and analytics.
2) Utility Requirements
a) Electrical: Requires connection to A-dec+ platform for touchscreen and diagnostics; standard facility AC power (commonly 100–240 VAC, consult spec sheet).
b) Air: Delivers dry, oil-free air required for handpieces and syringes—up to six instruments simultaneously (flow rates per clinical use). Inline or chair-mounted air regulator required. 2.50 scfm (70.80 l/min) at 80 psi (551 kPa).
c) Water: Incorporates water coolant vaporizer and self-contained water system. Requires supply line for water coolant, typically filtered and treated per manufacturer guidance. 1.50 gpm (5.68 l/min) at 40 psi (276 kPa).
d) Vacuum: Integrated with central or chair-side evacuation system; specifics depend upon operatory design. 12 cfm (339.84 l/min) at 8 inches of mercury (27 kPa).

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21

through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

7. Nitrous Oxide/Oxygen Flowmeter
   a. Basis-of-Design: Porter Instrument Company, MXR-1 Flush mount, (JSN UM752, QTY=7)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
      1) Porter Instrument Company
      2) Ohio Medical
   c. Configuration and Features
      1) Real-Time Visualization – Precision glass flow tubes allow for immediate visual confirmation of gas flow, while digital LED screen provides easy to read display.
      2) Dual Analog/Digital Operation – Device integrates both analog flow tubes for direct observation and digital display for precise readings and potential alarms.
      3) Oxygen Quick Connect – Conveniently located quick connect on the flowmeter's faceplate allows for the rapid attachment of emergency oxygen equipment.
      4) On/Off Switch – Integrated on/off switch provides quick and easy operation.
      5) Flush Button – Oxygen flush button included for immediate, high-flow delivery of oxygen when needed.
      6) Alarms – Equipped with both audible and visual alarms, enhancing safety by alerting users to abnormal conditions.
      7) Faceplate Dimensions – 12.25" W x 4.25" D x 4.50" H
      8) Weight – 22 lbs.
   d. Utility Requirements
      1) Electrical: 115 VAC, 60 Hz.
      2) Medical Gas: Requires connection to piped oxygen and nitrous oxide supply. Systems must mee the standards of the National Fire Protection Association (NFPA). Supply pressure for both oxygen and nitrous oxide should be 50 PSI.
      3) Vacuum: Requires a scavenging vacuum system to minimize staff exposure to nitrous oxide during procedures.
      4) Installation: Consult specific installation guides for detailed instructions to ensure all utility connections meet safety standards and local codes.
   e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.
8. Console Mount Dental Exam Light
   a. Basis-of-Design: A-dec Inc, A-Dec LED 574L, (JSN D6050, QTY=27)

b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
   1) A-dec Inc.
   2) Midmark Corp

c. Configuration and Features
   1) Features three intensity settings: 15,000, 25,000, and 30,000 lux.
   2) "Cure-safe" mode allows working at 23,000 lux without curing photo-initiated resins.
   3) 5000K neutral white color temperature.
   4) Light pattern features a "stadium" effect to minimize shadowing and reduce eye fatigue.
   5) Three-axis rotation (horizontal, vertical, and diagonal) and 540 degrees of horizontal rotation enable unlimited barycentric positioning.
   6) Light head offers 120 degrees of tilt and 80 degrees of diagonal adjustment for precise placement.
   7) Light focus is optimized for illumination between 16-30 inches (400-750 mm) from the oral cavity.
   8) Light includes local touchless controls (on/off sensor and mode toggle) for easy access by the dental team.
   9) Remote touchpad activation allows toggling settings and turning the light on/off without touching the head, requiring a remote touchpad.
   10) Auto on/off function automatically turns the light on and off based on the chair's position, requiring a remote touchpad.
   11) LEDs have a life expectancy of up to 40,000 hours (roughly 20 years of daily use). LED consumes 80% less power than traditional halogen lights and operates quietly without generating heat or needing a cooling fan.

d. Utility Requirements
   1) Power Supply: The A-dec LED 574L utilizes significantly less power than older halogen lights, but the total electrical needs depend on all connected components in the system.
   2) Wiring: Electrical wiring (100 - 240 VAC) must be installed by qualified professionals according to local regulations. Low voltage communication cables should be kept separate from mains wiring.
   3) Circuit Breakers: Appropriate circuit breakers are required. For non-chair-mounted A-dec LED lights, the operatory circuit breaker is used.
   4) Electrical Safety: All electrical connections should meet IEC 60601-1 standards and national deviations.
   5) Data Chase: A 2" ID conduit is needed.
   6) Wall Support: Walls supporting components like lights must meet minimum shear load and moment requirements.

7) Ventilation: The A-dec 500 LED dental light produces heat (77 BTU/hour), requiring adequate ventilation.
8) Installation: Consult specific installation guides for detailed instructions, including precautions regarding electrostatic discharge (ESD).

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

9. Ceiling Mount Dental Exam Light
   a. Basis-of-Design: A-dec Inc, A-Dec LED 576L, (JSN D6150, QTY=1)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
      1) A-dec Inc.
      2) Midmark Corp
   c. Configuration and Features
      1) Advanced articulation – Light head features a three-axis, 540° horizontal rotation for effortless positioning.
      2) Intuitive controls – Light can be operated through multiple methods including remote touchpad activation, local control and Auto On/Off.
      3) Remote touchpad activation: Clinicians can control the light's settings and power without touching the light head.
      4) Local control: A touchless on/off sensor and momentary mode toggle on the light head itself allow for control even when the touchpad is not available.
      5) Auto On/Off: Light can be configured to automatically turn on and off in sync with the dental chair's movement.
      6) High illumination and clarity: The bright LED array produces a high level of light intensity inside the oral cavity. The 5,000K color temperature provides a crisp, white light for accurate tissue diagnosis and better color matching.
      7) Light offers three distinct intensity settings to adapt to different clinical needs: 15,000 lux, 25,000 lux and 30,000 lux.
      8) LEDs have a life expectancy of up to 40,000 hours (roughly 20 years of daily use). LED consumes 80% less power than traditional halogen lights and operates quietly without generating heat or needing a cooling fan.
   d. Utility Requirements
      1) Electrical: 50-60 Hz, 100-240 VAC, 1.25 A. – Single Phase
      2) Water/Spray: Not applicable.
      3) Drain/Ventilation: Not applicable.
      4) Air Supply: Not applicable.
      5) Data Chase: A 2" ID conduit is needed.

6) Ceiling Support: Mounting structures must be designed to support a minimum static load of 70 lbs and a minimum moment of 150 ft-lb (203 Nm).
7) Installation: Consult specific installation guides for detailed instructions.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

10. Wall Mount Lead Apron Rack
    a. Basis-of-Design: Dentsply-Sirona, 662053 Apron Hanger (JSN X3150.1, QTY=21)
    b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
        1) Dentsply-Sirona
        2) Wolf X-Ray Corporation
    c. Configuration and Features
        1) Constructed of heavy-duty, epoxy-coated steel.
        2) Mounting hardware included.
    d. Utility Requirements
        1) Electrical: None required.
        2) Water/Spray: Not applicable.
        3) Drain/Ventilation: Not applicable.
        4) Air Supply: Not applicable.
    e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.
11. Dental Operating Delivery System
    a. Basis-of-Design: ASI Medical Inc, 90-2133D, (JSN D8250.4, QTY=2)
    b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
        1) ASI Medical, Inc.
        2)
    c. Configuration and Features
        1) Dimensions: 35.3" H x 21" W x 23.4" D.
        2) Weight: 126 lbs.
        3) Five (5) position stainless-steel handpiece control block with auto handpiece activation and individual handpiece pressure adjustments.
        4) Full one eighth inch thick wall aluminum chassis with durable powder coat white finish.

5) Cambria solid surface worktop.
6) High-grade easy-roll casters.
7) Adjustable height, swing-out surgical tray.
8) Two standard air high speed connections.
9) One standard air high/low speed connection.
10) One air/water syringe with quick release tip and stainless-steel needle valve flow controls with color indicator knobs.

d. Utility Requirements
1) Electrical Specification: One horsepower, 10 Amp rating with operating voltage of 120 volts/60Hz or 5Amp rating with operating voltage of 230volts/50Hz.
2) Water: The system utilizes a dual closed water bottle system for a self-contained water supply; tandem two-liter water supply with water auto fill to primary bottle.
3) Air: Air supply from an external source must be regulated to 80 PSI or below; regulated operating pressure of the compressor system up to 100 PSI.
4) Suction: Dental vacuum connection.
5) Data/Networking: USB outlets are provided for connecting devices like digital sensors.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

12. Surgical Instrument Drive System
a. Basis-of-Design: ASI Medical Inc, 90-2133D, (JSN D8560, QTY=2)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
1) ASI Medical, Inc.
2)

c. Configuration and Features
1) Dimensions: 35.3" H x 21" W x 23.4" D.
2) Weight: 126 lbs.
3) Five (5) position stainless-steel handpiece control block with auto handpiece activation and individual handpiece pressure adjustments.
4) Full one eighth inch thick wall aluminum chassis with durable powder coat white finish.
5) Cambria solid surface worktop.
6) High-grade easy-roll casters.
7) Adjustable height, swing-out surgical tray.
8) Two standard air high speed connections.
9) One standard air high/low speed connection.
10) One air/water syringe with quick release tip and stainless-steel needle valve flow controls with color indicator knobs.

d. Utility Requirements
   1) Electrical Specification: One horsepower, 10 Amp rating with operating voltage of 120 volts/60Hz or 5Amp rating with operating voltage of 230volts/50Hz.
   2) Water: The system utilizes a dual closed water bottle system for a self-contained water supply; tandem two-liter water supply with water auto fill to primary bottle.
   3) Air: Air supply from an external source must be regulated to 80 PSI or below; regulated operating pressure of the compressor system up to 100 PSI.
   4) Suction: Dental vacuum connection.
   5) Data/Networking: USB outlets are provided for connecting devices like digital sensors.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

13. Console Mount Dental Bracket with Display (JSN's D6151 QTY=29, M0506.1 QTY=24, M0506.2 QTY=5). Displays (M0506.1 and M0506.2) to be included by the bracket provider.

a. Basis-of-Design: A-dec Inc, A-dec 584 Central Console Mount w/FlexArm

b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
   1) A-dec, Inc.
   2) Midmark Corp

c. Flex-arm Mount (JSN D6151, QTY =29)
   1) Configuration and Features
      a) Flex arm movement combined with tilt and swivel mechanism.
      b) VESA compatible.
      c) Weight: 62 lbs.
      d) Accommodates any size medical grade monitor up to 20 pounds (9 kg).
      e) 80 inch (2032 mm) horizontal reach from center point.
      f) 24 inch (610 mm) dynamic height adjustment.
   2) Utility Requirements
      a) Electrical: 120 VAC, 60 Hz, Amps/Watts information may vary on what monitor is used.
      b) Water/Spray: Not applicable.
      c) Drain/Ventilation: Not applicable.
      d) Air Supply: Not applicable.

d. Monitor (JSN M0506.1, QTY 24, JSN M0506.2, QTY 5)
   1) Configuration and Features
      a) Video Monitor, 21-24 in, Flat Panel.
      b) 1,366 x 768 (HD) Resolution.

c) UL Hospital Grade Listed.
d) VESA compatible 75 x 75.
e) Smart Energy Saving.

2) Utility Requirements
a) Electrical: 120 V, 50 / 60 Hz, 29-45 W.
b) Water/Spray: Not applicable.
c) Drain/Ventilation: Not applicable.
d) Air Supply: Not applicable.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

14. Ceiling Mount Dual Head Surgical Light
a. Basis-of-Design: Medical Illumination, System Two, (JSN M7485, QTY=2)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
1) Medical Illumination
2) Stryker

c. Configuration and Features
1) 130,000 lux output.
2) Five-stage dimming & ambient light (minimally invasive) mode.
3) 4,300° K pure white illumination.
4) Near-zero radiated heat.
5) Optional HD camera.
6) Cross focus technology.
7) Ceiling Mounting Plate: Approximately 7.2 lbs. (3.3kg) to 58.2 lbs. (26.5kg).
8) Dual Central Axis: Approximately 38.3 lbs. (17.4kg).
9) Light Head assembly: Approximately 28.1 lbs. (12.8kg).
10) Power Box (Dual Light): Approximately 8.8 lbs. (4.0kg).
11) Central Axis Extension Arm lengths – Dual: 41.3” (1,050mm) / 35.4” (900mm).
12) Spring Arm length: 36.2” (920mm).
13) Light head assembly: 25.5” (648 mm) Dia. x 4.75” (120 mm) deep.

d. Utility Requirements
1) Electrical: 100 - 240 VAC 50/60 Hz – Single Phase; dual 360 watts.
2) Ambient/Operating temperature: 41°F to 104°F (-10°C to 40°C).
3) Humidity: 10% - 75% Relative Humidity.
4) Water/Spray: Not applicable.
5) Drain/Ventilation: Not applicable.
6) Air Supply: Not applicable.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21

through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

15. Dust Collector
    a. Basis-of-Design: DentalEZ Group, 85000 Portable, (JSN D0460, QTY=1)
    b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
        1) DentalEZ Group
        2) Vaniman
    c. Configuration and Features
        1) Disposable filter bags capture particulate larger than 7 microns to meet ASHRAE Test Standard 52-1-1992.
        2) A secondary cartridge micro-filter on the motor captures particulate up to 4 microns.
        3) Motor may be operated manually by the power switch or automatically by operation of the electric handpiece.
        4) Lights on the control panel indicate when the filter bag needs replacement, or the motor requires service.
        5) Automatic shutdown of the motor when the indicator light is on to prevent damage to the system.
        6) Base size: 11” W x 15 3/4” D x 16” D.
        7) 2” diameter detachable Flex Hose measures 4ft. long.
    d. Utility Requirements
        1) 120V/60HZ. 5amp standard power cord included.
        2) Water/Spray: Not applicable
        3) Drain/Ventilation: Not applicable.
        4) Air Supply: Not applicable.
    e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.
16. Intraoral X-Ray Unit, Wall Mount
    a. Basis-of-Design: Dentsply-Sirona, Heliodent Plus ((JSN X6600, QTY=17)
    b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
        1) Dentsply-Sirona
        2) Planmeca USA, Inc.
    c. Configuration and Features
        1) 0.4mm focal spot for excellent image quality
        2) Tube voltage – between 60 kV and 70 kV
        3) Tube current – 7 mA
        4) Arm length – 70 in
        5) Exposure time – 0.01 – 3.2s, incrementally adjustable

6) Total filtration – min. 2.5 mm Al equivalent at 70 kV
7) FSD (Focus-Skin Distance) – 20 cm

d. Utility Requirements
1) Electrical: 120 - 240 VAC 60 Hz – Single Phase
2) Water/Spray: Not applicable.
3) Drain/Ventilation: Not applicable.
4) Air Supply: Not applicable.
5) Refer to manufacturer's documentation for required wall backing.

e. Units are wall mounted in closed operatories and must include proper wall backing and clearance coordination with side consoles and upper wall cabinets. For open operatories, the x-ray units will mount in the Central Console and shared between the two chairs. Coordinate bracing/mounting and utilities with equipment supplier.

f. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

17. 3D Panographic X-ray System
a. Basis-of-Design: Dentsply-Sirona, ORTHOPHOS XG 3 DS, (JSN X6505, QTY=2)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
1) Dentsply-Sirona
2) Planmeca USA, Inc.

c. Configuration and Features
1) Radiation generator – Multipulse generator (max. 120 kHz).
2) X-ray tube – SR 90/15 FN.
3) Total filter – 2.5 mm AL
4) Tube voltage – 60-90 kV
5) Power consumption – 2.8 kW
6) Dimensions: 41" W x 88.50" H x 54" D.
7) Weight 120 kg (lbs. 242).

d. Utility Requirements
1) Electrical: 240 VAC 60 Hz 12 A – Single Phase
2) Water/Spray: Not applicable.
3) Drain/Ventilation: Not applicable.
4) Air Supply: Not applicable.
5) Refer to manufacturer's documentation for required wall backing.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

B. Ceiling Mounted Exam/Surgical Lights and Booms
1. Anesthesia Boom

a. Basis-of-Design: Stryker, SPS-2-T/SPS-3-BC/SFP, (JSN A1122, QTY=3)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
   1) Stryker
   2) Steris
c. Configuration and Features
   1) “No-fly” zone extends 12-inches from the mounting plate on all sides, and 16-inches up from the finished ceiling.
   2) Junction box: 7.4” X 3.5” X 3.74”.
   3) Electric Brake System.
   4) Fairfield Medical Rail Type.
   5) Top arm length: 1300 mm.
   6) Bottom arm length: 900 mm.
   7) Mid Tube Length: 150 mm.
   8) Column Tube Length: 350 mm.
   9) Weight Capacity: 282 lbs.
   10) Total Throat Used: 50%.
   11) Gas Hose Length: 14.65 ft.
   12) Stand up packaging type.
   13) Utility Configuration:
   a) Front: One (1) oxygen (O2); one (1) medical air; one (1) nitrous oxide (N2O); one (1) distribution board.
   b) Right: One (1) WAGD; one (1) 1G Blank Plate; two (2) vacuums.
   c) Back: One (1) CORP IP 4-in-1 plate; one (1) 1G blank plate; one (1) 20A/125V red duplex (2 circuits, 6 outlets).
   d) Left: one (1) 20A/125V red duplex (1 circuit, 4 outlets); one (1) vacuum; one (1) 3rd party data plate 1G.
d. Utility Requirements
   1) Refer to S-series manufacturing service module drawing for electrical circuit count.
   2) The junction box must be mounted adjacent to the med gas lines by the customer/contractor according to national and local building codes.
   3) Plumbing: install valve bridge to top of pre-install plate. All gas lines must be terminated with Stryker supplied gas risers by medical gas installer.
e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2. Dual Arm Equipment Boom
   a. Basis-of-Design: Stryker, S-Series SPS-3-C/SFP, (JSN A1122.1, QTY=3)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper

installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
1) Stryker
2) Steris

c. Configuration and Features
1) Electric brake system.
2) Fairfield medical rail type.
3) Spreader tube length: 138.5 mm.
4) Top arm length: 1000 mm.
5) Bottom arm length: 900 mm.
6) Mid tube length: 150 mm.
7) Column tube length: 450 mm.
8) Weight capacity: 266 lbs.
9) Total throat used: 62%.
10) Gas hose length: 14.88 ft.
11) Lay down packaging type.
12) Shelf 1: 515 mm.
13) Shelf 2: 750 mm w/controls.
14) Shelf 3: 515 mm.
15) Utility Configuration:
a) Font: Two (2) 20A/125V red duplex (2 circuits, 6 outlets) one (1) distribution board; one (1) COR IP MNA plate.
b) Right: One (1) Nitrogen regulator; two (2) 1G blank plates; one (1) 20A/125A red duplex (2 circuits, 6 outlets).
c) Back: One (1) 20A/125V red duplex (1 circuit, 4 outlets); one (1) COR IP SDI plate; one (1) COR IP 4-in-1 plate; two (2) vacuums.
d) Left: Two (2) 1G blank plates; one (1) carbon dioxide (CO_2); one (1) COR IP 4K HDMI; one (1) 20A/125V red duplex (1 circuit, 4 outlets).

d. Utility Requirements
1) Refer to S-series manufacturing service module drawing for electrical circuit count.
2) The junction box must be mounted adjacent to the med gas lines by the customer/contractor according to national and local building codes.
3) Plumbing: install valve bridge to top of pre-install plate. All gas lines must be terminated with Stryker supplied gas risers by medical gas installer.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

3. Surgical Light, Single
a. Basis-of-Design: Stryker, Surgical Light, SLX628, Flat, UDM, Video Power Arm, (JSN M7485, QTY=3)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper

installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
1) Stryker
2) Steris

c. Configuration and Features
1) Single common plate mounting type.
2) Ceiling cover: CB 6425004 590x214 TD 125mm_310mm_cable on top.
3) Tube length: 230.
4) Electronics in SK box.
5) Wall control.
6) StrykeCam HD.
7) Central endo lite.
8) Wall control mounted (recessed).
9) Sterile control + (sterilizable) light handle.
10) Device control.
11) First configuration.
12) Above ceiling or surface mount SK box.
13) Arm 1 (MP1); Arm 2 (MP2); Arm 3 (MP3).
14) MP1 Horizontal arm: 1400 mm.
15) MP1 HCT length: 200 mm.
16) MP1 Two circuits.
17) MP1 Isolated hospital power.
18) MP1 Stryker provided cables-COR IP.
19) MP2 Equipment: Oculan.
20) MP2 Horizontal arm: 1200 mm.
21) MP2: Classic cardanic.
22) MP2 Main voltage: 120VAC.
23) MP3 Equipment: First monitor UDM (19"-32").
24) MP3 Horizontal arm: 1100 mm.
25) MP3: StrykerUDM Video Bundle.

d. Utility Requirements
1) 120VAC; 60Hz; 2A.
2) 50-104°F operating temperature.
3) Water/Spray: Not applicable.
4) Drain/Ventilation: Not applicable.
5) Air Supply: Not applicable.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

4. Surgical Video Integration System
a. Basis-of-Design: Stryker, COR Lite, (JSN U8600, QTY=4)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.

1) Stryker
2) Steris

c. Configuration and Features
1) All-in-one HD digital video routing system supports all video standards and resolutions including 1080P and 4k.
2) Compatible with Stryker Connected OR IP and iSuite ecosystems, enabling centralized control of video routing and OR device integration via touchscreen interfaces.
3) May include Connected OR Hub functions: high-resolution recording up to 4K, export/edit/playback of surgical video (including DICOM compatibility), video editing/telestration, automatic smoke detection, and media export to PACS.
4) Should offer seamless integration with Stryker camera systems such as 1288 HD, 1588 AIM, or 1688/3-Chip HD cameras, as well as xenon or LED light sources (e.g., X8000, L9000).
5) Typically, rack mounted in OR video equipment rack; may include removable panels, cable management, labeling and internal UPS or surge protection support.

d. Utility Requirements
1) Twelve (12) electrical receptacles within the equipment rack.
2) Three (3) dedicated 20 A electrical circuits (each quad-outlet group on a separate 20 A circuit).
3) Electrical outlets (and associated data/network ports) must be located within 4 ft (1.2 m) of the video rack in each OR.
4) All circuit installations must comply with local building codes and IBC requirements.
5) Uninterruptible Power Supply (UPS) must be installed for at least one of the 20 A circuits to protect critical video functions.
6) If power strips are not permitted by local code, consult your Stryker Project Manager for allowable receptacle arrangements.
7) Rack must be connected to the facility's earth ground using 8 AWG grounding conductor.
8) Water/Spray: Not applicable.
9) Drain/Ventilation: Not applicable.
10) Air Supply: Not applicable.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

5. Exam/Procedure Light, Single
a. Basis-of-Design: Stryker, Sirca, (Exam and Procedure Rooms, JSN M7405, QTY=36)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.

1) Stryker
2) Steris

c. Configuration and Features
1) 80,000 lux illumination level.
2) Color rendering index: 96. 4900K color diameter.
3) 18 cm field size diameter.
4) 180 cm depth of field.
5) 270° rotation.
6) 5 levels of intensity control.
7) Weight: 12.34 lb (5.60 kg).

d. Utility Requirements
1) One (1) - 120 VAC, 20-amp (min) circuit to be hardwired by contractor during supplier installation.
2) Conduit must be brought to a J-box in the light system.
3) Power run and conduit must be structurally supported independently from the light system.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

6. Surgical Light, Dual (ED Trauma, JSN M7485, QTY=2)
a. Basis-of-Design: Stryker, Accend Dual Flat, (JSN M7485, QTY=2)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
1) Stryker
2) Steris

c. Configuration and Features
1) L/L Classic 1050/925mm.
2) Single common plate mounted.
3) Tube length: 250 mm.
4) Surface Mount wall control.
5) Sterilizable handle.
6) MP1 Equipment: Accend light head.
7) MP1 Arm length: 1050 mm.
8) MP1 Classic cardanic.
9) MP2 Equipment: Accend light head.
10) MP2 Arm length: 925 mm.
11) MP2 Classic cardanic.

d. Utility Requirements
1) One (1) 100v/240v uninterrupted grounded isolated hospital power in one (1) single gang, 2" x 4" junction box within 18" of center of Stryker supplied mounting plate.
2) Customer to supply additional conduit and wiring from J-box to tube mounted (Stryker supplied) power supply.

3) The contractor / electrician to hardwire equipment electrical whips during supplier installation.
4) Water/Spray: Not applicable.
5) Drain/Ventilation: Not applicable.
6) Air Supply: Not applicable.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

C. Ceiling Mount Gait Therapy Lift System

1. Single Rail

a. Basis-of-Design: Aretech, ZeroG, (JSN U0014 QTY=1)

b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.

1) Aretech
2) Gorbel

c. Configuration and Features

1) Patented unloading system.
2) Motorized trolley.
3) Patient Reports.
4) Wireless Interface.
5) Static weight support: 0 – 300 lbs.
6) Dynamic weight support: 0 – 150 lbs.
7) Reference drawings for track length.

d. Utility Requirements

1) Main Electronics Box, wall mounted near the star of the track: 208–230 VAC, 20 Amp, 50/60 Hz, single-phase dedicated circuit (cannot share a neutral line).
2) User Interface Computer: 100-120 Vac, 10 Amp, 50/60 Hz.
3) Wireless Router, 100–120 Vac, 5 Amp, 50/60 Hz.
4) 1 x 208-230 VAC, 20 A dedicated line (NEMA 6-20 straight blade receptacle).
5) 2 x 120 VAC, 10 A line and 5 A line, both with NEMA 5-15R receptacles.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2. Circular Rail

a. Basis-of-Design: Aretech, ZeroG, (JSN U0014 QTY=1)

b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper

installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
1) Aretech
2) Gorbel

c. Configuration and Features
1) Patented unloading system.
2) Motorized trolley.
3) Patient Reports.
4) Wireless Interface.
5) Static weight support: 0 – 300 lbs.
6) Dynamic weight support: 0 – 150 lbs.
7) Reference drawings for track length.

d. Utility Requirements
1) Main Electronics Box, wall mounted near the star of the track: 208–230 VAC, 20 Amp, 50/60 Hz, single-phase dedicated circuit (cannot share a neutral line).
2) User Interface Computer: 100-120 Vac, 10 Amp, 50/60 Hz.
3) Wireless Router, 100–120 Vac, 5 Amp, 50/60 Hz.
4) 1 x 208-230 VAC, 20 A dedicated line (NEMA 6-20 straight blade receptacle).
5) 2 x 120 VAC, 10 A line and 5 A line, both with NEMA 5-15R receptacles.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

D. Audiometric Sound Booth
1. Basis-of-Design: IAC Acoustics, 40A-10 Single Wall Audiometric Chamber, (JSN M0041, QTY=1)
2. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
a. IAC Acoustics
b. ETS-Lindgren
3. Configuration and Features
a. Standard 30” x 24” viewing window.
b. Instrument connection panel with two 2” cable pull through services.
c. LED lighting with fan ventilation service.
d. Standard STC-61 Door (36” clear opening)
e. 6” step-up isolation floor with pad and carpet finish.
f. Outside dimensions: 106” W x 112” D x 85” H
g. Inside dimensions: 98” W x 104” D x 78” H
h. Weight: 2416 kg (5327 lb).
4. Utility Requirements
a. Electrical: 120-240 VAC, 60 Hz.

b. Water/Spray: Not applicable.
c. Ventilation: A further 370mm should be added to the height of booth for booth's roof ventilation system. Confirmation of ceiling height required.
d. Air Supply: Not applicable.

5. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

E. Moving High Density Shelving (JSN A1145, QTY=6 units)
1. Basis-of-Design: Spacesaver Corporation, Wheelhouse (Mechanical Assist), (JSN A1145, QTY=6 units, see drawings at each location for configurations.)
2. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
   a. Spacesaver Corporation
   b. InterMetro Industries
3. Configuration and Features
   a. Low-Profile High-Density Mobile Shelving, Mechanical-Assist (MA) operation; compact rail-mounted carriages allowing high-density storage with minimal effort.
   b. Operation Mode: Mechanical-assist using an ergonomic three-spoke revolving handle that can move 4,000–10,000 lb carriage loads with very low force; includes anti-drift brake and color-coded safety pin.
   c. Low-profile chassis design: Wheels encased so shelving rides only ~4¼ in above rail, enabling lower profile and increased capacity/integration flexibility.
   d. Shelving types: Accepts 4-post or case-type shelving. 4-post standard widths 24–72 in, depths 12–36 in; case-type widths 24–48 in, depths 12–36 in.
   e. Length & Height flexibility: Carriages available up to 24 ft on level rail and up to 20 ft on unleveled rail. Heights configurable in 1½ in increments up to ~10 ft.
   f. ADA compliant and safety features: Includes anti-tip rails, safety sweep, aisle-entry/photo-sweep sensors, waist-high locks, hub locks, optional PIN-controlled access and audit trail when combined with TUSC® platform.
   g. Sustainability & construction: Made in USA from up to 25% recycled steel, with durable powder coat finishes. Modular and weld-free interlocking components for easy reconfiguration and relocation.
4. Utility Requirements
   a. Electrical: Not required for mechanical-assist model; no power or data connections needed.
   b. Water/Spray: Not applicable.
   c. Drain/Ventilation: Not applicable.
   d. Air Supply: Not applicable.

5. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

F. Louvered Wall Panels for Storage Bin Mounting
1. 36”W x 61”H Panel
   a. Basis-of-Design: Endoscope Services & Products Inc, ESP 16 Gauge Steel Louvered Wall Panel, 36”W x 61”H, (JSN UT020.36, QTY=121)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
      1) Endoscope Services & Products Inc
      2) Quantum Storage Systems
   c. Configuration and Features
      1) 36”W x 61”H 16-gauge steel wall panel for bin storage with gray enamel finish
   d. Utility Requirements
      1) Electrical: Not applicable.
      2) Water/Spray: Not applicable.
      3) Drain/Ventilation: Not applicable.
      4) Air Supply: Not applicable.
   e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.
2. 18”W x 61”H Panel
   a. Basis-of-Design: Endoscope Services & Products Inc, ESP 16 Gauge Steel Louvered Wall Panel, 18”W x 61”H, (JSN UT020.18 QTY=3)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
      1) Endoscope Services & Products Inc
      2) Quantum Storage Systems
   c. Configuration and Features
      1) 18”W x 61”H 16-gauge steel wall panel for bin storage with gray enamel finish
   d. Utility Requirements
      1) Electrical: Not applicable.
      2) Water/Spray: Not applicable.
      3) Drain/Ventilation: Not applicable.
      4) Air Supply: Not applicable.
   e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21

through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

3. 36”W x 19”H Panel
   a. Basis-of-Design: Endoscope Services & Products Inc, ESP 16 Gauge Steel Louvered Wall Panel, 36”W x 19”H, (JSN UT020.3619 QTY=2)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
      1) Endoscope Services & Products Inc
      2) Quantum Storage Systems
   c. Configuration and Features
      1) 36”W x 19”H 16-gauge steel wall panel for bin storage with gray enamel finish
   d. Utility Requirements
      1) Electrical: Not applicable.
      2) Water/Spray: Not applicable.
      3) Drain/Ventilation: Not applicable.
      4) Air Supply: Not applicable.

G. Hanging Wire Baskets for Louvered Panels
   1. 18”D x 36”W Basket
      a. Basis-of-Design: Endoscope Services & Products Inc, ESP Chrome Hanging Wire Baskets, 18”D x 36”W, (JSN UT018.1836 QTY=194)
      b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
         1) Endoscope Services & Products Inc
         2) Quantum Storage Systems
      c. Configuration and Features
         1) 18”D x 36”W hanging wire basket to be used in conjunction with louvered wall panels.
         2) Chrome finish
         3) Refer to manufacturer’s drawings for specific basket/louvered panel configuration.
      d. Utility Requirements
         1) Electrical: Not applicable.
         2) Water/Spray: Not applicable.
         3) Drain/Ventilation: Not applicable.
         4) Air Supply: Not applicable.
      e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2. 18”D x 18”W Basket
   a. Basis-of-Design: Endoscope Services & Products Inc, ESP Chrome Hanging Wire Baskets, 18”D x 18”W, (JSN UT018.1818 QTY=21)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
      1) Endoscope Services & Products Inc
      2) Quantum Storage Systems
   c. Configuration and Features
      1) 18”D x 18”W hanging wire basket to be used in conjunction with louvered wall panels.
      2) Chrome finish
      3) Refer to manufacturer’s drawings for specific basket/louvered panel configuration.
   d. Utility Requirements
      1) Electrical: Not applicable.
      2) Water/Spray: Not applicable.
      3) Drain/Ventilation: Not applicable.
      4) Air Supply: Not applicable.
   e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.
3. 12”D x 36”W Basket
   a. Basis-of-Design: Endoscope Services & Products Inc, ESP Chrome Hanging Wire Baskets, 12”D x 36”W, (JSN UT018.1236 QTY=330)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
      1) Endoscope Services & Products Inc
      2) Quantum Storage Systems
   c. Configuration and Features
      1) 12”D x 36”W hanging wire basket to be used in conjunction with louvered wall panels.
      2) Chrome finish
      3) Refer to manufacturer’s drawings for specific basket/louvered panel configuration.
   d. Utility Requirements
      1) Electrical: Not applicable.
      2) Water/Spray: Not applicable.
      3) Drain/Ventilation: Not applicable.
      4) Air Supply: Not applicable.
   e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21

through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

4. 12”D x 18”W Basket
   a. Basis-of-Design: Endoscope Services & Products Inc, ESP Chrome Hanging Wire Baskets, 12”D x 18”W, (JSN UT018.1218 QTY=74)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
      1) Endoscope Services & Products Inc
      2) Quantum Storage Systems
   c. Configuration and Features
      1) 12”D x 18”W hanging wire basket to be used in conjunction with louvered wall panels.
      2) Chrome finish
      3) Refer to manufacturer’s drawings for specific basket/louvered panel configuration.
   d. Utility Requirements
      1) Electrical: Not applicable.
      2) Water/Spray: Not applicable.
      3) Drain/Ventilation: Not applicable.
      4) Air Supply: Not applicable.
   e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.
5. 12”D x 18”W Corner Basket
   a. Basis-of-Design: Endoscope Services & Products Inc, ESP Chrome Hanging Wire Corner Basket, 12”D x 18”W, (JSN UT018.C, QTY=45)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
      1) Endoscope Services & Products Inc
      2) Quantum Storage Systems
   c. Configuration and Features
      1) 12”D x 18”W hanging wire corner basket to be used in conjunction with louvered wall panels.
      2) Chrome finish
      3) Refer to manufacturer’s drawings for specific basket/louvered panel configuration.
   d. Utility Requirements
      1) Electrical: Not applicable.
      2) Water/Spray: Not applicable.
      3) Drain/Ventilation: Not applicable.
      4) Air Supply: Not applicable.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

H. Bio Safety Cabinet
1. Class II, Type A2, Floor
a. Basis-of-Design: Labconco Bio Safety Cabinet, Class II, Type A2, Floor, Purifier Logic 4ft 30248 series (JSN L2335, QTY=1 unit)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
1) Labconco
2) NuAire, Inc.
c. Configuration and Features
1) 4’ Nominal sash width
2) Fully-closing, clear ¼” tempered safety glass sash
3) 8” sash opening
4) Dimensions: 54.3” w x 31.2” d x 89.2-95.5”h
5) Base Stand included.
6) Include Ventus Canopy Connection Kit for 4’ cabinet, 10” ID exhaust connection.
7) Two (2) electrical duplex receptacles, flush-mounted stainless steel with dampened hinges, one outlet each side with ground fault interruption
8) Compliance: ETL and NSF listed, ISO 5 conditions per ISO 14644-1 and 1
9) Supply and exhaust 99.99% efficient HEPA filters
d. Utility Requirements
1) Electrical: 115V, 60Hz, 12A
2) Water/Spray: Not applicable.
3) Drain/Ventilation: Not applicable.
4) Exhausted Duct: Exhaust Volume 319-396 CFM with canopy kit
e. Certifications
1) Unit must be certified by a third party prior to use to NSF 49 standard.
2. Class II, Type C1, Floor
a. Basis-of-Design: Labconco Bio Safety Cabinet, Class II, Type C1, Floor, 4’ Purifier Axiom, (JSN L2325, QTY=1 unit)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.

1) Labconco
2) NuAire, Inc.

c. Configuration and Features
1) Nominal air inflow velocity of 105 fpm.
2) NSF listed, modified ASHRAE 110 compliant.
3) 10” diameter stainless steel air-tight manual damper required.
4) Must include non-welded telescoping base stand.
5) Two electrical duplex receptacles, one on each side
6) Supply and exhaust 99.99+% efficient HEPA filters
7) 10” sash opening.
8) Dimensions: 54.2” w x32.7” d x 64.2” h

I. Appliances

All cooking appliances designated for permanent installation must meet IMC Chapter 9 Section 917 codes.

1. Undercounter Domestic Dishwasher
a. Basis-of-Design: Frigidaire, FGID2476S Gallery Stainless Steel 24” Dishwasher, (JSN K2515 QTY=2)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
1) Frigidaire
2) GE Appliances
c. Configuration and Features
1) Stainless-steel interior to enhance performance and extend life.
2) 24-hour delay start.
3) Ready to use dish alert with visual LED indicator.
4) 5 wash levels.
d. Utility Requirements
1) Voltage Rating - 120V / 60 Hz/ 15 A
2) Water Pressure – Hot water line to dishwasher must provide between 20 – 120 PSI with at least 120° F water temperature.
3) Wiring: Use 2-wire with ground wiring rated for 75°C (167°F).
4) Electrical and water supplies should enter cabinet opening on floor or through back or sidewalls.
5) Connections preferably located toward left side of the dishwasher. Do not cross drain, water or electrical lines in front of motor, blower or frame.
e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2. ADA Domestic Dishwasher
a. Basis-of-Design: GE Appliances, GLDT696JSS Stainless Steel Built-In Dishwasher with Hidden Controls, (JSN K2516, QTY=1)
b. Products of the following manufacturers are acceptable provided they meet

the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.

1) GE Appliances
2) Frigidaire

c. Configuration and Features
   1) Bright annealed stainless-steel interior.
   2) Low profile installation capable.
   3) 2-digit countdown display with 1–24-hour Delay Start.
   4) Audible end-of-cycle signal.
   5) 5 wash levels.
   6) Weight: 82 lbs.

d. Utility Requirements
   1) Dedicated Circuit: The dishwasher requires a dedicated 120-volt, 60Hz, AC-only, 15-ampere or 20-ampere electrical supply circuit.
   2) Grounding: The appliance must be properly grounded to a permanent wiring system or have an equipment-grounding conductor run with the circuit conductors.
   3) Wiring: Use 2-wire with ground wiring rated for 75°C (167°F).
   4) Circuit Protection: The circuit needs protection from a circuit breaker or time-delay fuse.
   5) Power Cord: If using a power cord, use a GE Appliances kit WX09X70910 (5.4 ft) or WX09X70911 (7.9 ft).
   6) Electrical Connection Location: The electrical connection is on the right side of the dishwasher. Drain Hose Length: Should not exceed 12 feet in length for proper drainage.
   7) Drain Connection Height: The drain connection height cannot exceed 72" above the bottom of the dishwasher.
   8) Hot water line: Supply line with a minimum diameter of 3/8".
   9) Water Temperature: Ensure the water entering the dishwasher is between 120°F and 140°F (49°C and 60°C) for optimal cleaning performance and to prevent damage.
   10) Water Pressure: The hot water supply line pressure must be between 20 PSI and 120 PSI.
   11) Connection Point: The water connection is on the left side of the dishwasher.
   12) Shutoff Valve: Install a hand shut-off valve in an accessible location, like under the sink, according to Lowe's. While optional in some areas, it is strongly recommended and may be required by local codes.
   13) Flushing the Line: Flush the water line to remove any debris before connecting the dishwasher.
   14) Flexible Hoses: If using a flexible braided hose, label it with the installation date and plan to replace it, along with any elbows and gaskets, every 5 years.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21

through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

3. Ice Dispenser, Countertop, Nugget, w/Filters.
   a. Basis-of-Design: Follett Corporation, Symphony Plus 50CI425W-S, (JSN R4700, UK014, QTY=50 each)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications. All installations are to include the mounted manufacturer recommended water filter and a spare filter.
      1) Follet Corporation
      2) Hoshizaki America Inc.
   c. Configuration and Features
      1) 50 lb. (11.4 or 22.7 kg) ice storage capacity.
      2) Dimensions: 21” W x 40” H x 24” D.
      3) Service clearance: 12” top.
      4) Counter-height removable air- or water-cooled ice machine.
      5) Automatic self-flushing.
      6) Manufacturer recommended filters included one (1) spare. Filter mounting location to be coordinated with Division 22 plumbing requirements and mounted in a suitable/accessible location.
   d. Utility Requirements
      1) 115 V/60/1 electrical: 11 amps, 0.8 kW 7' (2.1 m) cord, NEMA 5-15 90º hospital-grade plug.
      2) Drain: 3/4" MPT.
      3) Potable water inlet: 3/8" FPT.
      4) Condenser drain: 3/8" FPT.
      5) Condenser inlet: 3/8" FPT.
      6) Water flow requirements: 0.25 gpm at 50 F; 0.5 gpm at 70 F; 1.25 gpm at 90 F.
      7) Condenser water pressure: 10 - 125 psi (69 - 861 kpa).
   e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.
4. Electric Range
   a. Basis-of-Design: Frigidaire, FCRE3052AS (30 in./ Stainless Steel), (JSN K4500, QTY=2, only unit located in the Demo Kitchen will be connected to utilities. The unit located in the Rehab Daily Living Skills will not be connected to utilities.)
   b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.

1) Frigidaire
2) Whirlpool Corporation

c. Configuration and Features
1) Features: 5.3 total capacity.
2) Black metal with stainless steel overlay.
3) Four adjustable leveling legs and porcelain cooktop with center keep warm zone.
4) Storage Drawer.
5) UL Agency Approval.

d. Utility Requirements
1) Connected Load (kW Rating) 120V 11.5 / 8.5.
2) Minimum Circuit Required (Amps) 40A.
3) Voltage Rating 240V / 208V 60Hz.

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

5. Drill Press, Floor
a. Basis-of-Design: Dayton 4CY86, (JSN T0285, QTY=1)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
1) Dayton
2) Jet Equipment

c. Configuration and Features
1) Dimensions: 62" H x 13 3/4" W x 23 1/4" D.
2) 10 ½” x10 ½” table work surface.
3) 5/8” Cast Iron Capacity.
4) Spindle Travel 3 ¼”.
5) Floor mount (anchored)

d. Utility Requirements
1) Voltage: 110V/60HZ.
2) Ducted exhaust

e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

6. Grinder, Bench, W/Stand
a. Basis-of-Design: Jet JBG-8A/JPS-2A, (JSN T0400, QTY=1)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
1) Jet Equipment
2) Dayton

3) Westward
c. Configuration and Features
1) Dimensions: 12 ½”H x 19" W x 10” D.
2) Wheel Size 8” x 1” x 5/8”.
3) Motor 1HP, 120V, 1PH.
4) Motor RPM 3450.
5) Includes Pedestal, floor mounted (anchored)
d. Utility Requirements
1) Voltage: 110V/60HZ.
e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.
7. Range Hood, Exhaust, Vented
a. Basis-of-Design: ZLINE Kitchen and Bath, GL2i-RD-48, (JSN K3400, QTY=1)
b. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
1) ZLINE Kitchen and Bath
2) GE Appliances
c. Configuration and Features
1) Dimensions: 5 1/2" H x 48" W x 23 3/4" D.
2) 48" wide island mount range hood.
3) Built-in LED lighting.
4) 4-Speed Remote 700 CFM blower.
5) 2 telescoping chimneys (19" ea.).
6) Can be plugged in or hardwired.
d. Utility Requirements
1) Voltage: 110V/60HZ.
2) Ducted exhaust
e. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

J. Trash Compactor
1. Basis-of-Design: Wastecare Corporation (JSN M2200, QTY=2)
2. Refer to Specifications Sections **118201** – Hydraulic Cart Tipper, and **118226** – Facility Waste Compactors.
3. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

K. Compressor, Air, General
1. Basis-of-Design: Grainger, SpeedAire 4ME98 Air Compressor (JSN T9000,

QTY=1)

2. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
   a. Grainger
   b. Gast Manufacturing
3. Configuration and Features
   a. 60-gallon capacity
   b. Cast Iron Cylinder
   c. 135 psi Maximum Operating Pressure
   d. Maximum Speed: 950 PRM
   e. Floor Mount (Anchored)
4. Utility Requirements
   a. Electrical: Three Phase, 5 HP, 208-240V AC; 480V AC, 60 Hz
   b. Requires isolation mounting pads.
   c. Piped hose connections
5. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

L. Reel, Combo, Power Cord/Air House (Ceiling Mount)
1. Basis-of-Design: Coxreels C Series Combination Electric Cord/Air Hose CL350-5012-B (JSN UT901, QTY=2)
2. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
   a. Coxreels
   b. Campbell Hausfeld
3. Configuration and Features
   a. Reel Dimensions 16” W x 18 5/8”H x 17”D.
   b. Quad “4 Plug” industrial receptacle.
   c. Cord/Hose Length 50’
   d. Cord type SJO.
   e. Cord Amps 20A.
   f. Max hose O.D 5/8”
   g. 300PSI Max hose pressure
   h. Coordinate ceiling mount location with compressed air line drawings.
4. Utility Requirements
   a. Electrical: 120V
   b. Piped hose connections to air compressor
5. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any

deviations from these utilities must be documented within bid and shop drawing submittals.

M. Table, Changing, Infant, Wall Mount
   1. Basis-of-Design: Koala Kare Products (JSN A4995, QTY=35)
   2. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intended building construction and utilities; 2) coordination required to perform the modifications.
      a. Koala Kare Products
      b. American Specialties Inc. (ASI)
   3. Configuration and Features
      a. Polypropylene construction
      b. Unibody steel chassis
      c. Dimensions 35 15/16” L x 20 ¾” W x 4” D.
      d. Built-in liner dispenser.
   4. Utility Requirements
      a. Electrical: None
   5. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.2 OFCI MEDICAL EQUIPMENT

A. Provide structural support, wall backing, and utility connections and coordination as needed.

B. Summarized equipment schedule. Refer to Medical Equipment Schedule for equipment details.

JSN	Description	Qty
U0771	Accessory Bracket, Channel Mounting	4
UT701	Accessory Bracket, Channel Mounting	6
UT021	Bin, Storage, Wall Mounted	1
U5231	Box, Emergency	18
M1803	Bracket, Computer Workstation, Wall	64
U5226	Bracket, Monitor, Wall	84
U5227	Bracket, Monitor, Wall, Flat Panel	5
U8260	Bracket, Patient Transfer Board	10
U5232	Cabinet, Storage, Clinical, Defibrillator	17
K1552.3	Coffee Maker, Single Cup	11
X6240	CT Scanner, Multi-Slice, Large Bore	1
X9915	Detector, Ferromagnetic, MRI	1
UK022	Dispenser, Beverage, Iced Tea Brewer	2
UA001	Dispenser, Cleaning Solution	40
UK029	Dispenser, Cleaning Solution	3

A5079	Dispenser, Disinfectant Wipes, Wall Mount	34
A5093	Dispenser, Emesis Bag, Wall Mount	48
A5107	Dispenser, Glove, Quadruple Box	297
A5077	Dispenser, Hand Sanitizer, Wall Mount	767
A5077	Dispenser, Hand Sanitizer, Wall Mount	6
A5077.1	Dispenser, Hand Sanitizer, Wall Mount	2
U0037	Dispenser, Lint Free Paper Towel	2
U5107	Dispenser, Mask	26
UM420	Dispenser, Otoscope Tips, Wall Mount	10
U5081	Dispenser, Paper Towel, Ligature-Resistant	10
A5094	Dispenser, Personal Protection, Wall Mount	2
U5070	Dispenser, Scrub Brush	6
U5074	Dispenser, Soap, Ligature-Resistant	10
A5070	Dispenser, Soap, Wall Mounted	644
A5070	Dispenser, Soap, Wall Mounted	6
A5082	Dispenser, Paper Towel, Sensor, Hands Free	611
M2400.1	Dryer, Laundry, Commercial	1
UG113	Exerciser, Functional Trainer, Wall Mount	1
M5562	Eye, Chart, Visual Acuity, Wall, Digital	11
A5150	Hook, Compression Wrap, Wall Mount	1
X6196.1	Injector, Contrast Media, Ceiling Mount	1
X6196.2	Injector, Contrast Media, MR Conditional	1
M8541	Microscope, ENT, Wall Mount	2
M8541.3	Microscope, Operating, Endodontic	2
X9905	MRI Unit, 1.5T	1
M4200.1	Oto/Ophthalmoscope, Specula Dispenser, Thermometer	33
M4200.2	Oto/Ophthalmoscope, Diagnostic System, Integrated	27
M4200.3	Oto/Ophthalmoscope, Diagnostic System, Integrated	3
M4200.4	Oto/Ophthalmoscope, Set, Wall Mount	27
M4100.1	Oto/Ophthalmoscope, Diagnostic System, Integrated, w/Monitoring	91
M8275	Pulley System, Dual Column, Duplex, Wall Mount	1
X3150	Rack, Apron/Glove, Wall Mount	7
A5125	Rack, Crutch/Cane/Walker	3
U8190	Rack, Drying, Glassware, Wall Mount	1
UG122	Rack, Exercise Ball, Wall	2
UG122	Rack, Exercise Ball, Wall	1
UG122.2	Rack, Exercise Ball, Wall	4
UG117	Rack, Mat, Wall Mount	4
A5135	Rack, Mops/Brooms	40
A5111	Sharps, Disposal, Wall Mount	336
M4100	Sphygmomanometer, Aneroid, Wall Mount	1
M4050	Stadiometer, Wall Mount	7
M7900	Thermometer, Digital, Wall Mount	10
M2300	Washer, Laundry, Commercial	2
A5103	Waste Can, Pharmaceutical	17

S9765	Waste Disposal, Surgical Fluid Disposal	2
L2000	Water Treatment System, RO/DI, Countertop	1
L2000.1	Water Treatment System, Endoscope Reprocessor	1
X5900	X-Ray Unit, General Radiography, Digital	1
X5430	X-Ray Unit, Mammography, Digital	1
X6185	X-Ray Unit, Rad/Fluoro, Digital	1

2.3 OFOI MEDICAL EQUIPMENT

A. Refer to Medical Equipment Schedule of OFOI equipment.

2.4 EQUIPMENT ANCHORING AND SUPPORTS

A. Refer to Section 055000 "Metal Fabrications", and structural Drawings, for equipment supports fabrication and anchoring requirements.

2.5 UTILITY SERVICE CONNECTIONS AND REQUIREMENTS

A. Comply with equipment manufacturer's requirements and as specified in Division 22, Plumbing; Division 23, Heating, Ventilating, and Air Conditioning; Division 26, Electrical; Division 27, Communications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for healthcare installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for healthcare equipment piping to verify actual locations of piping connections before equipment installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Equipment Installation: Install healthcare equipment in accordance with manufacturer's printed instructions, as shown on the Drawings and Equipment Anchorage Schedule, as detailed in the shop drawings, and as specified in Division 13 Section "Seismic Control Assemblies".

B. Comply with requirements of Division 22, Plumbing for plumbing methods and connections.

C. Comply with requirements of Division 26, Electrical, and Division 27, Communications, for wiring methods for electrical and data communications connections.

D. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

E. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

3.3 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
   1. Equipment anchorage.
   2. Seismic restraints installation.
   3. Medical gas installation.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

3.4 ADJUSTING

A. Adjust moving parts to function smoothly and lubricate as recommended by manufacturer.

END OF SECTION

SECTION 117100 - MEDICAL STERILIZING EQUIPMENT

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes medical sterilizing, instrument washing equipment, and scrub/wash sinks.

B. Related Requirements:
   1. Division 01 - Sustainable Design Requirements.
   2. Final connections to services are specified in Divisions 21 through 28 and indicated on the Mechanical and Electrical drawings.

1.2 ACTION SUBMITTALS

A. Shop Drawings:
   1. Submit form for pressure vessels, specified under "General Requirements for Steam Sterilizers."
   2. Submit shop drawings showing layout and details of fabrication and installation including utility connections, wiring diagrams, and motor horsepower.
   3. Utilities Verification: Utilities and connections may vary between approved manufacturers and between design data and approved shop drawings and final manufacture of equipment.
      a. All utilities for equipment are indicated in mechanical and electrical documents and are referenced in Divisions 21 through 28. Any deviations from the utilities must be documented in bid submittal and shop drawing submittals.

1.3 FIELD CONDITIONS

A. Take field measurements to verify or supplement dimensions indicated. Be responsible for accurate fit of the Work.

1.4 WARRANTY

A. Special Warranty: Warrant pressure vessels for steam sterilizers against structural failure for 15 years from the date of initial operation. Include all parts and labor.

1.5 GENERAL REQUIREMENTS FOR STEAM STERILIZERS

A. Standards
   1. The design, construction, materials, and testing shall meet the requirements of the ASME Boiler and Pressure Vessel Code, ETL Testing Laboratory listed to UL 544, Uniform Plumbing Code, and any other local building codes.
   2. All electrical and mechanical components shall comply with the requirements of Divisions 21 through 28.

B. Sterilizer Function
   1. Unit shall be a steam jacketed sterilizer suitable for the sterilization of heat- and moisture-stable instruments, supplies and utensils utilizing steam saturation as a sterilizing agent.
   2. Chamber evacuation shall be either vacuum pump or a vacuum system utilizing a condenser and water ejector.

C. Controls
1. Microprocessor controls shall be provided for all sterilizers. The control unit shall consist of a selectively programmable microcomputer that programs, monitors and controls all sterilizer operations and functions through a color touchscreen user interface. The control system shall include a 10-inch CENTRIC (GSS67N) or AVANTI (HC-E Series) display, capable of showing cycle parameters, process progression, alarms, and system status in real time.
It shall be possible to energize the entire system by a single switch. Control unit shall automatically abort, reset, and reinitialize a cycle if, during the sterilizing phase, the chamber temperature drops more than 2°C (3.6°F) below the setpoint, or in the event of power loss. The controller shall store the last cycle status and parameters in memory. In GSS67N, built-in battery backup shall maintain controller operation for a minimum of 10 seconds, and up to 1 minute in HC-E Series systems.
The control unit shall be capable of remote communication via Ethernet or serial connection. Provision shall be included for connection of the sterilizer's computer bus to external systems such as hospital network, data logging systems (e.g., T-DOC), or Getinge Online remote monitoring. Automatic controls shall include the following:
2. Status indicator of each cycle phase, with visual and/or audible alerts if chamber does not reach or drops below set sterilizing temperature, or if the door is unlocked.
3. Digital touchscreen display with graphic and numeric real-time representation of cycle status, chamber temperature, pressure, remaining time, and alarms.
4. Programmable cycle selector actuating each cycle individually. Selected cycle shall be visually displayed with name and type.
5. Programmable and password-protected cycle parameters, with locking once cycle is started.
6. Cycle counter device, non-resettable, to track accumulated cycles.
7. Main power and control switch to energize and de-energize the unit.
8. Reset / abort function to safely terminate the cycle.
9. User access levels with optional RFID login (GSS67N).
10. Multilingual display capability (English, Spanish, French as standard).
11. Network connection for process report generation in PDF format and optional USB storage.
12. Control system shall include the ability to mount display on either side or above the chamber.

D. Cycles
1. Four factory default cycles for pre vacuum, gravity, liquid, and immediate use steam sterilization (IUSS) functions.
2. AU4 Cycle Temperature Ranges:
   a. Pre-vacuum: 132.2-135 degrees C (270-275 degrees F).
   b. Gravity: 121.1-135 degrees C (250-275 degrees F).
   c. Liquid: 121-135 degrees C (250-275 degrees F).
   d. IUSS: 135 degrees C (275 degrees F).
3. AU1 Cycle Temperature Ranges:
   a. Pre-vacuum: 132.2-135 degrees C (270-275 degrees F).
   b. Gravity: 132.2-135 degrees C (270-275 degrees F).

c. Liquid: 121-135 degrees C (250-275 degrees F).
d. Effluent: 121-135 degrees C (250-275 degrees F).

4. AU8 Cycle Temperature Ranges:
   a. Pre-vacuum: 132-137 degrees C (270-279 degrees F).
   b. Gravity: 121-137 degrees C (250-279 degrees F).
   c. Liquid:121-135 degrees C (250-275 degrees F).
   d. IUSS: 132.2-135 degrees C (270-275 degrees F).
5. Each cycle time shall include the following parameters:
   a. Time and date.
   b. Date format.
   c. Time units.
   d. Over temperature.
   e. Under temperature.
   f. Sterilize time.
   g. Sterilize temperature.
   h. Dry time values.
   i. Phase alarms.
   j. Sterilize temperature overdrive.
   k. Purge time.
   l. Chamber pressure points.
   m. Print interval.
   n. Number of vacuum pulses.
   o. Pressure & vacuum pulse points.
   p. Vacuum dry point.
6. Each cycle shall be provided with the following safeguards:
   a. Cycle cannot begin unless door is closed and locked pressure tight.
   b. Control shall reject incorrect cycle parameters.
   c. Warning message shall be displayed if the programmed exposure time and temperature combination results in an F_0 value lower than required.
   d. Test cycles such as Bowie-Dick and vacuum leak test shall be included in factory default configuration.

E. Alarms
1. Alarm conditions shall be displayed in real time on the touchscreen interface, accompanied by an audible signal. Optional high-decibel audio alert (≥80 dB) shall be available for enhanced notification. All alarms shall be time-stamped and recorded in the process report.
   a. The following minimum cycle alarms shall be provided.
      1) Vacuum system failure.
      2) Steam supply deviation.
      3) Overextended sterilization time.
      4) Chamber flood or vessel overflow.
      5) Media supply interruption (loss of water, steam, or compressed air) - if equipped.
      6) Door interlock failure or improper door position.
      7) Cycle abort due to unsafe condition or manual intervention.
      8) Temperature deviation below programmed setpoint during exposure phase.

2. Alarm conditions shall be displayed in real time on the touchscreen interface, accompanied by an audible signal. Optional high-decibel audio alert (≥80 dB) shall be available for enhanced notification. All alarms shall be time-stamped and recorded in the process report.

F. Printer
1. Control system is to provide selection of printer output and display window information in English, French or Spanish. Also, to provide selective access codes for setting cycles and cycle values to prevent unauthorized changes and use of cycles, and adjustment of cycle-status printout intervals. Temperature display and printout units shall be configurable in either degrees Fahrenheit or Celsius, pressure/vacuum display in psig/in Hg or Bars, and either standard AM/PM or Military format. System shall support multiple documentation formats including:
   a. On-board thermal printer located in the front fascia or control column (2-inch or 2-1/4" width depending on model).
   b. Network-connected printer for full-size process report printing (Letter/A4 format).
   c. USB output for digital storage of cycle reports (up to 10,000 cycles capacity).
   d. Network storage option to generate process reports in PDF format directly to hospital information systems.
2. In the control column, mount thermal printer (minimum 24-column) and provide duplicate print switch to furnish a duplicate printout of the entire cycle data (when unit is not in cycle) or of current cycle status (during a cycle). Furnish printout with date, cycle count, daily cycle number, starting time of each cycle, sterilize temperature selected, sterilize and dry time selected, key transition points in the cycle, alarm events, and any deviations which may jeopardize sterilization process. Design printer to use 2" or 2-1/4" single-ply paper, depending on the sterilizer model; include motorized take-up spool for automatic storage of printed data.

G. The system shall provide automatic condensing of chamber steam and disposal of condensate to waste. Condensate shall be cooled to(140 degrees F) before discharge to drain.

H. Drain Discharge Cool Down System: Cold water (Chilled water preferred) shall be part of water conservation system to automatically cool the drain discharge temperature below 140°F before entering the building sanitary waste drain. Construct drains of stainless steel.

I. Pressure gauges shall be provided to display chamber and jacket pressures.

PART 2 - PRODUCTS

2.1 All equipment manufactures and models are Basis of Design only. Actual equipment selected shall be of equal or better fit, and functionality, including any certifications, regulatory compliance, and registrations. Submit all selections to Owner for final approval of model, configurations, options, and accessories.

2.2 STERILIZERS

A. Basis-of-Design: Getinge USA, GSS67N Pass-Thru Steam Sterilizer (JSN S0535) and 533HC Pass-Thru Steam Sterilizer (JSN S0220)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
   1. Getinge USA Inc.
   2. Steris

C. Medium Steam Sterilizers (JSN S0535, QTY=2)
   1. Configuration and Features.
      a. Pre-vacuum/Gravity type.
      b. Minimum chamber size: 26"W x 27.56"H x 39.37"D.
      c. Recessed cabinet.
      d. Double door (pass-through).
      e. Nominal overall dimensions: 53"W x 55"D x 78"H.
      f. Touchscreen control user interface.
      g. Stainless steel chamber, jacket, door, and process piping.
      h. Sliding vertical power-operated door.
      i. One (1) loading car, one (1) transfer carriage, one (1) loading rack, two (2) shelves, one (1) intermediate shelf.
   2. Medium Steam Sterilizer Utility Requirements (JSN S0535).
      a. Potable Water - 3/4" connection (DN20), 3-6 bar dynamic, 200-252 L per cycle (53-67 gal), <35°C.
      b. Steam - Integral electrical steam generator.
      c. Drain - 2-1/2" drain connection (DN65), maximum temperature ≤60°C (140°F), 206-259 L per cycle (54-68 gal).
      d. Air - 1/4" connection (DN8), 6-8 bar (87-116 psi), 0.2-0.25 Nm^3 per cycle.
      e. Electrical - 480V, 3PH, 60Hz, 80A.
      f. Vacuum Pump Electrical - 208 V, 60Hz., 3 PH, 6A circuit.
      g. Relief valve vent - 1" NPT.

D. Small Steam Sterilizer (JSN S0220, QTY=1)
   1. Configuration and Features
      a. Pre-vacuum/Gravity type.
      b. Minimum chamber size: 17.5" W x 17.5"H x 26" D.
      c. Recessed cabinet double door pass-thru configuration.
      d. Power-operated sliding vertical door.
      e. Nominal overall dimensions: 21"W x 21"D x 38"H.
      f. Touchscreen control user interface.
      g. Double door mounting.
      h. 316L stainless steel chamber and door.
      i. One (1) loading car, one (1) transfer carriage, one (1) loading rack, two (2) shelves, one (1) intermediate shelf.
   2. Small Steam Sterilizer Utility Requirements (JSN S0220))
      a. Electric - 480V 3Ph for steam boiler and Vacuum Pump, 115V 1Ph for sterilizer

b. Potable Water - 1" NPT, 20-50 psig dynamic, 130 gal/hr flow rate, peak 15 gal/min.
c. Steam - System self generates steam.
d. Drain - 2" ODT drain terminal.
e. Air - 1/4" NPT, 70-100 psig dynamic, 1 SCFM.
f. Controls Electrical - 120V, 60Hz, 1PH, 2A circuit.
g. Relief valve vent - 3/4" NPT.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.3 PASS-THRU DRYING CABINET

A. Basis-of-Design: Steris Corporation, Pass-Through Drying Cabinet w/ Purge (29 in), (JSN U0017, QTY= 2)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
1. Steris
2. Getinge USA Inc.

C. Configuration and Features
1. Contains nine shelves, four scope hangers.
2. Interlocking doors.
3. Overall Size: 29 x 31 x 78" (737 x 772 x 1981 mm).
4. Operating Weight: 650 lb.
5. The On/Off switch is located on the front of the unit.
6. HEPA Filtered Air Purge.
7. 10" Touchscreen.
8. Tempered Glass Cabinet doors.

D. Utility Requirements
1. Clearance Front: 24.70 in (627.38 mm).
2. 110-120 Vac, 60 Hz, 20 Amp, BTU 2500, Dedicated Type B (NEMA 5-20) Wall Plug.
3. Operational Temperature: 63-77°F.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.4 ENDOSCOPE DRYING/STORAGE CABINET

A. Basis-of-Design: Medivators Inc, Endodry Storage & Drying System DRY-1002 (JSN M3160, QTY=2)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.

1. Medivators Inc.
2. Steris

C. Configuration and Features
1. Single-Sided Type.
2. Cabinet with Door Opening Right.
3. Dimensions: 75 H x 24 W x 22 D (inches).
4. Operating Weight: 170 kg (375 lb).
5. Standard Weight: 145 kg (320 lb).
6. Shipping Weight: 220 kg (485 lb).
7. Interface: IP20, Electrical Protection Class I, Ethernet RJ45 (10/100 Mbit).
8. Intuitive Touch Screen Interface features a 6" color touch screen.
9. Enhanced Endoscope Drying: uses filtered compressed air to efficiently dry endoscopes.
10. LED status indicators provide e information on endoscope storage status and potential issues.
11. Space-Saving Design with tempered glass doors.
12. Each endoscope connects to the drying circuit through an ergonomic hook-up connection. Hook-ups to be included.

D. Utility Requirements
1. Electrical: 100-240 V AC ± 10%, 50/60 Hz, 1-phase.
2. Power Input: 120 W.
3. Air: Instrument Grade Air.
4. Operating Temperature: 5°C-40°C (41°F-104°F).
5. Relative Humidity: 10%-75%.
6. Compressed Air: 6 mm (1/4") ID.
7. Compressed Air Pressure: 2-10 bar (29-145 psi) maximum flow volume of 5 CFM.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.5 TRANSFER CARRIAGE CART

A. Basis-of-Design: Getinge, 500 Series SMART FHT Trolley w/ Load Car and SMART Loading Trolley

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
1. Getinge USA Inc.
2. Steris

C. Trolley with Load Car (JSN S0495.1, QTY=2)
1. Configuration and Features
a. Units must be compatible with selected sterilizers.
b. Dimensions: 24.20 in W x 57.70 in D x 55.70 in H.
c. Fixed-height transfer trolley designed for ergonomic handling of loads between preparation, sterilization, and storage areas; compatible with Getinge 500 Series sterilizers.
d. Constructed of AISI 304 stainless steel.

e. Load car equipped with durable brass wheels (two fixed, two swivel with brakes); includes stainless steel support frame, one fixed shelf and two adjustable shelves.
f. Maximum load capacity: 200 kg (440 lb).
g. Load carrier length options: typically, 1000 mm (39.37 in), 1,360 mm (53.54 in), or 1,500 mm (59.05 in) depending on sterilizer model.
h. Passive accessory - no powered or automated parts.

2. Utility Requirements
   a. No utility connections required (no water, steam, electricity, air, or drainage needed).

D. Trolley (JSN S0495, QTY=4)
1. Configuration and Features
   a. Selected units must be compatible with selected washers and sterilizers.
   b. Weight: 79 kg.
   c. Max loading weight: 200 kg.
   d. Dimensions: 615 mm W X 1070 mm H X 1520 mm L.
   e. Ergonomic SMART design for optimal mobility and hygiene; constructed of AISI 304 stainless steel.
   f. Equipped with four high-quality wheels (two rigid, two swivel with brakes), 160 mm diameter; optional tow bar and pin available.
   g. Standard load capacity: 200 kg (440 lb); models with longer carriers support up to 265 kg (585 lb).
   h. Load carrier lengths range from 990 mm (38.97 in) to 1,500 mm (59.05 in) depending on configuration.
2. Utility Requirements
   a. No utility connections required.

E. Trolley (JSN US295, QTY=7)
1. Configuration and Features
   a. Smart Trolley for Washer/Disinfector
   b. Selected units must be compatible with selected washers and sterilizers.
   c. Weight: 79 kg.
   d. Max loading weight: 200 kg.
   e. Dimensions: 34.6 x 25.8 x 41.25
2. Utility Requirements
   a. No utility connections required.

F. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.6 CART WASHER/DISINFECTOR, PIT MOUNT

A. Basis-of-Design: Getinge Inc, 9128E Series Pit Mounted Cart & Utensil Washer/Disinfector, (JSN S3185, QTY=1)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.

1. Getinge USA Inc.
2. Steris

C. Configuration and Features
1. Effective Chamber Load Size: 37.7" W x 78.7"H x 112" L.
2. Laminated Safety Glass Power operated gliding doors.
3. PACS 3500 microprocessor control system with 12 operator ready cycles.
4. 128 high-pressure spray jets on 16 evenly spaced vertical/lateral spray tubes; lateral rinsing system for effective coverage.
5. Includes 3 Universal Wash Carts
6. Two peristaltic chemical dosing pumps
7. User interface: Centric or PACS 3500 touchscreen panel with color-coded guidance, soft keys, print/logging & password levels.
8. Circulation and heating system with flow control monitoring.

D. Utility Requirements
1. Supply Voltage: 480 VAC, 60 Hz, 96.2 A, 3-Phase, with 80 kVA Step Down Transformer
2. Supply Voltage: 120VAC, 60 Hz, 20A
3. BTU/hr clean side = 7700, Soiled side = 3100, Service area = 4600.
4. Installation Mounting: 6" (150 mm) Deep Pit Mounted Machine.
5. Hot Water: 113-140 F, 30-60 psi, min 26 GPM
6. Cold Water: 30-60 psi, min 26 GPM
7. Purified Water: 1 ¼" NPT, 30-60 psi, min 26 GPM
8. Compressed Air: 80-100 psi, 0.9SCFM
9. Process Drain: 2" unit connection, minimum 3" floor sink
10. High-Volume/Low-Pressure Wash: 5.1 HP pump with a flow rate of 105 gallons/minute.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.7 WASHER/DISINFECTOR, ELECTRIC

A. Basis-of-Design: Getinge Inc, 8666 Washer-Disinfector, (JSN S0955, QTY=2)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
1. Getinge USA Inc.
2. Steris

C. Configuration and Features
1. Stainless steel vertical sliding Double Doors features a large tempered glass window.
2. Clearance: 18 in (457.2 mm) on each side.
3. Chemical Dosing Pumps: Standard w/ 3 Dosing Pumps.
4. Total Weight: 772-882 LBS.
5. Exterior: 44"W x 73-3/4" H x 36"D (1118 x 1870 x 914 mm).
6. 304 stainless steel exterior panels, with a #4 polished finish.

7. Standard light in the chamber.
8. Wash Chamber: 26"W x 26"H x 28"D (660 x 660 x 720 mm).

D. Utility Requirements
1. Electric Heated Washer, With Drying: 240V, 60 Hz, 3-Phase, 60A.
2. Cold Water: on unit 3/4" (20 mm) Female, to washer 1" NPT, 30-70 PSIG, 6-8 GPM, do not exceed 90°F, 8.7 Gal/Phase.
3. Hot Water: on unit 3/4" (20mm) Female, to washer 1" NPT, 30-70 PSIG, 6-8 GPM. 110-140°F, 8.7 Gal/Phase.
4. Purified Water: on unit 3/4" (20 mm) Female, to washer 1" NPT, 30-70 PSIG, 6-8 GPM, 8.7 Gal/Phase.
5. Drain: on unit Ø2" (50 mm), to washer 4" drainpipe, 21 GPM waste line.
6. Water Supply Connections: Standard Bottom-Mounted Connections.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.8 WASHER/DISINFECTOR, ENDOSCOPE

A. Basis-of-Design: Medivators Inc, Advantage Pluss Pass-Thru Endoscope Reprocessing System (JSN U0018, QTY=2)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
1. Medivators Inc.
2. Wassenburg Medical

C. Configuration and Features
1. Dimensions: 51-1/2" (1306mm) Wide x 78-3/4" (2000mm) High x 31-1/4" (792mm) Deep.
2. Weight: 882 lbs. (400 kgs).
3. Foot switch opening doors.
4. Pass-Thru Windows with intercom.
5. Touchscreen Monitor.
6. Front doors with pull-out drawer.
7. Barcode scanner.
8. Computerized cycle documentation and reporting.

D. Utility Requirements
1. Optimal wall thickness is 4-1/2" (115mm) to 7" (180mm).
2. The interface between the wall opening and the floor must not have a cove or fillet.
3. The facility connections must not be more than 3 feet above the top of the ADVANTAGE PLUS Pass-Thru Endoscope Reprocessing System.
4. Wall preparation: 104-1/4" (2646mm) wide x 79-3/4" (2025mm) high; optional trim kit requires a minimum of 4" (100mm) of uninterrupted wall space on the sides and top of the re-processor for trim attachment.

5. Water: ¾" G male or ½" NPT female connection with shutoff valve and pressure gauge; potable water or RO water; filtered to 1 micron; pressure of 30 to 87 psi (2 to 6 bars); minimum flow rate of 1.3 gal/min (5 L/min), 2.6 gal/min (10 L/min) preferred; supplied water temperature 95°F ± 4ºF (35°C ± 2ºC).
6. Drain: 10.5 gal/min (40 L/min); minimum diameter of 4" (100 mm).
7. Air: 1/4" NPT female with a shutoff valve and pressure gauge located in the wall behind an access panel; pressure of 58 to 145 psi (4 to 10 bar); the maximum demand of compressed air is 1.1 scfm (32 l/min ANR); Filtered to 5 microns; The maximum dew point is 45°F (7°C); The maximum oil concentration is 5 mg/m3; the maximum oil concentration is 5 mg/m3.
8. Electrical Supply: 120 VAC ±10%, single phase, 60 Hz, 1200 Watts, 2400 BTU; GFI protected NEMA 5-15R outlet located in the wall behind an access panel.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.9 ENDOSCOPE STORAGE HOOKUP RACK

A. Basis-of-Design: Medivators, Inc, Advantage Hookup Rack (8 Hookup), (JSN US627, QTY=1)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
1. Medivators, Inc.
2. Wassenburg Medical

C. Configuration and Features
1. Holds 8 hookup blocks plus 2 disinfection/soak only blocks.
2. Constructed of stainless steel, with a graduated hanging design to promote drying and prevent tangling.
3. Compatible with the Medivators Advantage series automated endoscope reprocessor.
4. Dimensions: 11.25" W x 15.75" D x 24.5" H.

D. Utility Requirements
1. Electrical: None required.
2. Water/Spray: Not applicable.
3. Drain/Ventilation: Not applicable.
4. Air Supply: Not applicable.
5. Mounting/Installation: Freestanding countertop or wall-mounted as space allows-designed to sit next to the Advantage reprocessor. No pit or floor mount required.
6. Materials & Durability: Made from 316-grade stainless steel, ensuring corrosion resistance and easy cleaning.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.10 SINK, CLEAN-UP WORKSTATION (3-SINK)

A. Basis-of-Design: Steris Corp, AMSCO 50 Reprocessing 120" Adj Height, (JSN A1195, QTY=4)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
   1. Steris
   2. Getinge USA Inc.

C. Configuration and Features
   1. One (1) air pistol with tip attachments, One (1) water pistol with tip attachments, Two (2) back splash-mounted pre-rinse and faucet combo.
   2. Three (3) 17 x 30 x 10 in bay clean-up workstation, 120-inch total length.
   3. Acu-SinQ 2 chemistry dosing system and sink-top mounting kit (JSN U0053).
   4. Adjustable height configuration 33 inch to 41-inch maximum working height
   5. Max Weight: 690.00 lb..

D. Utility Requirements
   1. Air Pistol, 3/8" Compression, Silicon.
   2. Water Pistol, 3/8" Compression, Stainless-Steel.
   3. Pre-Rinse Hot, 3/8" Compression, Stainless-Steel.
   4. Pre-Rinse Cold, 3/8" Compression, Stainless-Steel.
   5. DI Faucet, 3/8" Compression, Stainless-Steel.
   6. Electrical: 120 V, 1 Phase.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.11 SINK, SCRUB, 1-BAY

A. Basis-of-Design: Steris Corp, Flexmatic with Infrared Sensor, (JSN P6980, QTY=1)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
   1. Steris
   2. Getinge USA Inc.

C. Configuration and Features
   1. One Station - 32 x 27-9/32 x 51-1/2".
   2. Infra-Red Sensor to turn water on and off automatically when hands are under the faucet.
   3. Thermostatically controlled mixing valve for water temperature up to 115°F (46°C).
   4. Weight: 160 lb.
   5. Mounting brackets are furnished for securing the station to a wall.

D. Utility Requirements
   1. Cold Water: 1/2" NPT; 20-50 psig dynamic.

2. Hot Water: 1/2" NPT; 120-140°F (49-60°C), 20-50 psig static.
3. Drain: 1-1/2" OD.
4. Electricity (80VA transformer) options: 120V, 1.2A, 50/60 Hz, 0.144KW, 1Ø; 220-240V, 0.6A, 50/60 Hz, 0.144KW, 1Ø.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.12 SINK, SCRUB, 2-BAY

A. Basis-of-Design: Steris Corp, Flexmatic without Timer, (JSN P6980, QTY=3)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
1. Steris
2. Getinge USA Inc.

C. Configuration and Features
1. Two Station - 64 x 27-9/32 x 51-1/2".
2. Thermostatically controlled mixing valve for water temperature up to 115°F (46°C).
3. Each station has one knee-operated control to start and stop water flow.
4. Mounting brackets are furnished for securing the station to a wall.
5. Weight: 295 lbs.

D. Utility Requirements
1. Cold Water: 1/2" NPT; 20-50 psig dynamic.
2. Hot Water: 1/2" NPT; 120-140°F (49-60°C), 20-50 psig static.
3. Drain: 1-1/2" OD.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.13 WALL MOUNT SHELF

A. Basis-of-Design: Steris Corp, Scrub Sink Shelf, Stainless Steel, 8"x32", (JSN A5165, QTY=6)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
1. Steris
2. Getinge USA Inc.

C. Configuration and Features
1. Dimensions: 8" x 32" in.
2. Constructed of heavy-gauge 18-gauge stainless stee with bead-blasted or matte-finish to match scrub sinks.
3. Matches AMSCO® Flexmatic scrub sink lineup.

D. Utility Requirements
   1. Electrical: None required.
   2. Water/Spray: Not applicable.
   3. Drain/Ventilation: Not applicable.
   4. Air Supply: Not applicable.
   5. Wall- or backsplash-mounted directly above scrub sinks.
   6. Requires adequate wall reinforcement or use of sink support/bracket kits described by Steris.
   7. Weight capacity: Supports stock supplies; approximate shelf weight 15 lb.
   8. Construction/Finish: Designed to match scrub sinks; easy-wipe stainless steel, corrosion resistant.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.14 INSTRUMENT ASSEMBLY TABLE

A. Basis-of-Design: Steris Corp, AMSCO Prep and Pack Deluxe Electric, (JSN E0135, QTY=6)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
   1. Steris
   2. Getinge USA Inc.

C. Configuration and Features
   1. Electric height-adjustable model with integrated control box and rocker switch.
   2. Dimensions: 72 L x 40 W x 69-1/2 to 85-1/2" H.
   3. Weight: 520 lb.
   4. Constructed with a stainless-steel work surface and frame, including durable caster wheels for mobility.
   5. Included Options:
      a. Lockable Casters
      b. Electric Height Adjustment
      c. Blue AKRO bins
      d. Multi-function shelving
      e. Surface-mounted flat screen monitor arm
      f. Adjustable overhead LED lighting
      g. 2 each 26" rails
      h. Small vertical CPU holder
      i. 15A electrical plug strip
      j. 2 each cable management units
      k. 6" suspended task drawer
      l. Magnification light.
   6. Designed for sterile processing departments to support prep, packing, and instrument assembly tasks.

D. Utility Requirements
   1. 120 Volt, 50/60 Hz., 3.0/2.2 Amp motor, a height control box with rocker switch and 8-1/2" (216 mm) power cord.
   2. Water/Spray: Not required.
   3. Drain/Ventilation: Not required.
   4. 4Air Supply: Not required.
   5. Freestanding unit: no floor or wall mount needed.
   6. Plugs into standard grounded electrical outlet.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.15 FLOOR MOUNT ULTRASONIC CLEANER

A. Basis-of-Design: Ultra Clean Systems Inc, 1150 Single Basin, (JSN S2635, QTY=2)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
   1. Getinge USA Inc.
   2. Steris

C. Configuration and Features
   1. 24 dedicated irrigation ports to facilitate lumen cleaning.
   2. TRT Technology (Titanium Rod Transducer) provides high cavitation energy (≈81 W/gal at 40 kHz) for efficient cleaning and shorter cycles.
   3. 13-minute ultrasonic cleaning cycle, adjustable between 8-13 minutes (+15-minute cycle for da Vinci robotic sets).
   4. 25 lbs. instrument weight capacity.
   5. Capacity for 8 Robotic instruments per cycle.
   6. Accepts regular hospital trays.
   7. 5.7" Touchscreen control, automated flush, rinse, enzyme dosing, and air purge options.
   8. Can be used as a regular ultrasonic (without irrigation).
   9. 30" W x 27.5" D x 40" H (Lid Open).
   10. 12.3 Gallon Basin Capacity.

D. Utility Requirements
   1. Electricity: 208 Volts AC / 50-60 Cycle; 10 Amp; NEMA 6-15R plug; dedicated circuit.
   2. Inlet Hose Connection-Cold: ¾ Garden Hose Thread, 6' length from the mixing valve; located in the lower rear of the machine.
   3. Inlet Hose Connection-Hot: ¾ Garden Hose Thread, 6' length from the mixing valve; located in the lower rear of the machine.
   4. Drain Hose: 5/8 I.D., 6' length from the mixing valve located in the; bottom of the rear of the machine.
   5. Mixing Valve Temperature: 110°F Preset at factory. Cold and Hot water lines should; have 15-60 psi at connections; hot water should be minimum of 125°F.
   6. Purified Water: RO/DI Rinse Water, 15-60 psi

7. Compressed Air: ¼" NPT female fitting, 15-30 psi.
8. Drain Requirement: Floor or wall drain acceptable. Drain line is 6" off floor.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

2.16 WASHER/DISINFECTOR RETURN LINE CONVEYOR

A. Basis-of-Design: Getinge Inc, RC Return Conveyor, (JSN U0019, QTY=1)

B. Products of the following manufacturers are acceptable provided they meet the criteria of these specifications. Items must be compatible with selected Washer/Disinfector units. The Contract Sum shall include costs related to 1) modifications, recommended by the manufacturer for proper installation and performance of products, to intend building construction and utilities; 2) coordination required to perform the modifications.
   1. Getinge USA Inc.
   2. Steris

C. Configuration and Features
   1. Fully automatic return conveyor system designed to transfer wash carts from the clean side to the soiled side.
   2. Compatible with Getinge 8666/8668/88/CM320-series wash carts.
   3. Modular design accommodates between 2 to 19 wash carts, enabling flexible configuration.
   4. Motor-driven rollers for easy, ergonomic cart transfer; rollers only activate on contact.
   5. Pass-through chamber (double-hatch with interlock) for enhanced cross-contamination prevention.
   6. Independent drive system that doesn't affect washer-disinfectors or AGS (Air Glide System).
   7. Removable drive components allow tool-free cleaning and maintenance.
   8. Silent operation and low energy consumption (24VDC motors).
   9. User interface includes start, stop, and reset buttons; emergency stop always on the right-hand end.
   10. Framework: SS EN 1.4301 (304).
   11. Conveyor covers: Electro-polished SS EN 1.4301 2G (304 2G).
   12. 60 mm EPDM transport wheels with high wear resistance.
   13. Drain slope built into conveyor base; delivered with removable bottom plug.
   14. Electrical cabinet is located on the soiled side, beneath hatch or chamber.
   15. Prepared for SMART 2.0 transport trolleys with docking blocks for safe transfer.

D. Utility Requirements
   1. Electrical: 100-240 VAC, 50/60 Hz.
   2. Electrical cabinet mounted on soiled side.
   3. Built-in drain slope design: each conveyor includes a bottom plug.
   4. Operating temperature: 5-40 °C (41-104 °F).
   5. Operating humidity: ≤80% at 31 °C (87 °F).
   6. Storage: min. 15 °C (59 °F), <75% RH at 20 °C.
   7. Delivery tolerance: −20 °C to 70 °C (−4 °F to 158 °F), <90% RH.
   8. Flooring: Must be level within 10 mm (0.4") across the unit area.

E. Building Utilities Available: All utilities for these units are indicated in Mechanical and Electrical documents and are referenced in Divisions 21 through 28. Any deviations from these utilities must be documented within bid and shop drawing submittals.

PART 3 - EXECUTION

3.1 INSTALLATION - GENERAL

A. Install the Work completely, and in accordance with manufacturer's instructions and approved Shop Drawings and under the supervision of the manufacturer's representative.

B. Touch up damaged finishes equal to original condition as approved. Make final adjustments required for proper operation as determined by the Architect.

C. Test all unit functions. Provide a dated report to Owner's representative certifying that the unit functions properly.

D. Demonstration
   1. The manufacturer shall provide four copies of operation manual describing equipment operating and routine maintenance service procedures. Instruct the Owner's designated representatives in these procedures during the startup and test period.
   2. Training
      a. Training shall be a 1-day, 2 sessions per model, minimum. Training shall be conducted by a factory authorized service representative when mutually agreed to with the Owner.

END OF SECTION

SECTION 117311 - PATIENT LIFTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Patient lift equipment with powered operating system and overhead-supported tracks.

B. Related Requirements:
   1. Section 095100 - Acoustical Ceilings.

1.2 ABBREVIATIONS AND ACRONYMS

A. CFCI - Contractor Furnishes and Contractor Installs.

1.3 REFERENCE STANDARDS

A. AISI S100 - North American Specification for the Design of Cold-Formed Steel Structural Members 2016.

B. AISI S240 - North American Standard for Cold-Formed Steel Structural Framing 2015.

C. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes 2014.

D. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric) 2013.

E. ITS (DIR) - Directory of Listed Products current edition.

F. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

G. UL (DIR) - Online Certifications Directory Current Edition.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference:
   1. Conduct conference at Project site prior to commencement of installation.
   2. Attendees shall include:
      a. General Contractor.
      b. Installer of ceiling-mounted patient-lift systems.
      c. Structural engineer responsible for delegated design (if applicable).
      d. Electrical subcontractor.
      e. Ceiling system installer.
      f. Owner's representative (optional).
   3. Review and coordinate the following:
      a. Project-specific ceiling and structural conditions.
      b. Support and anchorage requirements.
      c. Clearance conflicts with lighting, sprinklers, HVAC, cubicle curtains, and other ceiling-mounted components.
      d. Power supply routing and connection locations.
      e. Required submittals and approvals.
      f. Installation schedule and sequencing.

1.5 ACTION SUBMITTALS

A. Product Data: Provide manufacturer's data sheets of operating system components, track system components, track depth, track maneuverability systems, slings, and accessories. Indicate dimensions, performance requirements, service requirements, materials, finishes, and options.

B. Shop Drawings: Indicate dimensions, reflected ceiling plan track layouts, above-ceiling support requirements, attachment-to-support details, point loads, and power-supply connections.
   1. Include plans, elevations, sections, and details.
   2. Include details of components. Indicate location and size of each field connection.
   3. Include diagrams for service connections and power, signal, and control wiring.
   4. Coordinate shop drawings with:
      a. Lighting layout.
      b. HVAC ducts and diffusers.
      c. Fire sprinklers and smoke detectors.
      d. Other ceiling-mounted elements (e.g., cubicle curtain tracks).

C. Delegated Design Data:
   1. Shop drawings of overhead structural support system signed and sealed by a professional structural engineer.
   2. Calculations for loadings and stresses of cold-formed steel overhead structural support system, signed and sealed by a professional structural engineer.

D. Test Reports: Factory tests for each type of equipment.

E. Delegated-Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
   1. Provide delegated-design submittals for above-ceiling supplementary framing for support and anchorage of patient-lift systems.

1.6 INFORMATIONAL SUBMITTALS

A. Manufacturer's Qualification Statement.

B. Installer's Qualification Statement.

C. Coordination Drawings: For ceiling-mounted patient-lift systems, reflected ceiling plan(s), and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
   1. Suspended ceiling components.
   2. Structural members to which ceiling-mounted patient-lift systems will be attached.
   3. Items penetrating finished ceiling including the following:
      a. Lighting fixtures.
      b. Air outlets and inlets.
      c. Speakers.
      d. Sprinklers.
      e. Access panels.
   4. Perimeter moldings.

1.7 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For products to include in operation and maintenance manuals. Include description of equipment operation and required adjusting and testing. Identify system maintenance requirements, servicing cycles, lubrication types required and local spare part sources.

B. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.8 QUALITY ASSURANCE

A. Provide the following upon request:
   1. Submit field quality-control inspection reports upon request by Owner or Architect.
   2. Reports shall verify correct installation, alignment, support, and operation of ceiling-mounted systems.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution. Include patient lift as part of the patient-room mockup.
   1. Build mockup of typical installation of the following as shown on Drawings.
   2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Designer Qualifications: Design overhead structural support system under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in New Mexico.

D. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum three years of experience.

E. Installer Qualifications: Company specializing in performing work of the type specified and with minimum three years of experience and approved by manufacturer.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Package equipment to project site in protective packaging.

B. Protect finished surfaces during handling and installation with protective covering of polyethylene film or another suitable material.

1.10 WARRANTY

A. Correct defective Work within a three-year period after Date of Substantial Completion.

PART 2 - PRODUCTS

All equipment manufactures and models are Basis of Design only. Actual equipment selected shall be of equal or better fit, and functionality, including any certifications, regulatory compliance, and registrations. Submit all selections to Owner for final approval of model, configurations, options, and accessories.

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design above-ceiling supplementary framing for support and anchorage of patient-lift systems.

2.2 CEILING-MOUNTED PATIENT-LIFT SYSTEMS

A. Ceiling-Mounted Patient Lift: Consisting of a motor-driven lift unit that traverses on a ceiling-mounted track system.
   1. Manufacturers: Subject to compliance with requirements, provide system of equal or better to the basis of design (Arjo Maxi Sky 2 and Maxi Sky 2 Plus)
      a. Guldman
      b. Hill Rom

B. Ceiling-Mounted Track System: High-strength extruded aluminum in manufacturer's standard profile and thickness to support lifting capacity indicated for lift unit. Provide track shapes and accessories as required to provide a complete system in layout indicated on Drawings.

C. Manufacturer's standard track systems capable of varying track configuration layouts. Track profile shall be manufacturer's standard for the lifting capacity indicated (minimum 90 mm height or as required by layout).
   1. Track system shall support flexible configurations, including straight sections, curves (45° and 90°), exchangers, turntables, and X-Y traverse layouts as shown in Drawings.
   2. Provide all required accessories, connectors, end caps, brackets, and hardware for a complete and operational installation.

D. Lift Unit: Steel frame system with separate 24-V dc lifting and horizontal-drive motors secured to chassis.
   1. Battery-operated patient lift mounted in track system to transfer patients along track system; capable of both powered and manual traverse movement.
      a. Lifts per Charge: minimum 20 lifts.
      b. Lifting Speed: minimum 1.0 inch/sec.
      c. Features: Overload protection, dual pawl emergency brake system, and emergency down control.
      d. Battery Charging Options: Continuous charging.
      e. Hand-control remote control.
   2. Electrical Components, Devices, and Accessories: Listed and labeled by ITS (DIR), UL (DIR), or testing agency acceptable to authorities having jurisdiction and installed in compliance with NFPA 70 and marked for intended application.
   3. Safe Working Load: 600 lb. single mode, 1000 lb. dual mode.
   4. Description: Structural, overhead-supported, cold-formed framing system for supporting patient lift equipment track system. Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of patient lift overhead support system. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for a complete installation that supports the associated patient lift track and operating systems.

5. Design Criteria: Provide cold-formed steel overhead structural support system.
    a. Structural Performance: Cold-formed structural members and systems capable of withstanding design loads, and in compliance with design reference standards.
    b. Design Reference Standards: Provide system components in compliance with AISI S100 and AISI S240.
    c. Design Loads: Provide system components in compliance with applicable codes.
6. Lifting Capacity: 600 lb., 1000 lb. (for bariatric)
7. Maximum Lift Range: 90 in.
8. Safety Features:
    a. Emergency stop, accessible from floor level via cord-pull mechanism.
    b. Emergency lowering device, both mechanical (on motor casing) and electrical (via hand control).
    c. Electronic soft-start and soft-stop for strap movement to ensure controlled and safe lifting.
    d. Cut-off Angle: 45 degrees along the rail; 10 degrees across the rail. (confirm applicability with manufacturer)
9. Electronics:
    a. Control Unit: Hand-held wired control with tactile buttons. Optional infrared remote control available.
    b. On/Off Control: Electronic soft start and stop with integrated overload protection.
    c. Battery Power: 24-V rechargeable nickel-metal hydride batteries. Provide with clip-on charging station mountable anywhere along the track. Optional auto-return-to-charge function available.
        1) Charging station shall include indicator lights to show charging status.
    d. Battery Protection: Low-battery light illuminates when battery voltage is below 22 V; hoist disabled when battery voltage is below 20 V.
    e. Motors: Provide in quantity required by lifting capacity indicated.
        1) Lift Motors: 1.2 inches per second lift speed at maximum capacity load. 0.59 inches per second lift speed for bariatric at maximum capacity load.
        2) Horizontal-Drive Motors: 4-10 in (10-25 cm) per second horizontal traverse at maximum capacity load.

E. Accessories:
1. Sling system: Threaded nylon straps with compatible polyester or nylon-net patient slings, selected per patient needs.
2. Two-point spreader bar with locking sling clips.
3. Four-point spreader bar with locking sling clips.
4. Tandem carry bar for dual point lifting applications.
5. Bariatric carry bar for high-capacity transfers.
6. Slings: Manufacturer's standard sling with load rating equal to or greater than load rating of lift.
7. Installation Accessories: Provide necessary accessories and closure trim as required for complete installation.
8. Fasteners: Manufacturer's standard inserts, anchors, bolts, rivets, and screws appropriate for project conditions; corrosion resistant.

9. Optional: Room-to-room transfer accessories - confirm if required

F. Locations Table:

Room Number	JSN	Room Name	Lift Capacity	Notes
EMR-1294 EMR-1260 EMR-1261 EMR-1262 EMR-1263 EMR-1264 EMR-1265 EMR-1266 EMR-1267 EMR-1268 EMR-1270 EMR-1271 EMR-1290 EMR-1291 EMR-1292	A1200	ED Exams/Treatment	600 lbs	Straight Lift; 90 degree turn to park motor
WEL-1114D WEL-1114C	A1200	Triage	600 lbs	Straight Lift; 90 degree turn to park motor
EMR-1310 EMR-1311	A1203	Trauma	1000 lbs	Traverse Lift
IMG-1247 IMG-1237	A1200	CT	600 lbs	Straight Lift; 45 degree turn to park motor
PHM-1167 PHM-1195	A1200	Exam (Pharmacy)	600 lbs	Straight Lift; 45 degree turn to park motor
PCC-3143 PCC-3169 PCC-3195	A1200	Exam EKG	600 lbs	Straight Lift; 45 degree turn to park motor
IMG-1228	A1200	MRI	600 lbs	Straight Lift; 90 degree turn to park motor
IMG-1226A IMG-1226B	A1200	MRI Prep Room	600 lbs	Straight Lift; 90 degree turn to park motor
WIS-2286 WIS-2287 WIS-2288 WIS-2289	A1200	LDRP	600 lbs	Traverse Lift; 3" drop on rails to accommodate a ceiling detail
SUR-2263 SUR-2239 SUR-2261 SUR-2262 SUR-2260 SUR-2240 SUR-2241 SUR-2242 SUR-2258	A1200	Prep/PACU	600 lbs	Straight Lift covering 2 bays; 90 degree turn to park motor; curtain gap
IPC-3249 IPC-3199	A1203	Inpatient IOS	1000 lbs	Traverse Lift; transfer rails through door/door header; toitel room lift
IPC-3255 IPC-3297 IPC-3256 IPC-3258 IPC-3259 IPC-3263 IPC-3264 IPC-3267 IPC-3268 IPC-3271 IPC-3272 IPC-3275 IPC-3276 IPC3278 IPC-3279 IPC-3281 IPC-3282 IPC-3285 IPC-3286 IPC-3287 IPC-3295 IPC-3296	A1200	Inpatient Typical	600 lbs	Traverse Lift
RHB-4292	A1200	Exam IOS (PR Therapy)	600 lbs	Traverse Lift
SCC-4250	A1200	Exam IOS (Acupuncture)	600 lbs	Traverse Lift
PVM-2109	A1200	Exam IOS (Preventive medicine)	600 lbs	Traverse Lift
PCC-3212 PCC-3240 PCC-3170	A1200	Minor Procedure	600 lbs	Traverse Lift; shortened rails
SCC-4241 SCC-4240 SCC-4226	A1200	Wound Care Exam	600 lbs	Traverse Lift; shortened rails
SCC-4209 SCC-4209 SCC-4216 SCC-4217 SCC-4218 SCC-4219 SCC-4220	A1200	Podiatry Exam	600 lbs	Traverse Lift; shortened rails

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions, with installer present, for compliance with requirements of supporting structural members, installation tolerances, and other conditions that may impact performance of equipment.

B. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
Verification of Site Conditions:
1. With Installer present, examine substrates, structural supports, and ceiling areas to verify:
   a. Compliance with required installation tolerances.
   b. Adequate structural capacity for support of lifting system.
   c. Absence of obstructions or conflicts with other ceiling-mounted components.
   d. Accessibility for attachment of brackets and hardware.
2. Confirm that ceiling and wall finishes are complete and ready to receive equipment.

C. Do not proceed with installation until all unsatisfactory conditions have been corrected and verified.

3.2 CEILING-MOUNTED PATIENT-LIFT SYSTEMS INSTALLATION

A. Install tracks level and plumb, according to manufacturer's written instructions and approved shop drawings.
1. Set components plumb, level, and rigid.

B. Install anchors in accordance with anchor manufacturer's installation guidelines.

C. Interface With Other Work: Use pop rivets or screws to attach L-shaped perimeter moldings of ceiling to lift equipment track.

D. Track System Interface with Finish Ceiling: Install track system relative to finish ceiling for semi-recessed track installation.
1. Coordinate track system interface with components of Section 095100 - Acoustical Ceilings.

3.3 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

3.4 ADJUSTING

A. Adjust ceiling-mounted patient-lift system to ensure proper function and smooth operation in accordance with manufacturer's written instructions.
1. Verify alignment of tracks and secure fastening at all support points.
2. Test lift motor, strap movement, and controls under simulated or actual load conditions.
3. Confirm proper engagement of charging station and verify battery status indicators.
4. Adjust and test emergency stop and emergency lowering functions.
5. Ensure smooth traverse movement along track layout without obstructions or excessive resistance.

3.5 CLOSEOUT ACTIVITIES

A. Demonstration: Demonstrate operation of equipment to Owner's personnel.

B. Use operation and maintenance data as reference during demonstration.

C. Briefly describe function, operation, and maintenance of each component.

D. Training: Train Owner's personnel on operation and maintenance of system.

E. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

F. Provide minimum of 8 hours of training.

G. Final Acceptance: Remove labels, fingerprints; clean surfaces. Repair any marred or damaged surfaces that effect appearance in manner not acceptable to Owner. Replace any parts that cannot be repaired in such a manner.

3.6 PROTECTION

A. Protect installed products from damage from construction operations for the remainder of the construction period.

B. Repair damaged products according to manufacturer's written instructions. If damaged products cannot be successfully repaired, as determined by Architect, remove, and replace damaged products.

END OF SECTION

SECTION 118129 - FACILITY FALL PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes:
   1. Fall Arrest Safety Anchors.
   2. Supports for Suspended Platforms.
   3. Wall safety anchors.

B. Related Requirements:
   1. Section 013573 "Delegated Design Requirements and Procedures" for definitions, submittal procedures, responsibilities, and scheduling requirements associated with delegated design assignment indicated in this Section.

1.2 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, rated capacities, operating characteristics, furnished specialties, accessories, dimensions of individual components and profiles, and finishes.

B. LEED Submittals:
   1. Credit MR 4: for products having recycled content, manufacturer™™s product data for percentages by weight of pre-consumer and post-consumer recycled content, and statement of costs for each recycled product.
   2. Credit MR 5: Manufacturer's certification of the geographical location of the material extracting/harvesting, processing, and manufacturing, and statement of costs for each regional product and the fraction by weight that is considered regional.

C. Shop Drawings: Show fabrication and installation details. Include plans, elevations, sections, details, and attachments to other work.
   1. Submit shop drawings showing complete layout and configuration of system, equipment locations and all other components and accessories. Clearly indicate design and fabrication details, window drops, hardware and installation details.
   2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
   3. Include installation and rigging instructions and necessary restrictive and non-restrictive working usage notes and general safety notes.
   4. Submit one copy of system Equipment Manual and Inspection Log Book, with manufacturer's standard forms completed.

D. Samples: Submit sample of permanent signage to be posted at each roof access location. Include proposed drawings and instructions for use of the fall protection equipment.

E. Delegated-Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
   1. Provide delegated design submittals for facility fall protection, including connection to building structure.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, and professional engineer, and testing agency.

B. Product Test Reports: Based on evaluation of tests performed by manufacturer and supervised and verified by a qualified independent professional engineer.

C. Proof of liability insurance.

D. Field quality control reports.

E. Maintenance Data: For equipment to include in maintenance manuals.
   1. Safety Inspection Log Book with "Initial inspection “” Certificate for Use" and "Inspection Sign-off" completed.
   2. Two Laminated copies of roof plan, at a convenient scale, showing location of roof anchors and hoist supports to be posted by Owner near exits to roof.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications: An experienced firm specializing in the design, fabrication and installation of permanent building maintenance equipment with a record of successful in service installations of equipment similar in design and extent to that proposed for this project.
   1. Minimum five years experience in the design, fabrication and installation of similar maintenance equipment.
   2. Firm shall carry liability insurance to protect against product and system failure in amount of $5,000,000.

B. Installer Qualifications: Manufacturer of units.

C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated.

D. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM E 329 to conduct the testing indicated.

E. Welding: Qualify procedures and personnel in accordance with AWS D1 for the types of metals used.

F. Design Standards: Comply with the following:
   1. AISC publication S342-1993 with Supplement No. 1 "Load and Resistance Factor Design Specification for Structural Steel Buildings",
   2. AISI publication SG-971-1996 with 2000 Supplement: "Specification for Design of Cold-Formed Steel Structural Members."
   3. Aluminum Association's publication AA ADM-1 "Aluminum Design Manual, 2000."

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.5 PROJECT CONDITIONS

A. Field Measurements: Indicate measurements on Shop Drawings.

1.6 COORDINATION

A. Coordinate installation of anchorages for fall protection equipment. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage qualified professional engineer, as defined in Section 013573 "Delegated Design Requirements and Procedures" to perform structural analysis and design needed to assure that required performance is achieved.
   1. Safety anchorage shall be designed, tested and installed to meet federal, state, and local occupational health and safety regulations, including but not limited to the following:
      a. ANSI/WCA 1-14.1-2001 Window Cleaning Safety Standard.
      b. ASME A120.1-2001, Safety Requirements for Powered Platforms for Building Maintenance.
      c. OSHA 1910.28 Subpart D "Walking-Working Surfaces."
      d. OSHA 1910.66 Subpart F "Powered Platforms, Manlifts and Vehicle-Mounted Work Platforms" and appendix C.
      e. OSHA 1926.50 Subpart M "Fall Protection."
      f. "OSHA Ruling on Window Cleaning by Bosun's Chair" Memorandum to Regional Administrators from P. K. Clark, Director, Directorate of Compliance Programs.
   2. Material properties indicated in this Section shall be considered as minimum properties.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.3 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Stainless-Steel Sheet, Strip, Plate, and Flat Bars: ASTM A 666, Type 316.

C. Stainless-Steel Bars and Shapes: ASTM A 276, Type 316.

D. Steel Tubing: ASTM A 500, cold-formed steel tubing.

E. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

F. Mild Steel: Type 300W, hot-dipped galvanized to ASTM A123/A or proprietary polyurethane/polyurea coating system, with yield strength as follows:
   1. Hollow steel section piers: 50 ksi.
   2. Securement bolts: 44 ksi.
   3. Base plates and other sections: 44 ksi.

2.4 NONFERROUS METALS

A. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.

B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.

C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.5 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish fall protection equipment after assembly and testing.

C. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:
   1. ASTM A 123/A 123M for iron and steel fall protection equipment.
   2. ASTM A 153/A 153M for iron and steel hardware for fall protection equipment.

2.6 FALL PROTECTION SYSTEMS

A. Design system fall arrest safety anchors and equipment supports to AISC S342L (including supplement No.1) and ANSI/IWCA I-14.1, and as follows:
   1. System Design, General:
      a. Comply with OSHA 1910, Subpart F, Appendix C.
      b. Design of window washing - suspended maintenance systems that suits the building, plans, specifications, standards and governing codes.
      c. Design and provide any and all additional bracing as required for anticipated loads. Provide complete calculations showing all impact and torsion loads applied to structure for submittal review.
      d. Design anchor components to provide adequate attachment means suited to current window washing - suspended maintenance practices and compatible with industry standard equipment.
   2. Supports for Suspended Platforms includingroof-rigged davits, and rigging sleeves:
      a. Locate davit arm bases and safety and tie-back anchors to suit suspension equipment which will be used on the building with respect to items such as reach, rigging spacing, roof edge conditions and similar items.
      b. Safety factor against fracture or detachment: 4 to 1.
      c. Vertical service load: 1000 lbs.
      d. Rated load against fracture: 4000 lbs minimum.
      e. Capable of rotating a full 360 degrees.
      f. Designed to be easily and quickly broken down into pieces not weighing more than 50 lbs. each for carrying by a single man from location to location.
      g. Connector Pins: Structural pins with retaining and gravity locks, friction locks or cotter pins.
      h. All pins and loose pieces shall be tethered to a davit arm piece with 1/8 inch stainless steel multiple wire rope, complete with lead connectors and in a manner to allow easy connection.

i. Provide handle on each davit arm for carrying purposes.
j. Provide transportable sockets suited to davit arms as required.
k. Davit Arm Booms: Equipped with a friction trolley to which the line will be connected.
l. Provide stops to prevent trolley from detachment from boom.
m. Provide information plate on davit of non-corrosive material with maximum service capacity of arm and name, address and telephone number of supplier. Mount plate in prominent location on arm.

3. Fall Arrest Safety Anchors:
   a. Fall arresting force safety factor of 2 to 1 without permanent deformation: 1800 lbs minimum.
   b. Fall arrest force against fracture or detachment: 5,000 lbs minimum.
   c. Safety anchoring eye shall be of not less than 3/4 inch diameter material with an eye opening not less than 2-1/2 inch diameter. Anchor eye shall be of stainless steel. Bolts and connecting hardware shall be made of stainless steel.
   d. Height: As required to provide minimum 8-inches exposure above roof surface, unless indicated otherwise.
   e. Provide information plate on anchor, made of non-corrosive material, stating maximum service capacity of anchor, and name, address and telephone number of supplier. Mount plate in prominent location on anchor.

2.7 MISCELLANEOUS MATERIALS

A. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

B. Signage: Provide permanent, durable, legible signage at each access point to roof. Signage shall draw attention to fall protection provisions, and provide directions for use, using words and graphics.
   1. Provide frame and minimum 0.180 inch acrylic glazing, securely anchored to wall, or other approved materials.
   2. Include the following heading in minimum 1-inch letters : œœWorkers: Read This for Safety.• • In addition to English, provide the heading, in same size letters, in Spanish, French, and Arabic.

C. Personnel Equipment: Shall include 11 sets of harnesses, tethers, hardware, and carrying case for each set.
   1. Small: 2 sets; Medium: 2 sets; Large: 2 sets; X-Large: 4 sets; 2X-Large: 1 set.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of fall protection equipment.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Commencement of Work constitutes Contractor's acceptance of substrates and conditions.

3.2 INSTALLATION

A. Install fall protection equipment systems in accordance with approved shop drawings, specifications, manufacturer's instructions and under supervision of a professional engineer registered in state in which Project is located.

B. Provide handling, installation instructions, anchorage information, roughing-in dimensions, templates and service requirements for completion of work of this Section. Assist or supervise, or both, setting of anchorage devices when handled by others. Provide advice and assistance with respect to construction of other work related to products specified in this section.

C. Install all work true, level, tightly fitted, and flush to adjacent surfaces where required for installation.

D. Provide anchorage and mounting devices required for installation of each product.

E. Deform threads of all exposed studs behind nuts after nuts have been tightened.

F. Where contact is made between dissimilar materials, protect components with bituminous paint or other materials, to prevent corrosion.

3.3 FIELD QUALITY CONTROL

A. Conduct full live load and operational tests, after completion of the installation, under maximum design live loading conditions over a selected range of the building surfaces, in accord with applicable standards.

B. At a time mutually agreeable to all parties, allow one full day to conduct operational demonstrations for the Owner and/or the Owner's representative, after completion of the operational tests.

C. Repair or replace any components and correct all deficiencies observed as a result of these tests and demonstrations, and retest to assure compliance with the Contract Documents.

3.4 ADJUSTING AND CLEANING

A. Adjust fall protection equipment for proper, safe, efficient operation.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fall protection equipment.

END OF SECTION

SECTION 118201 – HYDRAULIC CART TIPPER

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Hydraulic Cart Tipper

1.2 RELATED REQUIREMENTS

A. Section 118226 – Facility Waste Compactors

B. Related Documents: Provisions established within General and Supplementary Conditions of the Contract, Division 1 General Requirements and Drawings are collectively applicable to this Section.

C. All equipment furnished under this contract shall meet all applicable local, state and federal Codes.

D. The Contractor shall verify with the Owner if the equipment in this Specification section will be provided by the waste hauler as part of the waste removal agreement.
   1. If the waste hauler is providing the equipment specified in this Section as part of the waste removal agreement, the Contraction is responsible for verifying the specification requirements with the waste hauler.

1.3 SUBMITTALS

A. Before executing any work under this section of specifications, furnish submittals in accordance with Section 013300 – Submittal Procedures, to show full compliance with contract requirements on items proposed to be furnished.
   1. Product Data and Equipment Manufacturer's Literature
      a. Brochures showing name and address of Equipment Manufacturer, catalog or model number of each item incorporated into the work.
      b. Equipment Manufacturer's illustration and detailed description.
      c. List of deviations from Specifications.
      d. List of commonly replaced parts for the equipment specified. Include the frequency of replacement, unit pricing and delivery times for each item.
   2. Certificates: The Equipment Manufacturer shall certify that the product offered meets the characteristics of the specified description and that the product conforms to the producer's own drawings, specifications, standards, and quality assurance practices.
   3. Test Reports: Provide certified equipment test reports on each type of equipment to be furnished. Reports shall include, but not be limited to, scale accuracy.
      a. Tests shall be conducted by the Equipment Manufacturer in the Equipment Manufacturer's own facility, and shall also be conducted on the same type of equipment to be furnished on this Project.
      b. Test records need not be re-certified providing no essential change in design has been made since tests were conducted.
   4. Shop Drawings: Complete and detailed for each item indicating fabrication and erection of dock equipment including plans, elevations and large-scale details.

B. Closeout Submittals: Provide closeout submittals and documents.

C. Installation Drawings: Show dimensions method of assembly, installation, and conditions relating to adjoining work which requires cutting or close fitting, reinforcement, anchorage, and other work required for complete installation for equipment detailed in this Section.

D. Review: Submittals will be reviewed for general design only, and not for method of assembly, construction, or detailed compliance with Contract Documents.

E. No deviation from Contract Documents is permitted unless specifically so noted by the General Contractor and accepted by the General Contractor in writing.

F. General Contractor Responsibility:
1. Errors or omissions in submittals regardless of review status of submittals
2. Coordination with work of other trades.
3. Space coordination and code compliance.
4. Assembly and installation techniques, including structural adequacy and suitable bracing and / or anchoring for stability and seismic conditions.
5. Maintenance of installation safety.
6. Satisfactory performance of all work.

1.4 QUALITY ASSURANCE

A. Qualifications: Equipment Manufacturer shall regularly and currently manufacture specified equipment as one of its principal products.

B. Equipment Manufacturer shall have technical qualifications, experience, trained personnel, and facilities to install specified items.

C. Equipment Manufacturer shall have equivalent product currently installed at three (3) installations similar to this Project that has been in satisfactory and efficient operation for three (3) years.

D. There shall be a permanent service organization, maintained and trained by Equipment Manufacturer, which will render emergency service within four (4) hours of notification that service is needed.

E. All materials and equipment to be permanently installed shall be new and of such quality to satisfy the standards of the Documents. The Equipment Manufacturer, if required, shall furnish satisfactory evidence as to the kind and quality of all materials and equipment used.

F. Workers skilled in their respective trades shall perform all labor; workmanship shall be of good quality so that first-class work is performed in accordance with the standards of construction set forth in the Documents.

G. The General Contractor and the Equipment Manufacturer are solely responsible for the accurate installation of equipment / systems and are to correct any operational aspects and deficiencies without recourse to the Owner.

H. If any work is performed which is contrary to any laws, ordinances, Codes, rules and regulations, the Equipment Vendor will make all necessary changes as required to comply therewith and bear all costs arising there from without additional cost to the Owner.

I. All parts of equipment shall be of design, size and materials to satisfactorily function under all conditions within rated load and speed range; all with proper factors of safety, maximum and electrical efficiency and minimum wear on parts.

J. All parts shall be built to definite standard dimensions and tolerances so that it will be possible to replace and / or adjust any part without tooling or machining being required to install replacement parts.

K. Mechanical fastenings used on parts to wear and replacement shall be key and seat, nut screw, or other removable and replaceable types, which do not require physical deformation or field positioning. Rivets or similar devices are not permitted as mechanical fastenings for such parts.

1.5 MANUALS, DIAGRAMS AND INSTRUCTIONS

A. All manuals, diagrams, and instructions will be submitted in accordance with the Division 01 specifications.

1.6 GUARANTEE

A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the General Contractor under the requirements of the Contract Documents.

B. Special Warranty: The equipment furnished is to be guaranteed for two (2) full years, from the date of acceptance and beneficial use or as detailed on the Documents. This guarantee is to include all replacement parts, as necessary to keep the equipment operational in accordance with the performance specifications and to the Owner's satisfaction.

C. All labor and materials furnished in connection with the installation of equipment shall be covered under the general warranty. Additional details may be provided in the RFP and the contractor must meet the warranty requirements of both the RFP and this equipment specification. Upon receipt of notice from the Owner of failure of any portion of materials and workmanship furnished, the General Contractor shall promptly replace the affected part(s) with new part(s) at his own expense.

D. No device shall be acceptable that will not give satisfactory performance without excessive maintenance and attention. If it becomes evident during the guarantee period that the device is not functioning properly or in accordance with the Contract requirements, or if in the opinion of the Owner, excessive maintenance and attention must be employed to keep such device operating, the device must be removed. A new device meeting all requirements shall be installed as part of contractual work until satisfactory operation of installation is obtained. The period of guarantee shall start anew from the date of completion of each new installation performed in accordance with the preceding requirements.

1.7 EQUIPMENT MAINTENANCE

A. The Owner shall be provided with a formal Preventive Maintenance Contract with a detailed parts list, replacement costs, descriptions and designations. The Preventive Maintenance Contract, if accepted by the Owner, is not to go into effect until after the guarantee expires. The Owner has the option to accept or decline the Preventive Maintenance Contract.

B. Maintenance Training Program shall be provided to the Owner, at the Equipment Manufacturer's factory, for training of additional Hospital technicians. Costs for this program shall be at the standard rate for this service.

C. One month before the equipment guarantee is to expire; the Equipment Manufacturer shall provide a review of the maintenance instruction program along with a review of the Preventive Maintenance Contract with its detailed parts list, individual replacement costs, descriptions and designations.

1.8 TOOLS

A. Provide one (1) complete set of special tools necessary to maintain and make adjustments on every part of the equipment, if such tools are required for the maintenance of the equipment.

1.9 CONSTRUCTION CONDITIONS

A. Provide all necessary anchor bolts, shims, fastenings, recesses, cutouts, slots, holes, patching and the like to perform installation of equipment to code and regulations.

B. Coordinate installation with other trades. Provide and obtain dimensions, clearances and similar data.

1.10 ELECTRICAL EQUIPMENT

A. Electrical equipment shall be suitable for use with electrical system shown on the Drawings.

B. Provide electrical components including motors, disconnect switches, motor controllers, motor control devices, and electrical circuits and connections, which conform to requirements of NFPA 70 whether or not electrical components are furnished as part of equipment assemblies.

C. Provide all electrical wiring, conduit, and all electrical devices necessary for the installation and operation of systems and equipment furnished.

1.11 PROJECT CONDITIONS

A. In order to discover and resolve conflicts or lack of definition, which might create problems, the Equipment Manufacturer must review contract documents for compatibility with its product prior to bidding.
   1. Review structural, architectural, electrical, mechanical and plumbing drawings, and specifications.
   2. Compliance with all provisions of the contract documents is assumed in the absence of written and approved exceptions.
   3. The design of the structural, mechanical and plumbing systems within the Project are fixed.

4. The Equipment Manufacturer's equipment shall fit and operate within these fixed elements.

PART 2 - PRODUCTS

2.1 HYDRAULIC CART Tippers

A. System Description
1. Provide quantities as shown on the Contract Drawings.
2. Design Requirements: Provide turn-key cart tipper system to dump general waste and recycle waste carts into the charge box of the compactor.
3. Provide cart tipper, which has been manufactured, fabricated, and installed to withstand loads specified and to maintain performance criteria stated by manufacturer without defects or failure.
4. Provide charge-box interface chute and all associated structural steel to support the tipper and the loaded cart.

B. General Operation
1. The cart tipper is to dump waste and recycle carts from the dock into the charge box of the compactor(s).
2. Cycle time: The unit shall have a cycle time of no more than 45 seconds.

C. Fabrication
1. Unit supplied completely assembled, ready for use.
2. Cart tippers shall have a capacity of 2,000 pounds.
3. Hydraulic Cylinders
   a. Provide a minimum of two hydraulic cylinders on either side of cart for stability and durability.
4. Frame
   a. Welded base frame construction.
   b. Provide a structural steel frame, high tensile steel pivot shaft and heavy duty bearings.
5. Power Unit
   a. Provide a power unit for the hydraulic lift.
   b. All individual components, as well as the control unit, shall be UL-approved.

D. Cart Attachment
1. The cart attachments shall securely attach to a tilt cart style cart. The cart tipper vendor shall work with cart supplier to ensure minimal movement of the cart during the dump cycle.
2. Provide an adjustable hold down bar and side hold down angles to support the cart.

E. Interface
1. The cart tipper will be located on a platform exterior to the loading dock. The cart tipper shall fully operate without interfering our coming into contact with doors, overhead obstructions, or compactor/container.
2. The cart tipper shall interface with the compactor/container(s) being specified for this Project.
3. The cart tipper shall interface with the waste carts being provided for this Project.

F. Safety
   1. Provide safety mechanisms to securely attach the cart to the cart tipper.
   2. Provide emergency stop button to stop the equipment in the event of an emergency.

PART 3 - EXECUTION

3.1 MANUFACTURED PRODUCTS

A. Materials, fixtures, and equipment furnished shall be of current production by Equipment Manufacturers regularly engaged in the manufacture of such items.

B. Units shall be products of one Equipment Manufacturer.

C. Equipment Manufacturer of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled units.

D. Components of an assembled unit need not be products of same Equipment Manufacturer.

E. Constituent parts, which are alike, shall be the products of a single Equipment Manufacturer.

F. Components shall be compatible with each other and with the total assembly for the intended service.

G. Nameplate:
   1. Each piece of equipment shall bear a corrosion-resisting steel, or deep-etched anodized aluminum nameplate located in a reasonably accessible position, permanently secured.
      a. Nameplate shall be proportionate to size of equipment and bear the following:
      b. Name of Equipment Manufacturer.
      c. Model number.
      d. Serial number.
      e. Electrical characteristics.

H. Fasteners
   1. Rivets, bolts, nuts, studs, spacers, and metal used for welding shall be same kind of metal as materials joined.
   2. Where corrosion-resisting metals are joined to each other or to other metals, rivets, bolts, and materials used for welding shall be corrosion-resisting metal.

I. Welding
   1. Joints in fabricated equipment shall be welded by an accepted method. Carbon arc welding is not acceptable, nor is any process permitting the pick-up of carbon acceptable.
   2. Welds shall be strong and ductile, with exposed surfaces free of imperfections such as pits, runs, spatter, and cracks, and shall have same color as adjoining surfaces.

J. Steel Fabrication
   1. Steel shall be free from kinks and sharp bends. Shearing and shipping shall be done neatly and accurately. Flame cutting may be employed instead of shearing

or sawing. Re-entrant cuts shall be made in the best possible manner. Burned surfaces or flame cut materials shall be ground or machined to remove ash and checks.

2. All joints, openings, and doors shall be square and neat. The finished equipment shall be free from sharp edges, fins, burrs, and sharp projections.
3. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be continuous for all major joints, and shall have the strength required to satisfy the design, use, and loading conditions. Intermittent welds may be used for attaching reinforcement members provided such welds will satisfy the design. Members to be welded shall be positioned and held by jigs or fixtures when necessary to ensure accurate alignment. All outside corners of the containment body shall be of butt joint construction.
4. Castings shall be sound and free from patching, misplaced coring, warping, or other defects, which might render the casting unsound for use. Forging shall be uniform in quality and condition, and shall be free from tears, cracks, seams, laps, internal ruptures, imbedded scale, segregation or other defects, which may detrimentally affect the suitability for the purpose intended.

3.2 EXAMINATION

A. Examine surfaces to receive product before application to ensure that the following conditions are met:
   1. Before shipment from Equipment Manufacturer's plant and following installation at project site, finished articles shall be thoroughly inspected and tested for compliance with specifications.
   2. Equipment Manufacturer shall inspect the site and conditions for which the equipment is to be installed and advise the General Contractor, in writing, of any conditions detrimental to the proper installation and operation of the equipment.

B. Do not start the work of this section until all deficiencies have been corrected. Commencement of work constitutes acceptance of the surfaces.

3.3 PREPARATION

A. Protect equipment against dirt, water, and chemicals during installation. Thoroughly clean equipment at the completion of work.

3.4 INSTALLATION

A. The work under this Section of the Specification shall include all labor, services, materials and equipment and the performance of all work as necessary and required to furnish and install the equipment as indicated on the Drawings and as specified above.

B. Delivery and installation of the equipment shall be so performed as to avoid delay on the work by other contractors. The General Contractor shall be responsible for receiving, uncrating, setting in place all of the equipment, and providing all the proper utilities, under the supervision of the Equipment Manufacturers.

C. The Equipment Manufacturer shall be responsible for all final connections of their equipment.

D. The equipment locations, as shown on the Drawings shall be checked by the General Contractor and the Equipment Manufacturers. All exact locations shall be determined by the dimensions of the equipment, and the layout drawing before an apparatus is installed. The General Contractor shall be solely responsible for the accurate installation and correct any operational aspects and deficiencies of his equipment without any recourse to the Owner.

E. The General Contractor and the Equipment Manufacturer shall consult the architectural and structural drawings for all dimensions, locations of partitions, locations of pipes and ductwork.

F. The General Contractor and the Equipment Manufacturer shall have a factory trained, field service technician on the premises to supervise the installation of all equipment. This service shall be at no additional cost to the Owner.

3.5 WORK BY OTHER TRADES

A. The mechanical, electrical and plumbing contractors shall, within their specific areas of responsibilities, provide all labor, services, and materials required to complete the following work:
   1. Electric power wiring services to motors and control panels, which will be provided by the General Contractor, will be as shown on the electrical working drawings or equipment shop drawings. All other wiring not shown on these drawings shall be provided by the Equipment Manufacturer.

B. All labor and materials furnished in connection with the installation shall meet all applicable local, state and Federal Codes, including OSHA, and shall be subject to terms of "General Conditions".

3.6 TESTS BY EQUIPMENT MANUFACTURER

A. Equipment manufacturer shall provide equipment-commissioning services as required by the owner. A detailed recommended commissioning plan shall be approved by the owner prior to testing and acceptance of the equipment. Equipment Manufacturer shall perform tests under normal operating conditions and in presence of the Owner.

B. Provide all equipment, instruments, and labor required for tests.

C. Evidence of malfunction in any tested system, piece of equipment, or component part thereof that occurs during, or as a result of tests, shall be corrected, repaired or replaced, and the test repeated.

3.7 OPERATING AND MAINTENANCE / REPAIR TRAINING BY EQUIPMENT MANUFACTURER

A. An orientation and continuing education program shall be presented to employees when the equipment is operational. The program is to be presented by a full time employee of the Equipment Manufacturer, trained in the respective department functions. The program is to be based on the department operations and employee responsibilities with audio-visual aid equipment and tape programs including operating manuals. The audio-visual programs shall be provided to the Owner at no cost for future use.

B. A factory trained representative shall provide equipment demonstration to all of the appropriate employees, including proper daily and emergency equipment operational instructions with daily start-up and shutdown procedures. Owner shall determine schedule and number of meetings to provide to all staff.

C. An instruction program shall be provided to the Owner's maintenance personnel, by fully trained and full-time instructors, on the maintenance, care, adjustment and operation of the Equipment as detailed above.

D. All instruction shall include classroom and "hands on" training when the equipment is in operation, but before the Owner begins beneficial use. The program is to include a review of equipment operation and characteristics, maintenance manuals, schematics and spare part recommendations.

3.8 EMERGENCY SERVICE

A. During the duration of the warranty, the Equipment Manufacturer must provide emergency service within twenty-four (24) hours of notification of trouble and return to operation any piece of equipment within forty-eight (48) hours of reported failure. This service is to be performed by the Equipment Manufacturer at no additional cost to the Owner.

END OF SECTION

SECTION 118226 – FACILITY WASTE COMPACTORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Integrated compactor container

B. Dock mounted winch system

1.2 RELATED REQUIREMENTS

A. Section 118201 – Hydraulic Cart Tipper

B. Related Documents: Provisions established within General and Supplementary Conditions of the Contract, Division 1 General Requirements and Drawings are collectively applicable to this Section.

C. All equipment furnished under this contract shall meet all applicable local, state and federal Codes.

D. The Contractor shall verify with the Owner if the equipment in this Specification section will be provided by the waste hauler as part of the waste removal agreement.

1. If the waste hauler is providing the equipment specified in this Section as part of the waste removal agreement, the Contraction is responsible for verifying the specification requirements with the waste hauler.

1.3 REFERENCE STANDARDS

A. All equipment shall comply with the requisite standards both locally and nationally for the installation of the equipment. The standards shall include all amendments, addenda and errata.

B. ANSI Z245-2 – American National Standard for Equipment Technology and Operations for Wastes and Recyclable Materials- Stationary Compactors- Safety Requirements.

1.4 SUBMITTALS

A. Before executing any work under this section of specifications, furnish submittals in accordance with Section 013300 – Submittal Procedures, to show full compliance with contract requirements on items proposed to be furnished.

1. Product Data and Equipment Manufacturer's Literature
   a. Brochures showing name and address of Equipment Manufacturer, catalog or model number of each item incorporated into the work.
   b. Equipment Manufacturer's illustration and detailed description.
   c. List of deviations from Specifications.
   d. List of commonly replaced parts for the equipment specified. Include the frequency of replacement, unit pricing and delivery times for each item.
2. Certificates: The Equipment Manufacturer shall certify that the product offered meets the characteristics of the specified description and that the product conforms to the producer's own drawings, specifications, standards, and quality assurance practices.
3. Test Reports: Provide certified equipment test reports on each type of equipment to be furnished. Reports shall include, but not be limited to, scale accuracy.
   a. Tests shall be conducted by the Equipment Manufacturer in the Equipment Manufacturer's own facility, and shall also be conducted on the same type of equipment to be furnished on this Project.

b. Test records need not be re-certified providing no essential change in design has been made since tests were conducted.

4. Shop Drawings: Complete and detailed for each item indicating fabrication and erection of dock equipment including plans, elevations and large-scale details.

B. Closeout Submittals: Provide closeout submittals and documents.

C. Installation Drawings: Show dimensions method of assembly, installation, and conditions relating to adjoining work which requires cutting or close fitting, reinforcement, anchorage, and other work required for complete installation for equipment detailed in this Section.

D. Review: Submittals will be reviewed for general design only, and not for method of assembly, construction, or detailed compliance with Contract Documents.

E. No deviation from Contract Documents is permitted unless specifically so noted by the General Contractor and accepted by the General Contractor in writing.

F. General Contractor Responsibility:
1. Errors or omissions in submittals regardless of review status of submittals
2. Coordination with work of other trades.
3. Space coordination and code compliance.
4. Assembly and installation techniques, including structural adequacy and suitable bracing and / or anchoring for stability and seismic conditions.
5. Maintenance of installation safety.
6. Satisfactory performance of all work.

1.5 QUALITY ASSURANCE

A. Qualifications: Equipment Manufacturer shall regularly and currently manufacture specified equipment as one of its principal products.

B. Equipment Manufacturer shall have technical qualifications, experience, trained personnel, and facilities to install specified items.

C. Equipment Manufacturer shall have equivalent product currently installed at three (3) installations similar to this Project that has been in satisfactory and efficient operation for three (3) years.

D. There shall be a permanent service organization, maintained and trained by Equipment Manufacturer, which will render emergency service within twenty-four (24) hours of notification that service is needed.

E. All materials and equipment to be permanently installed shall be new and of such quality to satisfy the standards of the Documents. The Equipment Manufacturer, if required, shall furnish satisfactory evidence as to the kind and quality of all materials and equipment used.

F. Workers skilled in their respective trades shall perform all labor; workmanship shall be of good quality so that first-class work is performed in accordance with the standards of construction set forth in the Documents.

G. The General Contractor and the Equipment Manufacturer are solely responsible for the accurate installation of equipment / systems and are to correct any operational aspects and deficiencies without recourse to the Owner.

H. If any work is performed which is contrary to any laws, ordinances, Codes, rules and regulations, the Equipment Vendor will make all necessary changes as required to comply therewith and bear all costs arising there from without additional cost to the Owner.

I. All parts of equipment shall be of design, size and materials to satisfactorily function under all conditions within rated load and speed range; all with proper factors of safety, maximum and electrical efficiency and minimum wear on parts.

J. All parts shall be built to definite standard dimensions and tolerances so that it will be possible to replace and / or adjust any part without tooling or machining being required to install replacement parts.

K. Mechanical fastenings used on parts to wear and replacement shall be key and seat, nut screw, or other removable and replaceable types, which do not require physical deformation or field positioning. Rivets or similar devices are not permitted as mechanical fastenings for such parts.

1.6 MANUALS, DIAGRAMS AND INSTRUCTIONS

A. All manuals, diagrams, and instructions will be submitted in accordance with the Division 01 specifications.

1.7 GUARANTEE

A. General Warranty: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the General Contractor under the requirements of the Contract Documents.

B. Special Warranty: The equipment furnished is to be guaranteed for two (2) full years, from the date of acceptance and beneficial use or as detailed on the Documents. This guarantee is to include all replacement parts, as necessary to keep the equipment operational in accordance with the performance specifications and to the Owner's satisfaction.

C. All labor and materials furnished in connection with the installation of equipment shall be covered under the general warranty. Additional details may be provided in the RFP and the contractor must meet the warranty requirements of both the RFP and this equipment specification. Upon receipt of notice from the Owner of failure of any portion of materials and workmanship furnished, the General Contractor shall promptly replace the affected part(s) with new part(s) at his own expense.

D. No device shall be acceptable that will not give satisfactory performance without excessive maintenance and attention. If it becomes evident during the guarantee period that the device is not functioning properly or in accordance with the Contract requirements, or if in the opinion of the Owner, excessive maintenance and attention must be employed to keep such device operating, the device must be removed. A new device meeting all requirements shall be installed as part of contractual work until satisfactory operation of installation is obtained. The period of guarantee shall start anew from the date of completion of each new installation performed in accordance with the preceding requirements.

1.8 EQUIPMENT MAINTENANCE

A. The Owner shall be provided with a formal Preventive Maintenance Contract with a detailed parts list, replacement costs, descriptions and designations. The Preventive Maintenance Contract, if accepted by the Owner, is not to go into effect until after the guarantee expires. The Owner has the option to accept or decline the Preventive Maintenance Contract.

B. Maintenance Training Program shall be provided to the Owner, at the Equipment Manufacturer's factory, for training of additional Hospital technicians. Costs for this program shall be at the standard rate for this service.

C. One month before the equipment guarantee is to expire; the Equipment Manufacturer shall provide a review of the maintenance instruction program along with a review of the Preventive Maintenance Contract with its detailed parts list, individual replacement costs, descriptions and designations.

1.9 TOOLS

A. Provide one (1) complete set of special tools necessary to maintain and make adjustments on every part of the equipment, if such tools are required for the maintenance of the equipment.

1.10 CONSTRUCTION CONDITIONS

A. Provide all necessary anchor bolts, shims, fastenings, recesses, cutouts, slots, holes, patching and the like to perform installation of equipment to code and regulations.

B. Coordinate installation with other trades. Provide and obtain dimensions, clearances and similar data.

1.11 ELECTRICAL EQUIPMENT

A. Electrical equipment shall be suitable for use with electrical system shown on the Drawings.

B. Provide electrical components including motors, disconnect switches, motor controllers, motor control devices, and electrical circuits and connections, which conform to requirements of NFPA 70 whether or not electrical components are furnished as part of equipment assemblies.

C. Provide all electrical wiring, conduit, and all electrical devices necessary for the installation and operation of systems and equipment furnished.

1.12 PROJECT CONDITIONS

A. In order to discover and resolve conflicts or lack of definition, which might create problems, the Equipment Manufacturer must review contract documents for compatibility with its product prior to bidding.
   1. Review structural, architectural, electrical, mechanical and plumbing drawings, and specifications.
   2. Compliance with all provisions of the contract documents is assumed in the absence of written and approved exceptions.
   3. The design of the structural, mechanical and plumbing systems within the Project are fixed.
   4. The Equipment Manufacturer’s equipment shall fit and operate within these fixed elements.

PART 2 - PRODUCTS

2.1 INTEGRATED COMPACTOR CONTAINER

A. Description:
1. Provide quantities as shown on the Contract Drawings.
2. Manufacturer's standard stationary-horizontal self-contained horizontal combination-container -type stationary compactor, complying with requirements, liquid-tight, and with components, options, and accessories needed to provide a complete, functional system.
3. Rated container capacity: 30 Cubic yards.
4. Provide a charge box capacity with a minimum WASTEC Rating of 1.31 cu. yd.
   a. Clear Top Opening (Length by Width): Minimum 41 inches by 58 inches.

B. General Requirements
1. Cycle Time: Maximum 40 seconds.
2. Total Normal Force (Normal): approximately 40,000 lbf.
3. Total Maximum Force: approximately 51,000 lbf.
4. Normal Ram Face Pressure: approximately 24.5 psi.
5. Maximum Ram Face Pressure: approximately 30.0 psi.
6. Ram Penetration: Minimum 6"
7. Ground Height: Minimum 8'-6".
8. Motor Size: 10 hp.
9. Finish: Manufacturer's standard.
10. Maximum Length – 23’9” (285”)
11. Electrical Power Supply: 208, 120 VAC, 3 phase, 60 Hz.
    a. Coordinate wiring requirements and current characteristics with building electrical system.

C. Hydraulic Equipment:
1. Provide manufacturer’s standard, self-contained, electric, hydraulic power unit for the compactor, controlled from a remotely located push-button station.
2. Hydraulic Pump: approximately 10 gpm
3. Normal Pressure: approximately 1,850 psi
4. Maximum Pressure 2,400 psi
5. Hydraulic Cylinders:
   a. Bore: approximately 4"
   b. Rod: approximately 2"

D. Controls: Standard 3 Push Button Station
1. Start
2. Stop
3. Reverse

E. Embedded Steel Plates
1. Provide embedded steel plates with a minimum thickness of 3/8 inches and a minimum width of 12 inches from the edge of the dock to the container resting position.
2. Secure the embedded steel plates with a minimum of 3/4 inch anchor bolt as required.
3. Contractor shall be responsible for coordinating locations with equipment supplier.

F. Container Guides
   1. Provide a container guide rail system to appropriately position the container at the dock.
   2. The guide rails shall be positions at the dock edge and extend as required by the container
      a. Contractor shall be responsible for coordinating locations with equipment supplier.

G. Safety Devices:
   1. Provide manufacturer's standard and original safety devices.

2.2 WINCH SYSTEM

A. Description:
   1. Provide quantities as shown on the Contract Drawings.
   2. Winch system shall be designed to pull empty containers from the truck onto the dock and into the appropriate position.
   3. The winch system shall be securely mounted to the dock directly in front of the compactor.
   4. The winch system shall be installed near the center of the compactor at its stations position.
   5. The winch shall not interfere with the operation of the hydraulic cart dumper loading waste into the compactor.

B. Requirements:
   1. The capacity of the winch is to be engineered by the vendor and shall have sufficient capacity to pull empty container (max 12,000 lbs.) from the truck into position.
   2. The Contractor is responsible for coordinating the electrical requirements with the equipment supplier.
   3. The Contractor is responsible for coordinating the anchoring requirements with the equipment supplier.
   4. The Contractor and equipment supplier shall be responsible for coordinate the winch requirements with the local waste hauler.

C. Interface:
   1. System shall interface with the compactor containers specified for this Project.
   2. System shall interface with the hydraulic cart dumpers specified for this Project.
   3. The Contractor shall be responsible for coordinate the winch requirements with the local waste hauler to ensure compatibility with the waste container removal vehicle.

PART 3 - EXECUTION

3.1 MANUFACTURED PRODUCTS

A. Materials, fixtures, and equipment furnished shall be of current production by Equipment Manufacturers regularly engaged in the manufacture of such items.

B. Units shall be products of one Equipment Manufacturer.

C. Equipment Manufacturer of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled units.

D. Components of an assembled unit need not be products of same Equipment Manufacturer.

E. Constituent parts, which are alike, shall be the products of a single Equipment Manufacturer.

F. Components shall be compatible with each other and with the total assembly for the intended service.

G. Nameplate:
   1. Each piece of equipment shall bear a corrosion-resisting steel, or deep-etched anodized aluminum nameplate located in a reasonably accessible position, permanently secured.
      a. Nameplate shall be proportionate to size of equipment and bear the following:
      b. Name of Equipment Manufacturer.
      c. Model number.
      d. Serial number.
      e. Electrical characteristics.

H. Fasteners
   1. Rivets, bolts, nuts, studs, spacers, and metal used for welding shall be same kind of metal as materials joined.
   2. Where corrosion-resisting metals are joined to each other or to other metals, rivets, bolts, and materials used for welding shall be corrosion-resisting metal.

I. Welding
   1. Joints in fabricated equipment shall be welded by an accepted method. Carbon arc welding is not acceptable, nor is any process permitting the pick-up of carbon acceptable.
   2. Welds shall be strong and ductile, with exposed surfaces free of imperfections such as pits, runs, spatter, and cracks, and shall have same color as adjoining surfaces.

J. Steel Fabrication
   1. Steel shall be free from kinks and sharp bends. Shearing and shipping shall be done neatly and accurately. Flame cutting may be employed instead of shearing or sawing. Re-entrant cuts shall be made in the best possible manner. Burned surfaces or flame cut materials shall be ground or machined to remove ash and checks.
   2. All joints, openings, and doors shall be square and neat. The finished equipment shall be free from sharp edges, fins, burrs, and sharp projections.
   3. The surface of parts to be welded shall be free from rust, scale, paint, grease, or other foreign matter. Welds shall be continuous for all major joints, and shall have the strength required to satisfy the design, use, and loading conditions. Intermittent welds may be used for attaching reinforcement members provided such welds will satisfy the design. Members to be welded shall be positioned and held by jigs or fixtures when necessary to ensure accurate alignment. All outside corners of the containment body shall be of butt joint construction.
   4. Castings shall be sound and free from patching, misplaced coring, warping, or other defects, which might render the casting unsound for use. Forging shall be uniform in quality and condition, and shall be free from tears, cracks, seams, laps, internal ruptures, imbedded scale, segregation or other defects, which may detrimentally affect the suitability for the purpose intended.

3.2 EXAMINATION

A. Examine surfaces to receive product before application to ensure that the following conditions are met:
   1. Before shipment from Equipment Manufacturer's plant and following installation at project site, finished articles shall be thoroughly inspected and tested for compliance with specifications.
   2. Equipment Manufacturer shall inspect the site and conditions for which the equipment is to be installed and advise the General Contractor, in writing, of any conditions detrimental to the proper installation and operation of the equipment.

B. Do not start the work of this section until all deficiencies have been corrected. Commencement of work constitutes acceptance of the surfaces.

3.3 PREPARATION

A. Protect equipment against dirt, water, and chemicals during installation. Thoroughly clean equipment at the completion of work.

3.4 INSTALLATION

A. The work under this Section of the Specification shall include all labor, services, materials and equipment and the performance of all work as necessary and required to furnish and install the equipment as indicated on the Drawings and as specified above.

B. Delivery and installation of the equipment shall be so performed as to avoid delay on the work by other contractors. The General Contractor shall be responsible for receiving, uncrating, setting in place all of the equipment, and providing all the proper utilities, under the supervision of the Equipment Manufacturers.

C. The Equipment Manufacturer shall be responsible for all final connections of their equipment.

D. The equipment locations, as shown on the Drawings shall be checked by the General Contractor and the Equipment Manufacturers. All exact locations shall be determined by the dimensions of the equipment, and the layout drawing before an apparatus is installed. The General Contractor shall be solely responsible for the accurate installation and correct any operational aspects and deficiencies of his equipment without any recourse to the Owner.

E. The General Contractor and the Equipment Manufacturer shall consult the architectural and structural drawings for all dimensions, locations of partitions, locations of pipes and ductwork.

F. The General Contractor and the Equipment Manufacturer shall have a factory trained, field service technician on the premises to supervise the installation of all equipment. This service shall be at no additional cost to the Owner.

3.5 WORK BY OTHER TRADES

A. The mechanical, electrical and plumbing contractors shall, within their specific areas of responsibilities, provide all labor, services, and materials required to complete the following work:
   1. Electric power wiring services to motors and control panels, which will be provided by the General Contractor, will be as shown on the electrical working drawings or equipment shop drawings. All other wiring not shown on these drawings shall be provided by the Equipment Manufacturer.

B. All labor and materials furnished in connection with the installation shall meet all applicable local, state and Federal Codes, including OSHA, and shall be subject to terms of "General Conditions".

3.6 TESTS BY EQUIPMENT MANUFACTURER

A. Equipment manufacturer shall provide equipment-commissioning services as required by the owner. A detailed recommended commissioning plan shall be approved by the owner prior to testing and acceptance of the equipment. Equipment Manufacturer shall perform tests under normal operating conditions and in presence of the Owner.

B. Provide all equipment, instruments, and labor required for tests.

C. Evidence of malfunction in any tested system, piece of equipment, or component part thereof that occurs during, or as a result of tests, shall be corrected, repaired or replaced, and the test repeated.

3.7 OPERATING AND MAINTENANCE / REPAIR TRAINING BY EQUIPMENT MANUFACTURER

A. An orientation and continuing education program shall be presented to employees when the equipment is operational. The program is to be presented by a full time employee of the Equipment Manufacturer, trained in the respective department functions. The program is to be based on the department operations and employee responsibilities with audio-visual aid equipment and tape programs including operating manuals. The audio-visual programs shall be provided to the Owner at no cost for future use.

B. A factory trained representative shall provide equipment demonstration to all of the appropriate employees, including proper daily and emergency equipment operational instructions with daily start-up and shutdown procedures. Owner shall determine schedule and number of meetings to provide to all staff.

C. An instruction program shall be provided to the Owner's maintenance personnel, by fully trained and full-time instructors, on the maintenance, care, adjustment and operation of the Equipment as detailed above.

D. All instruction shall include classroom and "hands on" training when the equipment is in operation, but before the Owner begins beneficial use. The program is to include a review of equipment operation and characteristics, maintenance manuals, schematics and spare part recommendations.

3.8 EMERGENCY SERVICE

A. During the duration of the warranty, the Equipment Manufacturer must provide emergency service within twenty-four (24) hours of notification of trouble and return to operation any piece of equipment within forty-eight (48) hours of reported failure. This service is to be performed by the Equipment Manufacturer at no additional cost to the Owner.

END OF SECTION

SECTION 122413 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Manually operated, single-roller shades.
   2. Manually operated, double-roller shades.
   3. Motor-operated, single-roller shades.
   4. Motor-operated, double-roller shades.

B. Related Requirements:
   1. Section 017823 "Operation and Maintenance Data".

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Sustainable Design Submittals:
   1. Product Data: Material Ingredient Documentation
   2. Product Data: For shade systems and shade cloth indicating compliance with General Emissions Evaluation.

C. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
   1. Motor-Operated Shades: Include details of installation and diagrams for power, signal, and control wiring.

D. Samples: For each exposed product and for each color and texture specified, 10 inches long.

E. Product Schedule: For roller shades. Use same designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than 2 units.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Provide the following upon request:
1. Qualification Data: For Installer.
2. Product Certificates: For each type of shadeband material.
3. Product Test Reports: For each type of shadeband material, for tests performed by a qualified testing agency.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED, SINGLE-ROLLER SHADES

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Material Ingredients: Advanced Inventory and Assessment documentation that demonstrates the chemical inventory of the product to at least 0.01 percent (100 ppm).

C. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range.

D. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
1. Bead Chains: Stainless steel.

a. Loop Length: Full length of roller shade.
b. Limit Stops: Provide upper and lower ball stops.
c. Chain-Retainer Type: Chain tensioner, jamb mounted.

2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller shade weight and for lifting heavy roller shades.
   a. Provide for shadebands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criterion is more stringent.

E. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
   1. Roller Drive-End Location: Right side of interior face of shade.
   2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
   3. Shadeband-to-Roller Attachment: Manufacturer's standard method.

F. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

G. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

H. Shadebands:
   1. Shadeband Material: Light-filtering fabric.
   2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
      a. Type: Enclosed in sealed pocket of shadeband material.
      b. Color and Finish: As selected by Architect from manufacturer's full range.

I. Installation Accessories:
   1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
      a. Shape: L-shaped.
      b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 4 inches.
   2. Endcap Covers: To cover exposed endcaps.
   3. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 MANUALLY OPERATED, DOUBLE-ROLLER SHADES

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Material Ingredients: Advanced Inventory and Assessment documentation that demonstrates the chemical inventory of the product to at least 0.01 percent (100 ppm).

C. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range.

D. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
   1. Bead Chains: Stainless steel.
      a. Loop Length: Full length of roller shade .
      b. Limit Stops: Provide upper and lower ball stops.
      c. Chain-Retainer Type: Chain tensioner, jamb mounted.
   2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller shade weight and for lifting heavy roller shades.
      a. Provide for shadebands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criterion is more stringent.

E. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
   1. Double-Roller Mounting Configuration: Offset, outside roller over and inside roller under.
   2. Inside Roller:
      a. Drive-End Location: Right side of interior face of shade.
      b. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
   3. Outside Roller:
      a. Drive-End Location: Right side of interior face of shade.
      b. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
   4. Shadeband-to-Roller Attachment: Manufacturer's standard method.

F. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller mounting configuration, roller assemblies, operating mechanisms, installation accessories, and installation locations and conditions indicated.

G. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

H. Inside Shadebands:
   1. Shadeband Material: Light-blocking fabric.
   2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
      a. Type: Enclosed in sealed pocket of shadeband material.
      b. Color and Finish: As selected by Architect from manufacturer's full range.

I. Outside Shadebands:
   1. Shadeband Material: Light-filtering fabric.
   2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
      a. Type: Enclosed in sealed pocket of shadeband material.
      b. Color and Finish: As selected by Architect from manufacturer's full range.

J. Installation Accessories:

1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
   a. Shape: L-shaped.
   b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 4 inches.
2. Endcap Covers: To cover exposed endcaps.
3. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as one piece, end plates, and removable bottom closure panel.
   a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open, but not less than 4 inches.
4. Closure Panel and Wall Clip: Removable aluminum panel designed for installation at bottom of site-constructed ceiling recess or pocket and for snap-in attachment to wall clip without fasteners.
5. Side Channels: With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with shadeband guides or other means of aligning shadebands with channels at tops.
6. Bottom (Sill) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
7. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.4 MOTOR-OPERATED, SINGLE-ROLLER SHADES

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Material Ingredients: Advanced Inventory and Assessment documentation that demonstrates the chemical inventory of the product to at least 0.01 percent (100 ppm).

C. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range.

D. Motorized Operating System: Provide factory-assembled, shade-operator system of size and capacity and with features, characteristics, and accessories suitable for conditions indicated, complete with electric motor and factory-prewired motor controls, power disconnect switch, enclosures protecting controls and operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with building electrical system.
   1. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   2. Electric Motor: Manufacturer's standard tubular, enclosed in roller.
      a. Electrical Characteristics: 110-V ac.
      b. Maximum Total Shade Width: As required to operate roller shades indicated.
      c. Maximum Shade Drop: As required to operate roller shades indicated.
      d. Maximum Weight Capacity: As required to operate roller shades indicated.

3. Remote Control: Electric controls with NEMA ICS 6, Type 1 enclosure for recessed or flush mounting. Provide the following for remote-control activation of shades:
   a. Keyed Control Station: Keyed, maintained -contact, three-position, switch-operated control station with open, close, and off functions. Provide two keys per station.
   b. Individual Switch Control Station: Maintained -contact, wall-switch-operated control station with open, close, and center off functions.
      1) Switch Positions: Five.
      2) Switch Style: Toggle.
   c. Group Control Station: Maintained -contact, three-position, rocker-style, wall-switch-operated control station with open, close, and center off functions for single-switch group control.
   d. Individual/Group Control Station: Maintained -contact, three-position, rocker-style, wall-switch-operated control station with open, close, and center off functions for individual and group control.
   e. Color: As selected by Architect from manufacturer's full range.
4. Crank-Operator Override: Crank and gearbox operate shades in event of power outage or motor failure.
5. Limit Switches: Adjustable switches interlocked with motor controls and set to stop shades automatically at fully raised and fully lowered positions.
6. Operating Features:
   a. Group switching with integrated switch control; single faceplate for multiple switch cutouts.
   b. Capable of interface with audiovisual control system.
   c. Capable of accepting input from building automation control system.
   d. Override switch.

E. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
   1. Roller Drive-End Location: Right side of interior face of shade.
   2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
   3. Shadeband-to-Roller Attachment: Manufacturer's standard method.

F. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

G. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers that are operated by one roller drive-end assembly.

H. Shadebands:
   1. Shadeband Material: Light-filtering fabric.
   2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
      a. Type: Enclosed in sealed pocket of shadeband material.
      b. Color and Finish: As selected by Architect from manufacturer's full range.

I. Installation Accessories:

1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
   a. Shape: L-shaped.
   b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 4 inches.
2. Endcap Covers: To cover exposed endcaps.
3. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as one piece, end plates, and removable bottom closure panel.
   a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open, but not less than 4 inches.
   b. Provide pocket with lip at lower edge to support acoustical ceiling panel.
4. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.5 MOTOR-OPERATED, DOUBLE-ROLLER SHADES

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Material Ingredients: Advanced Inventory and Assessment documentation that demonstrates the chemical inventory of the product to at least 0.01 percent (100 ppm).

C. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range.

D. Motorized Operating Systems: Provide factory-assembled, shade-operator systems of size and capacity and with features, characteristics, and accessories suitable for conditions indicated, complete with electric motor and factory-prewired motor controls, power disconnect switch, enclosures protecting controls and operating parts, and accessories required for reliable operation without malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with building electrical system.
   1. Electrical Components: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   2. Electric Motor: Manufacturer's standard tubular, enclosed in rollers.
      a. Electrical Characteristics: 110-V ac.
      b. Maximum Total Shade Width: As required to operate roller shades indicated.
      c. Maximum Shade Drop: As required to operate roller shades indicated.
      d. Maximum Weight Capacity: As required to operate roller shades indicated.
   3. Remote Control: Electric controls with NEMA ICS 6, Type 1 enclosure for recessed or flush mounting. Provide the following for remote-control activation of shades:
      a. Keyed Control Station: Keyed, maintained -contact, three-position, switch-operated control station with open, close, and off functions. Provide two keys per station.

b. Individual Switch Control Station: Maintained -contact, wall-switch-operated control station with open, close, and center off functions.
   1) Switch Positions: Five.
   2) Switch Style: Toggle.
c. Group Control Station: Maintained -contact, three-position, rocker-style, wall-switch-operated control station with open, close, and center off functions for single-switch group control.
d. Individual/Group Control Station: Maintained -contact, three-position, rocker-style, wall-switch-operated control station with open, close, and center off functions for individual and group control.
e. Color: As selected by Architect from manufacturer's full range.

4. Crank-Operator Override: Crank and gearbox operate shades in event of power outage or motor failure.
5. Limit Switches: Adjustable switches, interlocked with motor controls and set to stop shade movement automatically at fully raised and fully lowered positions.
6. Operating Features:
   a. Group switching with integrated switch control; single faceplate for multiple switch cutouts.
   b. Capable of accepting input from building automation control system.
   c. Override switch.

E. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shades for service.
   1. Double-Roller Mounting Configuration: Offset, outside shade over and inside shade under.
   2. Inside Roller:
      a. Drive-End Location: Right side of interior face of shade.
      b. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
   3. Outside Roller:
      a. Drive-End Location: Right side of interior face of shade.
      b. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
   4. Shadeband-to-Roller Attachment: Manufacturer's standard method.

F. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller mounting configuration, roller assemblies, operating mechanisms, installation accessories, and installation locations and conditions indicated.

G. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to three inline rollers into a multiband shade that is operated by one roller drive-end assembly.

H. Inside Shadebands:
   1. Shadeband Material: Light-blocking fabric.
   2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
      a. Type: Enclosed in sealed pocket of shadeband material.
      b. Color and Finish: As selected by Architect from manufacturer's full range.

I. Outside Shadebands:
   1. Shadeband Material: Light-filtering fabric.

2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
   a. Type: Enclosed in sealed pocket of shadeband material.
   b. Color and Finish: As selected by Architect from manufacturer's full range.

J. Installation Accessories:
1. Front Fascia: Aluminum extrusion that conceals front and underside of roller and operating mechanism and attaches to roller endcaps without exposed fasteners.
   a. Shape: L-shaped.
   b. Height: Manufacturer's standard height required to conceal roller and shadeband assembly when shade is fully open, but not less than 4 inches.
2. Endcap Covers: To cover exposed endcaps.
3. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as one piece, end plates, and removable bottom closure panel.
   a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open, but not less than 4 inches.
   b. Provide pocket with lip at lower edge to support acoustical ceiling panel.
4. Side Channels: With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with shadeband guides or other means of aligning shadebands with channels at tops.
5. Bottom (Sill) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
6. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.6 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
1. Source: Roller shade manufacturer.
2. Type: Acrylic-coated fiberglass.

C. Light-Blocking Fabric: Opaque fabric, stain and fade resistant.
1. Source: Roller shade manufacturer.
2. Type: Fiberglass with acrylic backing.
3. Orientation on Shadeband: Railroaded.
4. Color: Match Architect's sample.

D. Material Ingredients: Advanced Inventory and Assessment documentation that demonstrates the chemical inventory of the product to at least 0.01 percent (100 ppm).

E. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range.

2.7 ROLLER SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F:
   1. For Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4 inch per side or 1/2-inch total, plus or minus 1/8 inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4 inch, plus or minus 1/8 inch.
   2. For Outside of Jamb Installation: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:
   1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.
   2. Railroaded Materials: Railroad material where material roll width is less than the required width of shadeband and where indicated. Provide battens and seams as required by railroaded material to produce shadebands with full roll-width panel(s) plus, if required, one partial roll-width panel located at top of shadeband.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, locations of connections to building electrical system, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
   1. Opaque Shadebands: Located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.

B. Electrical Connections: Connect motor-operated roller shades to building electrical system.

C. Roller Shade Locations: As indicated on Drawings.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION

SECTION 123553 - GENERAL REQUIREMENTS FOR LABORATORY CASEWORK AND FUME HOODS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes laboratory casework with supplementary items necessary to complete their installation.
   1. Manufacturers.
   2. Seismic Performance.
   3. Mock-up Requirements.
   4. Tables.
   5. Adjustable Shelving.
   6. Electrical Service Fixtures.
   7. Under-Cabinet/Shelving Task Lighting.
   8. Umbilicals / Service Drops.
   9. Overhead Service Carriers (The Wing).
   10. Gas Cylinder Restraints.

B. Related Requirements:
   1. Section 013573 "Delegated Design Requirements and Procedures" for definitions, submittal procedures, responsibilities, and scheduling requirements associated with delegated design assignment indicated in this Section.

1.2 REFERENCES

A. American Hardboard Association (AHA).
   1. A135.4 – Basic Hardboard.

B. Americans with Disabilities Act (ADA).

C. American National Standards Institute (ANSI).
   1. ANSI A117.1 – Accessible and Useable Buildings and Facilities.
   2. ANSI Z358.1 - Emergency Eyewash and Shower Equipment.

D. American Society for Testing and Materials (ASTM).
   1. ASTM A1008 - Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   2. ASTM B221/B221M – Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes.
   3. ASTM C1036 – Specification for Flat Glass.
   4. ASTM D785 – Test Method for Rockwell Hardness of Plastics and Electrical Insulating Materials.
   5. ASTM E84 – Test Method for Surface Burning Characteristics of Building Materials.

E. Business and Institutional Furniture Manufacturers Association (BIFMA).

F. Factory Mutual (FM).

G. Forest Stewardship Council (FSC).

H. Leadership in Energy and Environmental Design (LEED).

I. National Electrical Manufacturers Association (NEMA).
   1. NEMA LD3 - High-Pressure Decorative Laminates.

J. National Fire Protection Association (NFPA).
   1. NFPA 30 - Flammable and Combustible Liquids Code.
   2. NFPA 45 - Standards on Fire Protection for Laboratories Using Chemicals.

K. Office of Safety and Health Administration (OSHA).

L. United States Department of Commerce, National Institute of Standards and Technology
   1. PS 1 – Construction and Industrial Plywood.
   2. PS 51 – Hardwood and Decorative Plywood.

M. Scientific Equipment and Furniture Association (SEFA).
   1. SEFA Desk Reference.

N. Underwriters Laboratories (UL).

O. Woodwork Institute (WI).

1.3 PREINSTALLATION CONFERENCE

A. Before Work begins, conduct conference at Project site to comply with requirements of applicable Division 01 Sections.
   1. Required Attendees:
      a. Owner.
      b. Architect.
      c. Contractor, including superintendent.
      d. Installer, including project manager and supervisor.
      e. Manufacturer/fabricator's qualified technical representative.
      f. Installers of other construction interfaced with Work.
   2. Minimum Agenda: Installer shall demonstrate understanding of the Work required by describing detailed procedures for preparing, installing, and cleaning the Work. Demonstration shall include, but not be limited to, following topics:
      a. Tour representative areas of Work, inspect and discuss condition of substrate, and other preparatory work performed by other trades.
      b. Review Work requirements (Drawings, Specifications, and other Contract Documents).
      c. Review required submittals, both completed and yet to be completed.
      d. Review and finalize construction schedule related to Work and verify availability of materials, installer's personnel, equipment, and facilities needed to make progress and avoid delays.
      e. Review required inspection, testing, certifying, and material usage accounting procedures.
      f. Review environmental conditions and procedures for coping with unfavorable conditions.
      g. Resolve deviations or differences between Contract Documents and the manufacturer/fabricator's specifications.
   3. Record discussions of conference, including decisions and agreements reached, and furnish copy of record to each party attending. If substantial disagreements exist at conclusion of conference, determine how disagreements will be resolved and set date for reconvening conference.

1.4 COORDINATION

A. Coordinate layout and installation of framing and reinforcements for lateral support of wall and tall cabinets.

1.5 ACTION SUBMITTALS

A. Product Data: Submit manufacturer's data for each item of laboratory furnishings and equipment. Include component dimensions, configurations, construction details, joint details, and attachments. Indicate location, size, and service requirement for each utility connection.

B. Sustainable Design Submittals
   1. Product Data: For recycled content, indicating postconsumer and pre-consumer recycled content and cost.
   2. Chain-of-Custody Certificates: For certified wood products. Include invoice that identifies vendors chain-of-custody certification number, FSC content designation, and cost on a line-item basis.
   3. Chain-of-Custody Qualifications: For manufacturer and vendor.
   4. Product Data: For composite wood products indicating compliance with Formaldehyde Emissions Evaluation.

C. Shop Drawings: Include the following:
   1. Location of assemblies in each room to include plans, elevations, sections, and attachment details for casework, fume hoods, canopy hoods, point exhausts and ceiling service panels. Include roughing-in information for mechanical, plumbing, and electrical connections.
   2. Details of construction.
   3. Details of connections between units and to adjacent work.
   4. Indicate details for anchoring laboratory casework and fume hoods to permanent building construction including locations of blocking and other supports. Include calculations demonstrating that anchorages comply with seismic performance requirements.

D. Samples:
   1. Submit Samples which conform to specified requirements, including construction and finishes. Samples will be retained for comparison with Work fabricated and will be returned upon completion of the Contract.
   2. Submit the following Samples for approval:
      a. Casework: Metal finish, wood finish, service fixture finish, and work tops.
      b. One of each mechanical service fixture.

E. Delegated-Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
   1. Provide delegated-design submittals for seismic restraints for laboratory casework and fume hoods, including items like point exhausts, canopy hoods and ceiling service panels which need to attach to structure.

1.6 INFORMATIONAL SUBMITTALS

A. Manufacturer's Project Acceptance Document: Certification by the manufacturer that its product(s) are approved, acceptable, suitable for use in specific locations, for specific details, and for applications indicated, specified, or required, and that a warranty will be issued.

B. Qualification Data: For manufacturer/fabricator, installer and professional engineer.
   1. For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Architects and Owners, and other information specified.
   2. Architect may waive submittal of qualification data for available manufacturers listed in this Section.

C. Test Reports: Submit test reports verifying conformance to specified performance tests.

D. Field Quality Control Reports: Written report of testing and inspection required by "Field Quality Control".

1.7 CLOSEOUT SUBMITTALS

A. Furnish maintenance instructions and complete touchup kit for each type and color of laboratory paint finish provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged casework and fume hood finishes.

B. Operation & Maintenance Manuals: Provide complete written instruction manuals outlining safe operating procedures, safety guidelines, and proper maintenance procedures for equipment and fume hoods.

C. Warranty: Provide manufacturer's written warranty covering materials and installation (labor) stating obligations, remedies, limitations and exclusions.

D. Receipts: Furnish receipts for keys and other loose items.

1.8 QUALITY ASSURANCE

A. Single Source Responsibility: Provide casework, work surfaces, laboratory furnishings, and accessories, all furnished by a single laboratory furniture company.

B. Manufacturer/Fabricator Qualifications: Manufacturer/fabricator with not less than 10 years experience with successful production of products and systems similar to scope of this Project, with a record of successful in-service performance and completion of projects for a period of not less than 10 years, and with sufficient production capability, facilities, and personnel to produce required Work.

C. Installer Qualifications:
   1. Experience: Installer with not less than 10 years experience in performing specified Work similar to scope of this Project, with a record of successful in-service performance and completion of projects for a period of not less than 10 years, and with sufficient production capability, facilities, and personnel to produce required Work.

2. Supervision: Installer shall maintain a competent supervisor who is at Project during times specified Work is in progress, and, who is experienced in installing systems similar to type and scope required for Project.
3. Manufacturer/Fabricator Acceptance: Installer shall be certified, approved, licensed, or acceptable to manufacturer/fabricator to install products.

D. Manufacturer's Technical Representative Qualifications: Direct employee of technical services department of manufacturer with minimum of 10 years experience in providing recommendations, observations, evaluations, and problem diagnostics. Sales representatives are not acceptable.

E. Mockups: Prior to fabrication and installation, provide a laboratory mockup where indicated on drawings. Location may be changed to meet construction phasing with approval of Architect. Components utilized meet the requirements of the Drawings and Specifications. The purpose of the mockup is to verify designs and confirm or modify the sequence of installation between the various trades. Approved mockup serves as the standard of quality against which the remaining laboratory work is measured. Build mockup to comply with the following requirements, using materials indicated for the completed Work:
1. Build mockup in the location and of the size indicated or, if not indicated, as directed by Architect. Contractor shall provide structural support framework.
   a. Provide laboratory casework and furnishings. Furnishings, such as the fume hood, must be installed, complete with fixtures and accessories, but does not need to be operational.
   b. Provide plumbing pipe, valves, fittings, and accessories required to make connections to complete the laboratory mockup. Fixtures and furnishings are not required to be operational, but must be installed to review and ensure proper coordination.
   c. Provide electrical systems in conjunction with the laboratory mockup. Power receptacles, raceway, data back boxes and conduit must be installed, but do not need to be operational. Lighting to be fully operational.
2. Clean exposed faces of mockup.
3. Notify Architect fourteen days in advance of the dates and times when mockup will be installed and ready for review.
4. Make such changes and alterations to mockup as may be discussed, agreed upon, and documented in writing resulting from the review. Modifications to the mockup that are agreed upon in writing will be incorporated into the overall design of the project without change in contract sum. Obtain Architect's acceptance of mockup before starting fabrication.
5. Maintain mockup during construction in an undisturbed condition as a standard for review of the completed Work.
6. Acceptance of mockup does not constitute acceptance of deviations from the Contract Documents contained in mockup unless such deviations are specifically noted by Contractor, submitted to Architect in writing, and accepted by Architect in writing.
7. Once installed and approved the mockup becomes part of the completed Work

1.9 DELIVERY, STORAGE, AND HANDLING

A. Schedule delivery of casework and equipment so that spaces are sufficiently complete that material can be installed immediately following delivery.

B. Protect finished surfaces from soiling or damage during handling and installation. Keep covered with polyethylene film or other protective coating. Protect all work surfaces from damage throughout construction period. Do not allow standing on work surfaces during the construction period. Provide signage marked in large lettering that reads: "NO STANDING".

1.10 FIELD CONDITIONS

A. Do not deliver or install equipment until the following conditions have been met:
   1. Building areas requiring the installation of laboratory casework: Dry and unexposed to adverse weather conditions which may damage finished materials.
   2. The air conditioning or heating system: On and functioning in areas of casework installation to maintain the temperature between 60 and 85 degrees Fahrenheit with the relative humidity between 45 percent and 65 percent.

B. Field Measurements: Where products and systems are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.11 SEQUENCING AND SCHEDULEING

A. All overhead mechanical, electrical and plumbing rough-in work: Complete prior to laboratory casework deliveries.

B. All mechanical, electrical and plumbing rough-in work required along walls and service islands, where lab furnishings are to be installed: Complete prior to delivery of materials.

C. Walls and partitions must be in place and finished with at least the primer coat of paint. If finish painting is to take place after lab casework and furnishings installation, protect the casework and furnishings by covering and masking prior to commencement.

D. All necessary wood or metal blocking must be installed within partitions prior to delivery of casework and furnishings.

E. Overhead soffits and ceiling grid must be in place prior to casework installation.

F. Overhead lighting must be installed and connected prior to casework installation.

G. All flooring required to be placed under lab casework systems must be installed prior to lab casework material delivery.

H. Concrete floors must be level within 1/8 inch of level per 10 foot run, nonaccumulative, when tested with a straight edge in any one direction.

I. Wet operations to be performed must be complete prior to material deliveries.

1.12 WARRANTY

A. Manufacturer's Warranty: Furnish manufacturer's written material and labor warranty signed by an authorized representative using manufacturer's standard form agreeing to furnish materials and labor required to repair or replace work which exhibits material defects caused by manufacture or design and installation of product. "Defects" is defined to include but not limited to deterioration or failure to perform as required.

1. Warranty Period: Manufacturer shall warrant the products to be free from material and labor defects for a period of 1 year from date of operational acceptance by the Using Agency.
2. Date of operational acceptance shall be after factory check, test and start-up services is complete, the unit is operating in a satisfactory manner, and the equipment has been satisfactorily commissioned by the Using Agency.

B. Installer's Warranty: Furnish installer's written workmanship warranty signed by an authorized representative using installer's standard form agreeing to provide labor required to repair or replace work which exhibits workmanship defects. "Defects" is defined to include but not limited to deterioration or failure to perform as required.

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Acceptable Manufacturers/Fabricators and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers/fabricators listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".
1. ICI Scientific.
2. Mott Manufacturing Limited.

B. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers/fabricators offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
1. Basis of Design: Mott Manufacturing, Inc.

C. Furnish and install casework, fume hoods, furnishings and equipment specified in the following sections by the same supplier.
1. Section 123553.03 - Adaptable Laboratory Casework Systems.
2. Section 123553.19 - Wood Laboratory Casework.

2.2 PERFORMANCE REQUIREMENTS

A. Contract Documents Design Intent: Drawings and Specifications indicate design intent for products and systems and do not necessarily indicate or specify total Work required and shall not be construed as an engineered design. Furnish and install all Work required for a complete installation.

B. Coordination of Contract Documents and Work:
1. Product Variations: In the event of minor differences between products and systems of acceptable or available manufacturer/fabricators, Contractor shall notify Architect of such differences and resolve conflicts in a timely manner. Failure of Contractor to provide notification shall be construed as acceptance of conditions indicated, and changes caused by minor differences between products and Contract Documents shall be included in the Work at no additional cost to Owner.

2. Allowable Adjustments: Minor dimension and profile adjustments may be made in interest of fabrication or erection methods or techniques or ability to satisfy design intent, provided design intent is maintained as determined by Architect. Proposed deviations shall include a detailed analysis of impact to adjacent substrates or other building systems, including related design or construction cost impacts. If accepted by Architect, deviations causing changes in materials, constructability, substrates, or conditions shall be included in the Work at no additional cost to Owner.

C. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design laboratory casework and fume hoods for seismic performance.

D. Seismic Performance: Laboratory casework, fume hoods, and support framing system, including attachments to other work, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. Design earthquake spectral response acceleration, short period (Sds) for Project is .213g.
2. Component Importance Factor: 1.0.
3. Base Cabinet Load (Including Countertop and Load on Countertop): 320 lb/ft.
4. Wall Cabinet (Upper Cabinet) Load: 160 lb/ft.

2.3 CASEWORK, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Certified Wood: Wood cabinets shall comply with requirements of ASTM D7612-10 (FSC, SFI, ATSM, CSA or PEFC certifications are acceptable).

C. Steel systems: Recycled Content: Post-consumer recycled content plus one-half pre-consumer recycled content shall not be less than 80 percent.

2.4 MATERIALS

A. Wood:
1. Composite Wood Products:
   a. Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.
2. Definition of cabinet components by surface visibility.
   a. Exposed Exterior Surfaces: Defined as all exterior surfaces exposed to view:
      1) All surfaces visible when doors and drawers are closed, including knee spaces.
      2) All sides of cabinets that abut other casework but will become visible when the casework is reconfigured.
      3) All exterior surfaces of suspended casework.
      4) All exterior surfaces of mobile casework.

5) Underside of cabinet bottoms 42 inches or more above finished floor, including cabinet bottoms behind light valances and the bottom edge of light valances.
6) Cabinet tops under 80 inches above finished floor, or if 80 inches and over and visible from an upper floor or building level after installation.
7) Visible front edges of stretchers, ends, dividers, tops, bottoms, shelves, and hanging stile.
8) Visible portions of bottoms, tops, and ends in front of sliding doors.
9) Sloping tops of cabinets.
10) Visible portions of cabinets after fixed appliances are installed.

b. Exposed Interior Surfaces: Defined as all interior surfaces exposed to view in open casework or behind transparent doors:
1) Fixed, adjustable and pull-out shelves, including edgebanding of all sides.
2) Dividers and partitions.
3) Interior face of ends (sides), backs, and bottoms, including Interior surfaces of cabinet top members 36 inches or more above the finished floor.
4) Interior face of door and applied drawer fronts.

c. Semi-exposed Surfaces: Defined as those interior surfaces exposed to view when doors or drawers are opened:
1) Fixed, adjustable and pull-out shelves, including edgebanding of all sides.
2) Dividers and partitions.
3) Interior face of ends (sides), backs, and bottoms on cupboard and drawer units, including the interior surfaces of cabinet top members 36 inches or more above finished floor.
4) Drawer sides, sub-fronts, backs, and bottoms.
5) The underside of cabinet bottoms between 24 inches and 42 inches above finished floor.
6) Security and dust panels or drawer stretchers.

d. Concealed Surfaces: Defined as those exterior and interior surfaces that are covered or not normally exposed to view:
1) Toe space unless otherwise specified.
2) Sleepers, stretchers, security panels, and solid sub-tops.
3) Underside of bottoms of cabinets less than 24 inches above finished floor.
4) Flat tops of cabinets over 80 inches above finished floor and not visible from an upper level.
5) The three non-visible edges of adjustable shelves.

3. Hardwood Lumber:
a. Type 1 Hardwood: Plain sawn white Maple Grade FAS, first and seconds or better, well matched for color and grain.
b. Type 2 Hardwood: Select grade hardwood of a species suitable for the specified purpose.
c. Provide all lumber clean and free of defects; kiln and air dried to a uniform minimum moisture content of 6 percent.

4. Hardwood Plywood:
   a. In accordance with ANSI/HPVA HP-1 latest edition unless otherwise specified herein.
   b. Face Veneer:
      1) Grade:
         a) Middle or higher of A-1.
      2) Species:
         a) Exposed and Semi-Exposed Surfaces: Select White Maple.
         b) Concealed Surfaces: Plain sliced hardwood veneer, suitable for unexposed surfaces.
      3) Cut:
         a) Plain Sliced, 1/50 inch thick minimum.
      4) Matching Type:
         a) Book.
      5) Grain Direction:
         a) Vertical matched grain direction on cabinet drawer heads, doors, end panels, KO panels, KO aprons, table aprons, and filler panels.
      6) Color and Matching Selection:
         a) Compatible in color with solid stock and well matched in color and grain with adjacent plywood panels.
         b) Hand select plywood prior to fabrication of cabinet faces for uniformity of color and grain on each run of bench. Darker and lighter panels are not acceptable in the same run of bench or same room after installation of casework.
   c. Cores:
      1) Veneer: One piece hardwood solid core with crossbanding and hardwood face veneers. Minimum 9 ply for 1 inch, 7 ply for 3/4 inch, 5 ply for 1/2 inch, and 3 ply for 1/4 inch.
      2) Combination with composite crossbands: Minimum 7 ply for 3/4 inch. One piece hardwood solid core with two hardwood solid and two MDF crossbands and hardwood face veneers. MDF crossbands under face veneers.
      3) MDF: Medium density fiberboard, Grade 130-MR50 with hardwood face veneers.
      4) Particleboard: Medium density, Grade M-3 particleboard with hardwood face veneers.
   d. Bond Type: Type II.
5. Hardboard:
   a. Tempered hardboard designed for strength and moisture resistance; consisting of wood fibers, highly compressed into a hard, dense, 1/4 inch thick, homogeneous sheet using natural resins and other added binders.
   b. Physical Properties:
      1) Average modulus of rupture: 5300 psi.
      2) Density: 50 to 60 pounds per cubic foot.
      3) Tensile strength: 3,500 psi.

B. Sheet Steel: ASTM A1008 /1008M mild steel, cold-rolled, pickled, double annealed, and free from rust, scales, deep scratches, buckles, ragged edges, and other defects. Provide metallic furniture stock sheets.

C. Metal Gages for Sheet Steel:
   1. Construct metal cabinets of sheet steel with minimum thickness in U.S. standard gage as follows:

Corner gussets for leveling bolts	11 gage (3.2 mm)
Apron corner braces, wall rail systems	12 gage (2.7mm)
Drawer support, hinge reinforcement, reinforcing gussets	14 gage (1.9 mm)
Horizontal rails and top rails, aprons, support struts, adjustable wall and island shelving, shelving hat channels	16 gage (1.5 mm)
Cabinet tops, end panels, bottoms, backs, toespace rails, security panels, vertical posts, vertical dividers, glazed doors, scribe strips, filler panels	18 gage (1.2 mm)
Door panels	18 gage (1.2 mm) exterior 20 gage (0.9 mm) interior
Enclosures, drawer fronts and bodies, pull-out tablet fronts and bodies, cabinet shelving, closure panels, overhead service carriers	20 gage (0.9 mm)

D. Aluminum Type: Unless otherwise noted on Drawings or elsewhere in this Section, provide extruded aluminum per ASTM B 221 in either alloy 6063-T42 or 6063-T5.

E. Epoxy Resin Sheets:
   1. Molded from modified epoxy resin that has been compounded and cured to provide optimum physical and chemical resistance required of a heavy duty laboratory working surface. Uniform mixture throughout, not dependent on a surface coating.
   2. Physical Properties:
      a. Compressive Strength (ASTM D695): 30,600 psi.
      b. Flexural Strength (ASTM D790): 12,800 psi.
      c. Tensile Strength (ASTM D638): 10,100 psi.
      d. Heat Distortion (ASTM D648): 330 degrees F.
      e. Water Absorption (ASTM D570): 0.018 percent.
      f. Hardness, Rockwell M (ASTM D785): 108.
      g. Fire Resistance (ASTM D635): Self Extinguishing.

F. Glass:
   1. Laminated safety glass: Two outer plies of glass with a vinyl interlayer, nominal 1/4 inch thick.
   2. Tempered safety glass: Heat treated glass, nominal 1/8 inch thick with a minimum of 88 percent clarity.

2.5 HARDWARE

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers/fabricators offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Drawer and Hinged Door Pulls: 3/8 inch diameter stainless steel wire pull, 4-3/4 to 5-1/16 inches center to center with radiused corners and a projection of 1 inch to 1-1/2 inches. Model DP57C as manufactured by Mockett, Model 115.61.602 as manufactured by Hafele America Co., or Model CC01-MC402-5-SS by Hardware Décor.
   1. Mount door pulls vertically and drawer pulls horizontally.
   2. Provide drawers 28 inches wide and smaller with one pull per drawer at centerline of cabinet.

C. Retracting Grab Bar Handless for Mobile Cabinets: Provide stainless steel folding handle in recessed tray, handle nominal 3 inches by 2 inches recessed 1/2 inchinto cabinet end panels. Model RHEE-07.39 as manufactured by Elesa USA Corporation, Model 06961-01 as manufactured by Norelem, or Model EE-03 as manufactured by Rohde.
   1. Provide two handles per mobile cabinet, mounted to each side, within 8 inches of cabinet front and 8 inchesof cabinet top.
   2. Mobile cabinets with the add-a-drawer option: Mount grab bar handles in lower portion.

D. Rear Bumpers for Mobile Cabinets: Provide round, clear, screw-on bumpers with integrated screw hole, 7/8 inch by 3/8 inch into back of cabinet. Model 9072 as manufactured by Shepherd Hardware Products.
   1. Provide two bumpers per mobile cabinet, mounted to back, within 1 inch of cabinet top.

E. Drawer and Pullout Shelving Slides:
   1. Description: Full extension with soft closing action, ball bearing, rail mounted, multimembered slides fabricated of minimum 16 gage steel with an electro-zinc finish.
   2. Acceptable Manufacturers:
      a. Accuride International Incorporated, Santa Fe Springs, California
      b. CompX Precision Slides, Waterloo, Ontario Canada
      c. Knape and Vogt, Grand Rapids, Michigan
   3. Drawer and Pullout Shelving Slide Ratings:
      a. Drawer Width: 0 - 24 inches Maximum dynamic load rating 100 pounds
      b. Drawer Width: Over 24 inches Maximum dynamic load rating 200 pounds
   4. File Cabinet Drawer Slide Ratings:
      a. Drawer Width: All sizes Maximum dynamic load rating 150 pounds
   5. Slides shall have progressive movement with a positive stop at full extension or at a minimum 1 inch over travel and permit removal of drawer without use of tools. Drawers shall not lift out or otherwise be removable without the release of a locking device on each slide.

6. Dynamic Load Rating: Slides meet BIFMA "Business Institutional Furniture Manufacturers Association" Standards. 0.017 pounds per cubic inch at full travel plus or minus 1/4 inch for 50,000 cycles.

F. Pull-out Shelf Bumper: Provide on hinged side of pull-out shelf.
1. Basis of Design: Bainbridge Manufacturing, Inc., Part Number 1934.

G. Hinges:
1. Description: Institutional type, 5-knuckle, projecting barrel, minimum 2-1/2 inches long. Hinges for full overlay cabinets to have a wraparound design and slotted screw holes for adjustability.
2. Material: Type 304 stainless steel, minimum 0.095 inches thick.
3. Provide minimum of 2 hinges for doors under 48 inches high; minimum of 3 hinges for doors 48 inches to 84 inches high; and minimum of 4 hinges for doors over 84 inches in height.
4. Mounting: Drill each leaf for screw attachment to door and frame. Use stainless steel flathead screws.

H. Door Catches: Roller or magnetic type, adjustable, roller type operating with a built-in tension spring. Provide all parts of cadmium plated steel except roller. Attach to top of base cabinet doors, the bottom of wall cabinet doors, and at the top and bottom of tall cabinet right-hand doors. Provide a vertical sliding bolt assembly, astragal strip and dummy pull for the left-hand door of tall cabinets. Vertical sliding bolts; concealed in the stiles of glazed doors and between pans of solid doors to engage stainless steel keepers.

I. Doorstop:
1. Provide at all tall cabinets with glass doors located adjacent to a benchtop or perpendicular surface, such as a wall.
2. Provide with base and wall cabinets located adjacent to a perpendicular surface, such as a wall.
3. Chain or cable, secured to the top of the door and cabinet frame. Provide in lengths required to stop the door from opening more than 90 degrees.

J. Shelf clips: Die formed steel, zinc plated or polycarbonate clip with grooved plug and spring clip. Provide shelf clips adjustable on 1-1/4 inch centers and meet seismic requirements. For metal cabinets shelf adjustment holes are on nominal 1/2 inch centers.

K. Label Holders:
1. Description: Formed steel with satin chrome finish, 3-1/2 inch wide by 1-1/2 inch high, to accept card size of 2-3/4 inch wide by 1-1/4 inch high, screw installed.
2. Provide one label holder for every drawer and door. When cabinets have multiple drawers, doors, or a combination of both, provide a label holder for every drawer and door on each cabinet.
3. Label holders are not required for cabinets with glass fronts or chemical storage (i.e., flammables, corrosives, bases, etc.).
4. Coordinate location of label holder during shop drawing review.

L. File Suspension Rails: Provide each file drawer with a pair of 14 gage steel, file suspension rails.

M. Leveling Glides: 2 inch diameter, two-piece pivot construction, steel housing, non-marring, phenolic or translucent plastic insert, 1/2 inch diameter, minimum 1-1/2 inch long zinc plated stems.

N. Mobile Cabinet Casters - Swivel Type: 3 inch overall height, with toe brake. Provide minimum load rating of 165 pounds per caster.
   1. Basis of Design: Shepherd Softech PSF75101BK-B.

O. Retractable Table Casters - Swivel Type with Retractable Leveling Glide: 4 inch overall height, with leveling glide that can be raised or lowered to handle the table load and prevent movement. Provide minimum load rating of 660 pounds per caster.
   1. Basis of Design: Zambus CarryMaster; Model AC-600S.

P. Anti-Tip Interlock: Provide in all mobile cabinets with drawers and adjustable pullout shelves. Provide with snapper actuator, lockbar, adjustable locking pins, drawer wedges, lockbar retainers, and wedge lock.
   1. Basis of Design: Compx Timberline, System 350.

Q. Drawer Protection and Identification Plate: Plate, Type 304 stainless steel, 16 gage with a number 4 finish. Attach plate to drawer with flathead stainless steel screws countersunk at each corner. Engrave each plate with 1/2 inch high numbering. Numbering selected by the Owner's Representative. Padlock eyes, Type 304 stainless steel, 12 gage with a number 4 finish. Padlock provided by Owner.

R. Grommets in Countertops: Manufacturer: Outwater Plastic Industries, Wood Ridge, New Jersey, (800) 631-8375, Model Number 35 DG, Dove Gray, or equal (no known equal). Seal Grommets to bench with silicone sealer.

S. Seismic Clips: Anchor rear support structures and legs of adaptable laboratory casework system assemblies to prevent overturning and movement during a seismic event.

2.6 TABLE - METAL LEG FRAME, ADJUSTABLE HEIGHT

A. Perimeter rails: 2 inches by 2 inches by 12 gage steel channel with a continuous inner reinforcement U-channel. Spot weld inner reinforcement channel approximately 12 inches on center, staggering weld on each side.

B. Legs: 1-1/2 inch by 1-1/2 inch by 12 gage steel tubing. Height adjustment to be accomplished through inner telescoping leg and spring bolts.

C. Provide each leg with leveling glides and/or casters as scheduled on the drawings

D. Inner leg: 27-1/4 inches long inner telescoping leg extension. Provide with six 9/16 inch round holes on inside of table for spring bolts. Provide each leg with a leveling glide unless otherwise noted.

E. Quick Release Pins: Provide each leg with two 1/2 inch diameter by 2-1/2 inch usable leg stainless steel push-button, quick-release pins, McMaster-Carr model 92384A096, or equal.

F. Stretcher rails: 2 inches by 1-1/4 inch by 16 gage steel tube. Connect by welding between two end legs and between two back legs.

G. Finish: Finish as specified for Metal Finishes under this section.

H. Tops: As specified for Work Surfaces under this section. Refer to Table Schedule for type.

2.7 SHELF FRAME ASSEMBLIES

A. Nominal Shelf Dimensions:
   1. Width: 24 inches, 30 inches, 36 inches 914 mm), 42 inches or 48 inches
   2. Depth and weight capacity: 6 inches, 8 inches, 12 inches, or18 inches; 130 pounds. 24 inches; 100 pounds
   3. Thickness: 1 inch

B. General Requirements:
   1. Shelves shall have a 1 inch overhang behind the face of the rear tubular posts.
   2. Shelf Brackets: 11 gage metal with 3 blade hooks and rise above the shelf surface 6-inches to provide sides. Depth to match shelf depth. Provide one pair for each shelf. Screw shelves to each bracket. Top shelf assemblies shall have inverted shelf brackets.
   3. Front Retainer Rod: Type 304 stainless steel 1/4 inch diameter rod with a number 4 polished finish. Bend 90 degrees at 1-1/2 inches from each end. Insert bent ends into shelf to a depth of 1/2 inch with horizontal portion of rod at 1 inch above shelf.
   4. Front Retainer 'P' Clip: Type 304 stainless steel 1/4 inch diameter rod with a number 4 polished finish. Stop rod at 1-1/2 inches from each end of shelf. Insert rod into 'P' clip, maximum spacing of 'P' Clip is 24 inches on center. Maximum spacing of 'P' clip to end of rod is 2 inches. Construct the 'P' clip from 11 gage by 1/2 inch wide Type 304 stainless steel with a number 4 polished finish. Attach 'P' clips to front of shelf edge using stainless steel screws.
   5. Front Clear Retainer Strip: 1/4 inchthick by 2 inches high, clear polycarbonate resin. Attach to front of shelf with stainless steel round head screw and washer at 12 inchon center.

C. Wall Frame Assemblies:
   1. Standards: 16 gage metal, single-slotted or double-slotted type on 1 inch centers, 30 inches long and 1 inch depth.
   2. Cross Rails and Cross Rail Brackets: 16 gage metal.
   3. Brackets: 11 gage metal with 3 blade hooks and rise above the shelf surface to provide sides. Screw shelves to each bracket.

D. Adaptable Frame Assemblies: Refer to Section 123553.03 Adaptable Laboratory Casework Systems.

E. Shelf Materials:
   1. Refer to Section 123553.19 for Wood.

F. Finish as specified for metal finish in this section.
   1. FINISHES

G. Metal Finishes:
   1. Finish casework, casework support structure, fume hood super-structure and other laboratory furnishings.
   2. Preparation: Spray clean metal with a heated cleaner / phosphate solution, pretreat with iron phosphate spray, water rinse, and neutral final seal. Immediately dry in heated ovens, gradually cooled, prior to application of finish.

3. Application: Electrostatically applied epoxy or urethane powder coat painting process that coats all hidden and exposed surfaces with an acid and abrasion resistant coating. Bake in a controlled high temperature oven to ensure a smooth, hard satin finish. Surfaces shall have a chemical resistant, high grade laboratory furniture quality finish of the following thicknesses:
   a. Exterior and interior surfaces exposed to view: 1.5 mil average and 1.2 mil minimum.
   b. Backs of cabinets and other surfaces not exposed to view: 1.0 mil average.
   c. Finish drawer bodies in matching or harmonizing color and apply corrosion resistant treatment to selected, concealed interior parts.
4. Color: Select from standard colors.
5. Metal Finish Performance Requirements:
   a. Abrasion Resistance: Maximum weight loss of 5.5 mg per 100 cycle when tested on a Taber Abrasion Tester Number E40101 with 1000 gm wheel pressure and Calibrase Number CS10 wheel.
   b. Hardness: Surface hardness equivalent to 4H or 5H pencil.
   c. Humidity Resistance: Withstand 1,000 hour exposure in saturated humidity at 100 degrees F.
   d. Moisture Resistance: No visible effect to surface finish after boiling water trickled over test panel inclined at 45 degrees Fahrenheit for 5 minutes. No visible effect to surface finish following 100 hour continuous application of a water soaked cellulose sponge, maintained in a wet condition throughout the test period.
   e. Adhesion: Score finish surface of test panel with razor blade into 100 squares, 1/16 inch by 1/16 inch, cutting completely through the finish but with minimum penetration of the substrate, and brush away particles with soft brush. Minimum 95 squares shall maintain their finish.
   f. Salt Spray: Withstand minimum 200 hour salt spray test, conforming to ASTM B117-59 procedure.

2.8 COAT RACK, LAB (MQ-100)

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers/fabricators offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Available Manufacturers:
   1. Global Industrial, Model T9F695715.
   2. Bradley, Model 9944-000000.
   3. Safco, Model 4162.

C. Size: 26 inches wide by 2-5/8 inches deep by 7-1/4 inches high nominal dimensions.

D. Type: Multiple hat and coat hooks, wall mounted on mounting backplates.

E. Construction: 22 gauge stainlesssteel baclplate with14 gauge stainless steel double hooks.

2.9 WORK SURFACES

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers/fabricators offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Epoxy Resin:
   1. Available Manufacturers:
      a. American Epoxy Scientific, LLC.
      b. Durcon, a Wilsonart Company
      c. Kewaunee Scientific Corporation
   2. Thickness: 1 inch thick unless otherwise noted on Drawings. Check thickness before fabrication. Each corner of top shall not deviate more than plus or minus 1/32 inch from nominal.
   3. Warpage: Check top for warpage before fabrication. Place slab on a true plane formed by a surface plate of Tool Room Grade B or better. Measure in unrestrained condition. Top will be accepted for use if there is no gap exceeding 1/16 inch in a 36 inch span or 3/32 inch in a 96 inch span.
   4. Fabrication:
      a. Provide in longest practical lengths. Bond all joints with a highly chemical and corrosion resistant cement having similar properties as the base material. Provide a 1/8 inch wide drip groove on underside of all exposed edges set back 1/2 inch from edge of top. Finish exposed edges.
      b. Size Tolerances: Length, plus or minus 1/8 inch. Width, plus or minus 1/16 inch.
      c. Size Tolerances: Length, plus or minus 1/8 inch. Width, plus or minus 1/16 inch.
      d. Squareness: Plus or minus 1/64 inch for each 12 inches. A top spanning 48 inches; held to plus or minus 1/16 inch.
      e. Location Of Cutouts And Drillings: Plus or minus 1/8 inch.
      f. Sizes Of Cutouts And Drillings: Plus 1/8 inch, minus 0.
   5. Curbs: Supply loose for field application. Provide curbs 4 inches high by 3/4 inches thick unless otherwise indicated on Drawings. Where tops abut wall, casework, or fume hood, supply an end curb. Caulk joints between curb and walls, fume hoods, and cabinets with acid-resistant silicone caulk.
   6. Color: To be selected by the Owner's Representative from the Manufacturer's standard colors.

2.10 SINKS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers/fabricators offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Epoxy Resin Sink:
   1. Available Manufacturers:
      a. American Epoxy Scientific, LLC.

b. Durcon, a Wilsonart Company.
c. Or equal, (no known equal).

2. Description: Integrally molded from modified thermosetting black epoxy resin, and oven cured. Minimum wall thickness of 1/2 inch with all interior corners coved to 1-1/2 inch radius and bottoms pitched to end outlet opening.
3. Sink mounting methods:
   a. Drop-in: Supported by an upper flange from the work surface. Top edge of sink positioned 1/8 inch below the work surface with a 30 degree bevel from the top of the work surface to the top of the sink lip. Joint between sink and work surface shall not exceed 1/8 inchplus or minus 1/16 inch. Seal joint between sink and top with epoxy sealant.
   b. Under Mount: Support sink at bottom using an upper direction compression support system. Seal joint between top and sink with silicone sealant.
4. Provide sink with the following accessories:
   a. Outlet: 1-1/2 inch NPS.
   b. Overflow: Open end overflow standpipe. Overflow to be 2 inches shorter than depth of sink.
   c. Strainer: Removable disc strainer.
   d. Tailpiece: Town & Country Plastics Model PP-18, R&G Sloane Part Number 7218; or Scientific Plastics Company, Inc., Part Number W81595-158.

C. Epoxy Resin Oval Cupsink:
1. Available Manufacturers:
   a. American Epoxy Scientific, LLC.
   b. Durcon, a Wilsonart Company.
   c. Or equal, (no known equal).
2. Description: 3 inches by 6 inches ID with a minimum wall thickness of 3/8 inch. Integrally molded from modified thermosetting black epoxy resin, oven cured. Cove corners and pitch bottom to outlet opening.
3. Provide sink with the following accessories:
   a. Strainer: Removable disc strainer.
   b. Tailpiece: Town & Country Plastics Model PP-18; R&G Sloane Part Number 7218; or Scientific Plastics Company, Inc., Part Number W81595-158.

D. Cupsink Mounting Bracket:
1. Fabricate from 16 gage sheet metal. Construct as detailed on the Drawings. Secure bracket to mounting surface using stainless steel fasteners. Caulk cupsink to bracket and joint between bracket and mounting surface with an acid-resistant silicone caulk.
2. Finish: Finish as specified for metal finish in this section, with color selected by Owner's Representative.

2.11 LABORATORY SERVICE FIXTURES

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers/fabricators offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. General:
   1. Installation: Provide and install at point of use all service fixtures. Connect to the service piping systems specified in Division 22. Provide the product of one manufacturer for all laboratory service fixtures, including fixtures supplied with fume hoods and emergency shower and eye wash units. Provide all fixtures designed for laboratory use and comply with SEFA 7.
   2. Refer to Laboratory Service Fixture Schedule for fixture types and descriptions.
   3. Acceptable Manufacturers:
      a. WaterSaver Faucet Company. WaterSaver fixture numbers are referenced herein.
      b. Broen-LAB A/S
      c. Chicago Faucet Company.
   4. Materials: Provide the bodies of service valves, fixtures and accessories of cast or forged brass with a minimum copper content of 85 percent. Fabricate assembly components and operating parts such as valve stems, renewable units, packing nuts, outlet nozzles, and straight serrated hose ends from solid brass bar stock. Fabricate replaceable seats, needle cones, valve disc screws, and other accessories from monel metal or stainless steel alloys especially selected for use intended.
   5. Provide water faucets that meet the requirements of the United States Safe Drinking Water Act as lead-free
   6. Assembled at the factory: Service fixtures, including the mounting of valves and shanks to turrets, flanges, and other mounting accessories.
   7. Furnish and install nipples, locknuts, washers, shanks and other accessories required to properly mount and connect the fixtures.
   8. Testing: Individually factory test fixtures. Valves and fixtures, except water fixtures, shall withstand a test pressure of 100 pounds per square inch. Test water fixtures at 80 pounds per square inch.
   9. Fixtures located on the same plane shall have their handles project the same distance from the plane of reference to present a uniform, related appearance, regardless of valve type.
   10. Identify mechanical services with full view colored index buttons in accordance with SEFA 7 Color Code.

C. Water Valves:
   1. Renewable unit containing all working parts which are subject to wear, including stainless steel or monel metal seat, monel metal screw, heavy duty seat disk, Teflon packing, and an integral or external adjustable volume control.
   2. Provide unit capable of being readily converted from compression to self closing, and vice versa, without disturbing faucet body proper and shall also be capable of being readily converted from water construction to needle valve or steam valve construction without disturbing faucet body.
   3. Provide unit sealed in valve body with special composition gasket. Metal-to-metal or ground-joint type of sealing not acceptable.

D. Needle Valves:
   1. Vacuum, gas, and air needle valves shall have a stainless steel replaceable floating cone that is precision ground and self-centering.

2. Action of valve: Slow compression for fine control under pressure up to 150 psi and shall have parts subject to wear, easily replaceable.

E. Fine Control Valves:
1. Fine Control valves for special gas service: As described for needle valves with the following additions.
   a. Fine stem threads with approximately 30 threads per inch.
   b. Renewable stainless steel needle and seat with 1/8 inch orifice.
   c. Constructed to maintain a constant flow rate of 4 bubbles per 15 seconds as valve is tested out under 50 pounds, 100 pounds, 150 pounds, 200 pounds, and 250 pounds of nitrogen pressure.

F. High Purity Water Valves:
1. Forged brass body with all interior components coming in contact with water constructed of polypropylene.
2. Maximum working pressure of 50 psig.
3. Provide with 3/8 inch brass riser and gooseneck with polypropylene lining.
4. Provide with polypropylene serrated tip at the outlet.

G. Laboratory Ball Valves: Straight pattern body, valve stem with integral chrome plated ball and TFE-coated O-rings stem seals in valve body, molded TFE valve seals, and tested at 125 psi nitrogen under water. Valves shall have chrome plated forged brass lever-type handle with screw-on type index requiring less than 5 pounds pressure to actuate. Provide with removable 10 serrated hose end.

H. Foot-Operated Water Valves:
1. Forged brass body and pedals mounted on hinged bracket.
2. Self-closing renewable unit containing all working parts which are subject to wear, including stainless steel or monel metal seat, monel metal screw, heavy duty seat disk, Teflon packing, and an integral or external adjustable volume control.

I. Goosenecks: Hot water/cold water gooseneck mixers shall swivel. Provide swivel point at turret or at valve level if wall or panel mounted. Provide swing joints with heavy Teflon packings. All goosenecks shall provide full thread for attachment of antisplash outlet fixtures, serrated tips or filter pumps.

J. Vacuum Breakers: Provide vacuum breakers, integral with the gooseneck where required. Vacuum breakers shall have a forged brass body, renewable seat and a special design valve member for fine flow control. Vacuum breakers shall not spill over at low water volume. At fume hoods provide vacuum breakers externally mounted on face of fume hood superstructure where required as part of the factory pre-piping.

K. In-line Backflow Preventer: Provide in-line dual check backflow preventer, integral with water service fixtures to maintain continuous pressure. ASSE certified under Standard 1024.

L. Aerators: Aerators shall have 3/8 inch NPS male inlet. Provide with integral flow control that adjusts between 0.5 GPM and 3.0GPM. Flow control to be set as indicated on Drawings.

M. Serrated Tips: Serrated tip fixtures shall have 3/8 inch IPS thread with hose end being tapered and shall not have less than 10 serrations. Provide 1/8 inch diameter of orifice in serrated tip, except where otherwise specified. For water units provide with integral flow control that adjusts between 0.5 GPM and 3.0 GPM. Flow control to be set as indicated on Drawings.

N. Quick Disconnect Fitting with 1/4 Inch Male NPT: For service tube ends. Each keyed disconnect shall include nipple and coupler with color-keyed band marking media.

O. Quick Connect Bodies: For service connections to flexible casework systems. Each keyed disconnect shall include nipple and coupler with color-keyed band marking media and hose between service panel and flexible casework system.
   1. Finish: Chrome plated brass.
   2. Provide with stainless steel braided hose with Teflon lining with a maximum working pressure of 1000 psig.

P. Fixture Finish: Fixtures shall be coated with an electrostatically applied epoxy powder coating in the color of white.

Q. Faucet and Valve Handles: Molded plastic or wrist blade type with a screw-on type index disc. Provide color coded handle to match the fixture's service. Provide color code requirements for service fixtures as follows:

Service	Index Color	Symbol	Handle Color
Air	Grey	AIR	Orange
Argon	Grey	AR	Violet
Carbon Dioxide	Grey	CO2	Pink
Chilled Water Return	Grey	CHWR	Green
Chilled Water Supply	Grey	CHWS	Green
Compressed Air	Grey	CA	Orange
Potable Cold Water	Grey	CW	Green
Potable Hot Water	Grey	HW	Red
Gas	Grey	GAS	Blue
Industrial Cold Water	Grey	ICW	Green
Industrial Hot Water	Grey	IHW	Red
Lab Air	Grey	LA	Orange
Distilled Water	Grey	DW	White
Deionized Water	Grey	DI	White
Reverse Osmosis Water	Grey	RO	White
Nitrogen	Grey	NIT	Brown
Special Gas	Grey	Varies by gas	Light Blue
Steam	Grey	STM	Black
Vacuum	Grey	VAC	Yellow

R. Wrist blade Handles: Install handles so blades are perpendicular to the benchtop in the off position and horizontal to the benchtop in the open position.

2.12 EMERGENCY SHOWER AND EYE WASH UNITS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers/fabricators offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. General: Provide and install at point of use all emergency shower and eyewash units. Connection to the service piping systems specified in Division 22. Provide units that meet the requirements of ANSI Standard Z358.1.

C. Acceptable Manufacturers:
   1. Water Saver Faucet Company. WaterSaver fixtures are referenced herein.
   2. Broen-LAB A/S.
   3. Guardian Equipment.

D. Emergency Showers:
   1. Deluge type with a concealed stay-open ball valve. Provide with "Panic Bar" activation as detailed on the Drawings.
   2. Shower head and flush ceiling collar: stainless steel. Maximum mounting height of shower head 96 inches.
   3. Design valve so that water flow remains on without requiring use of the operator's hands.
   4. All exposed valves, piping, and associated devices: Stainless steel.

E. Test Kit for Emergency Shower and Safety Stations:
   1. Provide 48 inch telescopic aluminum pole, 11-1/2 inch diameter Tyvek test chute, 5 gallon plastic pail and eyewash tester.

F. Deck Mounted Eye, Face and Body Spray Units:
   1. Dual purpose eyewash/drench hose unit.
   2. The angled dual head body and valve of forged brass.
   3. The squeeze handle of stainless steel with plastic cover.
   4. The handle and deck flange of molded nylon, with handle locater guides.
   5. Provide self-closing valve with a locking clip to hold the valve open once the unit is activated.
   6. Provide unit with dual, polypropylene, angled, gentle spray heads; polyurethane filter; integral volume control; integral backflow preventer; and integrated nylon flip-top dust cover.
   7. Finish: Match laboratory service fitting finish.
   8. Provide with 8 foot long high pressure, reinforced PVC hose.

G. Thermostatic Mixing Valve
   1. Provide at every emergency shower, eye wash or combination unit.
   2. Provide with bimetallic thermostat that senses incoming water temperature and automatically blends water to a pre-set temperature.
   3. Provide with fail safe option for loss of either hot or cold water. Loss of hot water, valve will continue to deliver cold water. Loss of cold water, valve will close and not deliver any water.

4. Include mounting bracket.
5. ASSE certified under Standard 1071.

2.13 UNDERCABINET/SHELVING TASK LIGHTING

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers/fabricators offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Description: UL1598, UL2108 and UL8750 listed, LED light fixture in lengths equal to the cabinet or shelf it is mounted to. Provide standard output, neutral white, color temp to match general room lighting color temp, minimum 90 CRI or higher, daisy chained together with integral individual dimming from 0 to 100 percent and rocker switch on each fixture. Provide with occupancy sensor and automatic shut-off after 10 hours in silver, anodized aluminum, or white finish.

C. Acceptable Manufacturers:
1. LightCorp; Model: Reed Premier “” Standard Output.
2. Mocha Lighting; Model: Lungo “” Low Voltage.
3. BOCA Flasher; Model: TASK Master.

2.14 UMBILICALS/SERVICE DROPS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers/fabricators offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Description: Construct of 18 gage sheet metal with collar at top. Provide bottom curb in same material as benchtop, properly cemented to benchtop. Provide top collar of 16 gage sheet steel. Provide 1 inch by 1 inch, 18 gage angle at curb.

C. Umbilicals shall have removable sections for easy access to piping and conduit. Exposed fasteners will not be allowed. Removal of sections shall not disturb ceiling or benchtop. Construct hanger clips of 18 gage sheet metal and spot welded to removable section.

D. On freestanding umbilicals provide a pipe support channel, spot welded to the fixed enclosure section. On wall or corner umbilicals, attach pipe support channel to the wall.
1. Basis of Design: Unistrut

E. Finish: Finish as specified for metal finish in this section, with color selected by Owner's Representative.

2.15 OVERHEAD SERVICE CARRIERS (THE WING)

A. Description: Construct of metal framing system components in dimensions indicated in drawings. Provide service carriers pre-plumbed for required utilities and coordinate laboratory gas piping material with Division 22. Provide service carriers with receptacles and pre-wired for required electrical and data and coordinate requirements with Divisions 26/27. Coordinate connection of services, point exhaust, electrical and data and junction boxes with other trades.

B. Construct of 11 gage steel framing members with 18 gage metal closure panels. Bottom and end panels to be removable.

C. Securely and rigidly fasten the entire assembly, including diagonal braces, to structural slab above or to a structural grid where provided.

D. Ceiling Trim Plate: Provide ceiling trim plate at each vertical support that penetrates the ceiling system.

E. Finish assembly as specified for metal finish in this section. Paint all exposed piping and conduit servicing the carrier. Color selected by Owner's Representative.

2.16 GAS CYLINDER RESTRAINTS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers/fabricators offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Description: Provide metal framing system members, fastened to the wall or laboratory bench, for mounting of cylinder restraint devices.

C. Metal Framing System Components: Consist of two 12 gage steel channel members with two male swivel hanger fittings, Number M2350, on each member for each cylinder. Unistrut Part Numbers are referenced. Finish as specified for metal finish in this section, with color selected by Owner's Representative.
   1. Acceptable Manufacturers:
      a. Unistrut Corporation
      b. Elcen
      c. Grinnell Power Strut

D. Chain Restraints: Consist of 3/16 inch diameter Type 316 stainless steel chain Number 3618T715, length as required to restrain a standard 9 or 10 inch gas cylinder, with a Type 316 stainless steel threaded connector Number 3711T33, on one end of the chain, and a Type 316 stainless steel load rated spring snap with a minimum load rating of 300 pounds, Number 8907T11, on the other end of the chain.
   1. Acceptable Manufacturer /Distributer:
      a. McMaster-Carr.

2.17 SOURCE QUALITY CONTROL TESTING OF METAL FINISH

A. Metal Finish: Meet or exceed the latest edition of the following Section and Articles of SEFA-8-M Recommended Practices;
   1. 8.0 Cabinet Surface Finish Tests"
      a. 8.1 Chemical Spot Test.
      b. 8.2 Hot Water Test.
      c. 8.3 Impact Test.
      d. 8.4 Paint Adhesion Test.
      e. 8.5 Paint Hardness Test.

B. Testing Requirements: Provide a third party tester that is not a representative of the Manufacturer or Installation Contractor.

C. Test Results: Submit a certified report providing test results and indicating the finish conforms with or exceeds the above SEFA-8-M Recommended Practices.

2.18 SOURCE QUALITY CONTROL TESTING OF EPOXY WORK SURFACES

A. Meet or exceed the latest edition of the following Section and Articles of SEFA-3 Recommended Practices:
   1. 2.1 Chemical/Stain Resistance Test:
      a. Test Method A.
      b. Test Method B.

B. Testing Requirements: Provide a third party tester that is not a representative of the Manufacturer or Installation Contractor.

C. Test Results: Submit a certified report providing test results and indicating the finish conforms with or exceeds the above SEFA-3 Recommended Practices.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Surfaces and Conditions: Examine substrates to receive products and systems and associated work for compliance with requirements and other conditions affecting performance. Proceed only when unsatisfactory conditions have been corrected in a manner complying with Contract Documents. Starting work within a particular area will be construed as acceptance of surface conditions.

3.2 DELIVERY

A. Delivery casework systems in two stages:
   1. Deliver fixed casework and fume hoods.
   2. Deliver flexible casework systems.

B. Deliver flexible casework systems just prior to building occupancy, as instructed by Architect.

3.3 PREPERATION

A. General: Comply with manufacturer's instructions, recommendations, and specifications for cleaning and surface preparation. Surfaces shall have no defects, contaminants, or errors which would result in poor or potentially defective installation or would cause latent defects in Work.

3.4 INSTALLATION

A. General:
   1. Installation Quality Standards: In addition to standards listed elsewhere, perform Work according to following, unless otherwise specified.
      a. Respective manufacturer/fabricator's written installation instructions.
      b. Approved submittals.
      c. Contract Documents.
   2. Control of Corrosion: Prevent galvanic action and other forms of corrosion by isolating metals and other materials from direct contact with incompatible materials.

3. Install casework, tables, casework support systems, overhead service drops, fume hoods and local point exhaust devices in accordance with manufacturer's instructions and approved Shop Drawings, and under the supervision of the manufacturer's trained personnel.
   a. Include installation of service fixtures. Final connections to services are specified in Division 22.
4. Anchor casework and fume hoods securely in place with appropriate seismic tie-down kits, in accordance with delegated design calculations and requirements.

B. Casework Installation:
1. Install, plumb, level, true and straight with no distortions. Shim as required, using concealed shims. Securely anchor to building structure. Where laboratory furniture abuts other finished work, scribe and apply filler strips for accurate fit with fasteners concealed where practicable.
2. Installation of each individual bench run shall start at the high point of the floor under that bench run with levelers screwed in as much as possible.
3. Where required, assemble units into one integral unit with joints flush, tight, and uniform. Align similar adjoining doors and drawers to a tolerance of 1/16 inch.
4. At fixed casework installations provide galvanized backer plates at toe kicks to receive applied base where floor elevation deviations cause gaps over one inch between bottom of cabinet base and floor.
5. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind. Lubricate operating hardware as recommended by Manufacturer.
6. Securely fasten tall cabinets, fume hood superstructures and tall flammable storage cabinets to solid support material near top of cabinet.
7. Reinforcement of stud walls to support cabinets, shelving, and other wall mounted laboratory furnishing items: Done during wall erection by trade involved. Laboratory furniture company/supplier is responsibility for indicating on Shop Drawings the accurate location and sizing of reinforcement.

C. Work Surface Installation:
1. Field jointing where practicable: Made in same manner as factory jointing using dowels, splines, adhesives, and fasteners recommended by Manufacturer. Locate field joints as shown on accepted Shop Drawings, factory prepared so that there is no job site processing of top and edge surfaces.
2. Abut top and edge surfaces in 1 true plane, with internal supports placed to prevent any deflection.
3. Provide all holes and cutouts as required for built-in equipment and mechanical and electrical service fixtures. Prior to making openings, verify size of opening with actual size of equipment to be used. Form inside corners to a radius of not less than 1/8 inch. After sawing, rout and file cutouts to ensure smooth, crack free edges. Seal exposed edges after cutting with a waterproofing material recommended by manufacturer.
4. Secure tops to support with concealed Z-Type, angle type fastening, "Liquid Nails", Ply400/Ply 200 adhesive or equivalent. Fastening devices spaced no more than 3 feet on center. Adhesives shall be liberally applied for solid anchoring of tops.

5. Plastic laminate worktop joints: 1/4 inch diameter bolt type "dog-bone" or "tite-joint" fasteners routed into bottom surface of worktops. Provide flush hairline joints in top units and seal with silicone sealant.
6. Epoxy Resin Work Surface Joints: 3/32 inch flush and smooth with epoxy sealant.
7. Stainless Steel Work Surface joints: Electrically weld all shop and field joints; grind smooth and polish.
8. Caulk joints between curb and walls, fume hoods, and cabinets with acid-resistant silicone caulk.

D. Sink Installation: Set in chemical resistant sealing compound sinks which were not factory installed and secured and supported per manufacturer's recommendations.

E. Accessory Installation: Install accessories, fixtures and equipment in accordance with manufacturer's recommendations ready for final connection to services.

F. Refer to Specification Section 115313 for additional information regarding fume hood installation.

3.5 FIELD QUALITY CONTROL

A. Manufacturer/Fabricator's Field Service: Manufacturer/fabricator's qualified technical representative shall inspect first day's Work and periodically inspect Work to ensure installation is proceeding in accordance with manufacturer/fabricator's designs, recommendations, instructions, and warranty requirements. Representative shall submit written reports of each visit indicating observations, findings, and conclusions of inspection.

B. Testing Agency Field Service: The Owner will engage through the Contractor a qualified independent testing agency to perform field quality control. Materials and installation failing to meet specified requirements shall be replaced at Contractor's expense. Retesting of materials and installations failing to meet specified requirements shall be done at Contractor's expense.

3.6 ADJUSTING

A. Repair or remove and replace defective work, as directed by Owner's Representative upon completion of installation.

B. Adjust doors, drawers, hardware, fixtures and other moving or operating parts to function smoothly.

3.7 CLEANING AND PROTECTION

A. Clean shop finished casework and fume hoods, touch up as required, and remove and refinish damaged or soiled areas.

B. Cover casework for protection against soiling and deterioration during remainder of construction period.

C. Clean countertops with diluted dishwashing liquid and water leaving tops free of all grease and streaks. Use no wax or oils.

D. If steel wool is used in cleaning stainless steel, use only stainless wool.

E. Protect casework and fume hoods before, during, and after installation. Materials damaged due to improper protection are cause for rejection.

END OF SECTION

SECTION 123553.03 – ADAPTABLE LABORATORY CASEWORK SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes adaptable laboratory casework systems.

B. Related Requirements:
   1. Section 123553 "General Requirements for Casework and Fume Hoods" for all references, materials, hardware, finishes, installation, etc.
   2. Section 123553.19 "Wood Laboratory Casework."

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Acceptable Manufacturers/Fabricators and Products: Subject to compliance with requirements of Contract Documents as judged by the Architect, provide product by one of manufacturers/fabricators listed. If not listed, submit as substitution according to the Conditions of the Contract and Division 01 Section "Substitution Procedures".
   1. Air Master Systems Corporation; Gemini (round leg) or Titan (square leg).
   2. ICI Scientific; Envision 3.0.
   3. Mott Manufacturing Limited; Optima 2550.

B. Basis of Design (Product Standard): Contract Documents are based on products and systems specified to establish a standard of quality. Other manufacturers/fabricators offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Basis of Design: Mott Manufacturing Optima.

2.2 SYSTEM DESCRIPTION

A. Comply with SEFA 10 "Adaptable Casework Systems."

B. Design Requirements:
   1. Provide modular, pre-engineered components to create laboratory furniture assemblies that accommodate reconfiguration and/or relocation. The system is a single-sided and/or double-sided assembly. Double sided assemblies shall be provided with table that can be removed and relocated as a stand-alone table without modification to the frame.
   2. System supports work surfaces, suspended cabinets, mobile cabinets and overhead storage components which are self-supporting and independent of the building structure.
   3. Vertical height of movable bench and table work surfaces and shelves can be adjusted with simple, positive mechanisms

2.3 PERFORMANCE REQUIREMENTS:

A. Structural performance: Provide support framing capable of withstanding the total live loads indicated for various system designs including weight applied to the top of work surface and total weight of below-counter storage units and other accessories.

B. Seismic performance: Refer to Section 123553.

C. Testing of Casework, Tables, and Shelving: Meet or exceed SEFA 10.

2.4 CASEWORK SYSTEM FABRICATION

A. General: Description:
   1. To be used in wall, island or peninsula configurations; self-supporting without anchoring to the building. Components include table frame assembly and rear support structure made from minimum 14 gage tubular steel or extruded aluminum.
   2. System ships complete from the factory with minimal on-site assembly.

B. Table Frame Assembly:
   1. Nominal table assembly dimensions:
      a. Width: 48, 60, 72, and 96 inches.
      b. Depth Including Adaptable Frame Assembly: 30 or 33 inches.
      c. Height: Adjustable from nominal 29 to 36 inches (not including work surface)
   2. Modular, interchangeable work surface support structure, adjustable height in minimum 1 inch increments.
   3. Reinforce at front and rear corners with gussets.
   4. Provide stretchers between side legs (front and back). Provide rear stretch between back legs.
   5. Provide table assembly with one side removable as a stand-alone table with four legs.

C. Adaptable Frame Assembly:
   1. Nominal support structure dimensions:
      a. Width: 48, 60, 72, and 96 inches.
      b. Depth: 3 inches for a single-sided bench, 6 inches for a double-sided bench.
      c. Height: 85 inches maximum.
   2. Provide uprights with slots on 1 inch increments for shelving adjustment.
   3. High/low voltage and data cabling run in separate upright from gas piping. All services terminate in hose or plug connection. Provide sufficient length to reach from top of support structure to ceiling service panel.
   4. Provide hose/cord wrap for bundling plumbing, electrical and data lines and cords from top of support structure to ceiling service panel.
   5. Plumbing:
      a. Factory pre-pipe rear support structure compliant to all state and local codes. Provide up to three services as indicated on the drawings, to a point of connection at the top of the support structure. Provide, per Division 22 the piping material and installation of each service type. Pressure test all pre-piped lines in the factory.
      b. Provide up to three service fixtures as indicated on Drawings. Provide quick disconnect with hose at the top of the support structure. Plumbing shall be arranged so that services cannot be intermixed.
      c. Refer to service fixture schedule and section 123553 for service fixture outlet.

d. All service valves and quick disconnects shall be keyed and color-coded. Only plug and body connects of the same key will couple and allow flow.

6. Electrical:
   a. Factory pre-wire all power/data raceways, receptacles, task lighting and wiring in accordance with all applicable state and local codes and Division 26 specifications. Terminate wiring with cord and twist lock plug as indicated on Ceiling Service Panel types. All electrical fixtures shall be UL listed and labeled.
   b. Factory pre-wire rear support structure with all power/data receptacles where noted, task lighting and wiring in accordance with all applicable state and local codes and Division 26 specifications. Terminate wiring with cord and twist lock plug as indicated on Ceiling Service Panel types. All electrical fixtures shall be UL listed and labeled.
   c. Raceway Finish: Provide housings and line-type fittings with manufacturer's standard baked-on, chemical-resistant enamel. Color selected by the Owner's Representative from the Manufacturer's non-standard colors.
   d. Cover Plates: Provide satin finish, Type 304, stainless-steel cover plates with formed, beveled edges.
   e. For 60 inch wide and greater bench assemblies:
      1) Single sided bench: Provide two 20 amp circuits per bench assembly. Provide two circuits within one cord and twist lock plug assembly.
      2) Double-sided bench: Provide four 20 amp circuits per bench assembly. Provide two circuits within one cord and twist lock plug assembly for a total of two cord/twist lock assemblies.
      3) Provide three 20 amp circuits where additional power is required on vertical for single-sided bench.
   f. For bench assemblies facing the ghost corridor provide one additional receptacle fed from an independent 20 amp circuit with cord and twist lock assembly.
   g. For each double sided frame system provide one additional receptacle, mounted in frame below the bench top, tied into one of the circuits.
   h. For 120 volt power provide two circuits within one cord and twist lock plug assembly NEMA L14-20P.
7. Data:
   a. Factory pre-wire ethernet ports, cabling, pass through coupler, furniture plate and other accessories in accordance with all applicable state and local codes and Division 27 specifications.
   b. Provide four data ports per double sided bench assembly (two per side).
   c. Provide with data cut-outs on each side of bench with pull string installed.

D. Adjustable Shelving:
1. For nominal dimensions and general requirements refer to Section 123553.
2. Shelf Requirements:
   a. Metal shelving: Form front and back edges down 1 inch (25 mm) and returned back 3/4 inch (19 mm). Form ends down 1 inch (25 mm). Reinforce with a welded hat channel for the full length of the shelf.
   b. Provide with integral rear retaining lip 1 inch (25 mm) high. Top shelf assemblies do not require retaining lip.

2.5 METAL FINISH

A. Refer to Section 123553.

PART 3 - EXECUTION

3.1 GENERAL

A. Refer to Section 123553.

END OF SECTION

SECTION 123553.19 – WOOD LABORATORY CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes wood laboratory casework.

B. Related Requirements:
   1. Refer to Section 123553 "General Requirements for Laboratory Casework and Fume Hoods" for all References, Approved manufacturers, Materials, Hardware, Finishes, Installation, etc.
   2. Section 123553.03 "Adaptable Laboratory Casework Systems."

PART 2 - PRODUCTS

2.1 MANUFACTURERS AND PRODUCTS

A. Refer to Section 123553 for approved manufacturers.

2.2 CASEWORK DESIGN

A. Comply with SEFA 8-W "Laboratory Grade Wood Casework."

B. Minimum standards for work within this Section: Construct in accordance with Premium Grade of the Architectural Woodwork Standards, latest edition unless otherwise specified herein.

C. Full overlay style.

D. Rigid and self-supporting cabinets suitable for use in an assembly or as individual, stand-alone units, with joints securely glued and cabinets clamped under pressure during assembly to ensure secure joints and cabinet squareness.

E. Joints: Doweled and glued or mortised and tenoned secured with glue and countersunk screws.

F. Square edged door and drawer fronts overlapping the openings on all four sides. In elevation, hold the reveal between end panel and door or drawer edge to a maximum of 1/8 inch wide. Hold spaces between abutting doors and drawers to a maximum of 1/8 inch wide, both horizontally and vertically, and shall be accurate and uniform, forming a continuous reveal throughout full length of assembled casework. Hold the reveal between top of cabinet and door or drawer edge to a maximum of 1/4 inch wide. Trim and sand smooth with all edges and corners radiused.

G. Testing of Casework, Tables, and Shelving: Meet or exceed SEFA 8-W.

2.3 CASEWORK FABRICATION

A. General: Include completely enclosed vertical posts. Include the items of cabinet construction listed. Exclude provisions for doors in open shelf cabinets or cubbies.

B. Floor Mounted Base Cabinets:
   1. End Panels:
      a. 3/4 inch veneer core hardwood plywood.
      b. Exposed edges: 1/8 inch, Type 1 hardwood lumber edgebanding.

c. Provide a minimum of 2 rows of drilled holes in each end panel, 1-1/4 inch on centers, for the attachment of drawer and shelf slides or shelf clips.
d. Attach to top frame, bottom, intermediate rails, and toespace rail with multiple dowels and glue or mortise and tenon joints secured with glue and countersunk screws.
e. For sink cabinets containing an under-mount sink, provide support rails secured between end panels with leveling screws to support sink.

2. Backs:
   a. Unexposed interiors and exteriors: Minimum 3/16 inch hardboard.
   b. Exposed interiors and unexposed exteriors: 1/4 inch veneer core hardwood plywood.
   c. Exposed exterior backs: 3/4 inch veneer core hardwood plywood.
   d. Provide removable vertical split backs on all base cabinets, except units with security panels and sink cabinets, to allow access to service piping from the front of the unit.
   e. All sink cabinets to have partial height back panels to allow passage of the drain line and piping to the service chase.
3. Bottoms:
   a. 3/4 inch veneer core hardwood plywood.
   b. Exposed edges: 1/8 inch, Type 1 hardwood lumber edgebanding.
   c. Attach to end panels with multiple dowels and glue or mortise and tenon joints secured with glue and countersunk screws.
4. Toespace Rail:
   a. Install between end panels to provide a minimum toespace of 2-1/4 inches deep by 4 inches high.
   b. Type 2 hardwood lumber or fir, 3/4 inch by 4 inch.
5. Top Frames:
   a. Full frame consisting of front, rear, and side members. Join frame members with multiple dowels and glue or mortise and tenon joints secured with glue and countersunk screws.
   b. Front member: Type 1 hardwood lumber or Type 2 hardwood lumber with 1/8 inch), Type 1 hardwood lumber edgebanding. Minimum 1 inch by 2-1/2 inch.
   c. Rear member: Type 1 or Type 2 hardwood lumber. Minimum 1 inch by 2-1/2 inches.
   d. Side members: Type 2 hardwood lumber. Minimum 3/4 inch by 1-1/2 inch.
   e. Attach top frame to end panels with multiple dowels and glue or mortise and tenon joints secured with glue and countersunk screws.
6. Intermediate Rails: Provide between drawers and doors, and between multiple drawers at all security panels.
   a. Type 1 hardwood lumber, minimum 3/4 inch thick.
   b. Attach to end panels with multiple dowels and glue or mortise and tenon joints secured with glue and countersunk screws.
7. Adjustable Shelves:
   a. Provide one shelf per cupboard unit. 1 inch veneer core hardwood plywood.
   b. Exposed edges: 1/8 inch, Type 1 hardwood lumber edgebanding.
   c. Fit dividers and end panels with stud type shelf brackets for adjustment on 1-1/4 inch centers. Groove shelves at brackets to prevent movement.

d. Front edge of shelf to be within 1 inch of inside face of door. Provide split-depth shelf so that front section can be removed to allow for taller storage.

8. Hinged Doors: 3/4 inch hardwood plywood with particleboard, MDF or combination core with 1/8 inch, Type 1 hardwood lumber edgebanding.
9. Drawers:
   a. Drawer box (back, sides, and subfront): Minimum 1/2 inch 9 ply Baltic Birch veneer core plywood or 1/2 inch, Type 2 hardwood. Attach back, subfront and sides with 5/16 inch dowels and glue or multiple dovetail and glue.
   b. Bottom: 1/4 inch hardboard. Dado bottom into back, subfront and sides sealed with hot melt glue around drawer bottom perimeter.
   c. Removable drawer head: 3/4 inch hardwood plywood with particleboard, MDF or combination core with 1/8 inch Type 1 hardwood lumber edgebanding.

C. Mobile Base Cabinets: Provide mobile cabinets as described under Floor Mounted Base Cabinets above, unless modified under this Paragraph.
1. Omit toespace or bottom base and provide casters - swivel type for mobile cabinets, refer to Section 123553.
2. End Panels: Attach to top, bottom, and intermediate rails, with multiple dowels and glue or mortise and tenon joints secured with glue and countersunk screws.
3. Tops:
   a. 3/4 inch veneer core hardwood plywood.
   b. Exposed edges: 1/8 inch, Type 1 hardwood lumber edgebanding.
   c. Attach to end panels with multiple dowels and glue or mortise and tenon joints secured with glue and countersunk screws.
4. Backs: Unexposed interiors and exposed exterior backs: 3/4 inch veneer core hardwood plywood.
5. Anti-Tip Interlock: Provide in all cabinets with drawers and adjustable pullout shelves.
6. Counterweight: Provide in all cabinets.

D. Wall and Upper Cabinets:
1. End Panels:
   a. 3/4 inch veneer core hardwood plywood.
   b. Exposed edges: 1/8 inch Type 1 hardwood lumber edgebanding.
   c. Provide 2 rows of drilled holes in each end panel, 1-1/4 inch on centers, to receive shelf clips.
   d. Attach to top, bottom, and bottom rail with multiple dowels and glue or mortise and tenon joints secured with glue and countersunk screws.
2. Backs:
   a. 1/4 inch veneer core hardwood plywood.
   b. Rabbetted backs and provide unexposed exterior hanger rails at the top and the bottom.
3. Bottoms:
   a. 1 inch veneer core hardwood plywood.
   b. Exposed edges: 1/8 inch, Type 1 hardwood lumber edgebanding.
   c. Attach to end panels with multiple dowels and glue or mortise and tenon joints secured with glue and countersunk screws.
4. Tops:

a. 1 inch veneer core hardwood plywood.
b. Exposed edges: 1/8 inch, Type 1 hardwood lumber edgebanding.
c. Attach to end panels with multiple dowels and glue or mortise and tenon joints secured with glue and countersunk screws.

5. Adjustable Shelves:
   a. Full width with two adjustable shelves for cabinets between 31 inches high up to 37 inches high.
   b. 1 inch veneer core hardwood plywood.
   c. Exposed edges: 1/8 inch, Type 1 hardwood lumber edgebanding.
   d. Adjustable on 1-1/4 inch centers.
   e. Front edge of shelf to be within 1 inch of inside face of door.
6. Hinged Solid Doors: 3/4 inch hardwood plywood with particleboard, MDF or combination core with 1/8 inch, Type 1 hardwood lumber edgebanding.

E. Knee Space:
1. Perimeter Rails: 3/4 inch by 4-1/8 inches solid Type 1 hardwood lumber. Groove rails for "Z" irons or drill for top attachment. Front rail forms apron.
2. Reinforcing Cross Rails: 3/4 inch by 4-1/8 inches solid hardwood lumber glued into front and back rail grooves and pinned at intervals not more than 33 inches on centers. Reinforce cross rails with glue blocks.
3. Leg: 2 inch by 2 inch solid, Type 1 hardwood lumber. Provide legs with leveling glides and a 2 inch high black coved vinyl or rubber shoe around leg base.
4. Leg stretcher rails with 1-1/4 inch by 2-1/2 inch solid Type 1 hardwood lumber. Connect by mortise and tenon and stove type bolt, washer and square nut.
5. End Panel: 3/4 inch veneer core hardwood plywoodwith Type 1 hardwood lumber edgebanding on all exposed edges.
6. Back Panel: 3/8 inch veneer core hardwood plywood with 1/8 Type 1 hardwood lumber edgebanding. Provide all panels with bottom 6 inches fixed and the top portion removable. Attach removable portion using stainless steel screws and finishing washers.

F. Filler Panels:
1. Provide filler panels or scribe strips at exposed to view areas between back of cabinets and walls, between backs of cabinets at end of island or peninsula benches, and at any other area necessary to enclose gaps. For floor mounted cabinets provide all filler panels with bottom 6 inches fixed and the top portion removable.
2. 3/8 inch veneer core hardwood plywood with 1/8 inch, Type 1 hardwood lumber edgebanding.
3. Secure to frame and/or cabinet back and wall with metal angle and oval head screws with finishing washers.

2.4 HARDWARE

A. Refer to Section 123553.

2.5 METAL FINISH

A. Refer to Section 123553.

PART 3 - EXECUTION

3.1 GENERAL

A. Refer to Section 123553.

END OF SECTION

SECTION 123570 - HEALTHCARE CASEWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes stainless-steel healthcare casework.

B. Related Requirements:
   1. Section 013573 "Delegated Design Requirements and Procedures" for definitions, submittal procedures, responsibilities, and scheduling requirements associated with delegated design assignment indicated in this Section.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

B. Keying Conference: Conduct conference at Project site. Incorporate keying conference decisions into final keying requirements.

1.3 COORDINATION

A. Coordinate layout and installation of framing and reinforcements for support of healthcare casework.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, elevations, sections, and attachment details.
   1. Indicate locations of blocking and reinforcements required for installing healthcare casework.
   2. Indicate hardware locations.
   3. Indicate locations of and clearances from adjacent walls, doors, windows, other building components, and equipment.
   4. Include coordinated dimensions for equipment specified in other Sections.

C. Keying Schedule: Include schematic keying diagram, and index each key set to unique designations that are coordinated with the Contract Documents.

D. Samples for Initial Selection: For units with factory-applied color finishes.

E. Samples for Verification: For each type of hardware indicated, in full-size units.

F. Delegated-Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements.
   1. Provide delegated-design submittals for seismic restraints for healthcare casework.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish complete touchup kit for each type and color of healthcare casework provided. Include fillers, primers, paints, and other materials necessary to perform permanent repairs to damaged casework finish.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect finished surfaces during handling and installation with protective covering of polyethylene film or other suitable material.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain healthcare casework from single source from single manufacturer.

B. Product Designations: Drawings indicate sizes and configurations of healthcare casework by referencing designated manufacturer's catalog numbers. Other manufacturers' metal healthcare casework of similar sizes, of similar door and drawer configurations, and complying with the Specifications may be considered. See Section 016000 "Product Requirements."

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design healthcare casework for seismic performance.
   1. Material properties indicated in this Section shall be considered as minimum properties.

B. Seismic Performance: Healthcare casework, including attachments to other work, shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
   1. Design earthquake spectral response acceleration, short period (Sds) for Project is as indicated on the Drawings.
   2. Seismic Importance Factor: 1.5.

2.3 CASEWORK MATERIALS

A. Steel Sheet: Cold-rolled commercial steel sheet, complying with ASTM A 1008/A 1008M; matte finish; suitable for exposed applications.

B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, stretcher-leveled standard of flatness.

C. Nominal Stainless-Steel Thicknesses for Stainless-Steel Healthcare Casework:
   1. Sides, Ends, Fixed Backs, Bottoms, Cabinet Tops, Soffits, and Items Not Otherwise Indicated: 0.050 inch.
   2. Back Panels, Doors, Drawer Fronts and Bodies, and Shelves: 0.038 inch except 0.050 inch for unreinforced shelves more than 36 inches long.
   3. Intermediate Horizontal Rails, Center Posts, Tubular Legs, and Top Gussets: 0.062 inch.
   4. Drawer Runners and Hinge Reinforcements: 0.078 inch.
   5. Leveling and Corner Gussets: 0.109 inch.

D. Clear Tempered Glass Shelves: ASTM C 1048, Kind FT, Condition A, Type I, Class 1, Quality-Q3; 6.0 mm thick; with exposed edges seamed before tempering.

E. Pegboard: Perforated stainless-steel sheet, 0.050-inch nominal thickness.

F. Insulation for Warming Cabinets: Semirigid, glass-fiber board insulation complying with ASTM C 612, Type IA or Type IB.

G. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 CABINET FABRICATION

A. General: Assemble and finish units at point of manufacture. Use precision dies for interchangeability of like-size drawers, doors, and similar parts. Perform assembly on precision jigs to provide units that are square. Reinforce units with angles, gussets, and channels. Integrally frame and weld to form a dirt- and vermin-resistant enclosure. Maintain uniform clearance around door and drawer fronts of 1/16 to 3/32 inch.

B. Metal Flush Doors: Outer and inner pans that nest into box formation, with full-height channel reinforcements at center of door. Fill doors with noncombustible, sound-deadening material.

C. Hinged Doors: Mortise doors for hinges and reinforce with angles welded inside inner pans or hollow-metal stiles at hinge edge.

D. Metal Drawers: Fronts made from outer and inner pans that nest into box formation, with no raw metal edges at top. Sides, back, and bottom fabricated in one piece with rolled or formed top of sides for stiffening and comfortable grasp for drawer removal.

E. Metal Shelves: Front, back, and ends formed down, with edges returned horizontally at front and back to form reinforcing channels. Provide clips, brackets, pilasters, or other means to support shelves from cabinet ends and to allow height of shelves to be adjusted in increments of not more than 2 inches.

F. Sloping Tops: Unless tops are concealed by other construction, provide sloping tops on cabinets with tops 60 inches or more above the finished floor. Slope tops 25 degrees or more and construct of same material and with same finish as cabinets.

G. Toe Space: Unless casework is built-in, provide metal toe space, fully enclosed, 4 inches high by 3 inches deep, with no open gaps or pockets.

H. Filler Strips: Provide as needed to close spaces between cabinets and walls, ceilings, and indicated equipment. Fabricate from same material and with same finish as cabinets and with hemmed or flanged edges.

I. Trim Flanges: Formed metal trim fabricated from same material and with same finish as cabinets. Provide at perimeter of recessed cabinets.

2.5 SPECIALTY CABINETS

A. Narcotics Cabinets: Construct of stainless steel as individual, freestanding units with finished sides and top and double-walled bottom. Provide with double-pan flush outer door and 0.062-inch- nominal thickness, single-pan inner door, both with locks; each is individually keyed and not master keyed.

B. Specimen Pass-Through Cabinets: Construct of stainless steel as through-wall units with double-walled construction and smooth interior. Provide with double-pan flush doors with interlocking hardware that prevents each door from being opened when the other door is open. Provide with removable, stainless-steel spill tray and trim flanges for both faces.

C. Warming Cabinets: Recessed units covered on back, top, and sides with 1-inch- thick insulation. Insulate double-pan door and equip with heat-resistant gasket. Provide with thermostatically controlled heating system to maintain temperature within 10 deg F of temperature setting that can be varied from 97 to 160 deg F.
   1. Equip units with fan-forced electric heating system.

D. Desk Units: Recessed units with sloped stainless-steel writing surface, white marker board back panel, and built-in fluorescent light fixture.
   1. Provide drawers under the writing surface as indicated.
   2. Provide keyboard drawer under the writing surface and provide drawers and space for CPU under keyboard drawer as indicated. Provide rack for monitor over the writing surface.

2.6 STAINLESS-STEEL FINISH

A. Grind and polish surfaces to produce uniform, directional-satin finish matching No. 4 finish, with no evidence of welds and free of cross scratches. Run grain with long dimension of each piece. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces clean.

2.7 CABINET HARDWARE

A. General: Provide healthcare casework manufacturer's standard, commercial-quality, heavy-duty hardware complying with requirements indicated for each type.

B. Continuous Hinges: Stainless-steel continuous hinges complying with BHMA A156.9, Grade 1. Provide for narcotics cabinets and specimen pass-through cabinets.

C. Hinged Door and Drawer Pulls: Back-mounted pulls of stainless steel.
   1. Design: Wire pulls .
   2. Overall Size: As selected by he Architect from manufacturer's full range.

D. Sliding Door Pulls: Recessed flush pulls of stainless steel. Provide two pulls for drawers more than 24 inches wide.
   1. Design and Size: Round, 1-3/4 inches in diameter by 1/8 inch deep.

E. Door Catches: Nylon-roller spring catches. Provide two catches on doors more than 48 inches high.

F. Drawer Slides: Side-mounted, epoxy-coated -steel, self-closing, ball-bearing drawer slides; designed to prevent rebound when drawers are closed; complying with BHMA A156.9, Type B05091.
   1. Provide Grade 1HD-100 for drawers not more than 6 inches high and 24 inches wide.
   2. Provide Grade 1HD-200 for drawers more than 6 inches high or 24 inches wide.
   3. Provide Grade 1HD-100 for computer keyboard drawers.
   4. Provide full -extension type where Grade 1 is indicated.

5. Provide full-overtravel-extension type where Grade 1HD-100 or Grade 1HD-200 is indicated.

G. Label Holders: Stainless steel, aluminum, or chrome plated; sized to receive standard label cards approximately 1 by 2 inches, attached with screws or rivets. Provide where indicated.

H. Locks: Cam or half-mortise type with five-pin tumbler; brass with chrome-plated finish; complying with BHMA A156.11, Type E07261.
1. Provide minimum of two keys per lock and two master keys.
2. Provide locks on all drawers and doors.
3. Keying: Key locks alike within each room, and key each room separately.
4. Master Key System: Key all locks to be operable by master key.

I. Sliding-Door Hardware Sets: Healthcare casework manufacturer's standard, to suit type and size of sliding-door unit.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas, with Installer present, for compliance with requirements for installation tolerances, location of reinforcements, and other conditions affecting performance of healthcare casework.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF CABINETS

A. Install cabinets level, plumb, and true; shim as required, using concealed shims. Where healthcare casework abuts other finished work, apply filler strips and scribe for accurate fit, with fasteners concealed where practical. Do not exceed the following tolerances:
1. Variation of Tops of Base Cabinets from Level: 1/16 inch in 10 feet.
2. Variation of Bottoms of Upper Cabinets from Level: 1/8 inch in 10 feet.
3. Variation of Faces of Cabinets from a True Plane: 1/8 inch in 10 feet.
4. Variation of Adjacent Cabinet Surfaces from a True Plane (Lippage): 1/32 inch.
5. Variation in Alignment of Adjacent Door and Drawer Edges: 1/16 inch.

B. Recessed Cabinets: Set cabinets in openings and fasten to partition framing, wood blocking, or reinforcements in partitions with fasteners spaced not more than 24 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.

C. Base Cabinets: Fasten cabinets to partition framing, wood blocking, or reinforcements in partitions with fasteners spaced not more than 16 inches o.c. Bolt adjacent cabinets together with joints flush, tight, and uniform.

D. Wall Cabinets: Fasten to hanging strips, masonry, partition framing, blocking, or reinforcements in partitions. Fasten each cabinet through the back, near the top, at not less than 16 inches o.c.

E. Install hardware uniformly and precisely. Set hinges snug and flat in mortises.

F. Adjust healthcare casework and hardware so doors and drawers align and operate smoothly without warp or bind and so contact points meet accurately. Lubricate operating hardware as recommended by manufacturer.

3.3 CLEANING AND PROTECTION

A. Clean finished surfaces, touch up as required, and remove or refinish damaged or soiled areas to match original factory finish as approved by Architect.

END OF SECTION

SECTION 123623.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Plastic-laminate-clad countertops.
   2. Accessories.

B. Related Requirements:
   1. Section 017823 "Operation and Maintenance Data".

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings:
   1. Plans, sections, details, edge and backsplash profiles, and attachments to other work.
   2. Locations and details of joints.
   3. Locations and sizes of cutouts and holes for items installed in countertop.
   4. Apply AWI's Quality Certification Program label to Shop Drawings.

C. Samples for Initial Selection: Plastic laminates in each type, color, pattern, and surface finish required in manufacturer's standard size.

D. Samples for Verification:
   1. Plastic Laminates: For each type, color, pattern, and surface finish required, 8 by 10 inches in size.
   2. Fabrication Sample: For each type and profile of countertop required, provide one sample applied to core material with specified edge material applied to one edge.

E. Sustainable Design Submittals:
   1. Product Data: Environmental Product Declaration.
   2. Product Data: Material Ingredient Documentation.
   3. Product Data: For adhesives and sealants indicating compliance with VOC content requirements.
   4. Laboratory Test Reports: For laminating adhesives, indicating compliance with requirements for low-emitting materials.
   5. Chain-of-Custody Certificates: For certified wood products. Include invoice that identifies vendors chain-of-custody certification number, certified content designation, and cost on a line-item basis.
   6. Laboratory Test Reports: For composite wood products, indicating compliance with the formaldehyde emissions evaluation.

1.3 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Indicate locations and sizes of cutouts and holes for items installed in countertop and backsplashes.

B. Product Certificates: For the following:
   1. Composite wood products.

2. High-pressure decorative laminate.
3. Chemical-resistant, high-pressure decorative laminate.

C. Quality Standard Compliance Certificates: AWI's Quality Certification Program.

D. Qualification Statements: For Installer.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For plastic-laminate-clad countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Furnish not less than 2 linear feet for every 100 linear feet or fraction thereof, of each type, color, pattern, and size of countertop product installed.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
1. Shop Certification: AWI's Quality Certification Program accredited participant.

B. Installer Qualifications: AWI's Quality Certification Program accredited participant.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.

B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

C. Keep surfaces of countertops covered with protective covering during handling and installation.

1.8 FIELD CONDITIONS

A. Environmental Limitations without Humidity Control: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

B. Environmental Limitations with Humidity Control: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F and relative humidity between 25 and 55 percent during the remainder of the construction period.

C. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

D. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD COUNTERTOPS

A. Quality Standard: Unless otherwise indicated, comply with ANSI/AWI 1236 for grades of plastic-laminate-clad countertops indicated for construction, finishes, installation, and other requirements.
   1. Provide inspections of fabrication and installation together with labels and certificates from AWI certification program indicating that countertops comply with requirements of grade specified.
   2. The Contract Documents contain requirements that are more stringent than that of the referenced quality standard. Comply with requirements of the Contract Documents in addition to those of referenced quality standard.

B. Grade: Custom.
   1. Product Certificates: For indigenous materials, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project, means of transportation, and cost for each indigenous material.

C. Certified Wood: Wood products shall comply with requirements of ASTM D7612-10 (FSC, SFI, ATSM, CSA or PEFC certifications are acceptable).

D. High-Pressure Decorative Laminate: ISO 4586-3, Grade HGF.

E. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

F. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.

G. Material Ingredients: Documentation that demonstrates the chemical inventory of the product to at least 0.1 percent (1000 ppm).

H. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
   1. Match Architect's sample.

I. Edge Treatment: As indicated on Drawings.

J. Core Material: Veneer-core plywood.

K. Core Thickness: 3/4 inch.

L. Backer Sheet: Provide plastic-laminate backer sheet, ISO 4586-3, grade to match exposed surface, on underside of countertop substrate.

2.2 ACCESSORIES

A. Grommets:
   1. Wire-Management Grommets: Circular, grommets and matching caps with slot for wire passage.
      a. Finish: Molded plastic.
      b. Outside Diameter: 2 inches.
      c. Color: As selected by Architect.

B. Counter Support Brackets: Manufactured, wall mounted, heavy duty, welded aluminum brackets for supporting countertops and vanities.
   1. Inside Wall Mounted Brackets:
      a. Size: As recommended by manufacturer for counter depths indicated.
      b. Finish: As selected by Architect.
         1) Color: As selected by Architect.

2.3 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.

B. Composite Panel Products: Provide materials that comply with requirements of referenced quality standard for each type of countertop and quality grade specified unless otherwise indicated.
   1. Composite Wood Products: Verify products are made using ultra-low-emitting formaldehyde resins, as defined in CARB 93120, "Airborne Toxic Control Measure (ATCM) for Formaldehyde Emissions from Composite Wood Products," or are made with no added formaldehyde.
   2. Product Data: For recycled content, indicating percentage of postconsumer and preconsumer recycled content and cost.
   3. Veneer-Core Hardwood Plywood: ANSI/HPVA HP-1.

2.4 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products in accordance with test method indicated by a qualified testing agency.
   1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
   2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
   3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

B. Fire-Retardant-Treated Plywood: Products with a flame-spread index of 25 or less when tested in accordance with ASTM E84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 ft beyond the centerline of the burners at any time during the test.

1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.

2.5 MISCELLANEOUS MATERIALS

A. Adhesives: Use adhesives that comply with testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Adhesive for Bonding Plastic Laminate: Type I, waterproof type as selected by fabricator to comply with requirements.
   1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

C. Installation Adhesive: Manufacturer's standard product that is recommended for application indicated.
   1. Verify adhesives have a VOC content of 70 g/L or less.

2.6 FABRICATION

A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

B. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch over base cabinets. Ease edges to radius indicated for the following:
   1. Solid-Wood (Lumber) Members: 1/16 inch unless otherwise indicated.

C. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
   1. Notify Architect seven days in advance of dates and times countertop fabrication will be complete.
   2. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended, and check measurements of assemblies against field measurements before disassembling for shipment.

D. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
   1. Seal edges of cutouts by saturating with varnish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.

B. Examine shop-fabricated work for completion and complete work as required, including removal of packing.

3.3 INSTALLATION

A. Grade: Install countertops to comply with same grade as item to be installed.

B. Assemble countertops and complete fabrication at Project site to extent that it was not completed in the shop.
   1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
   2. Seal edges of cutouts by saturating with varnish.

C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where indicated on Shop Drawings.
   1. Secure field joints in countertops with concealed clamping devices located within 6 inches of front and back edges and at intervals not exceeding 24 inches. Tighten in accordance with manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

D. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical-treatment manufacturer's written instructions, including those for adhesives used to install woodwork.

E. Countertop Installation:
   1. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
   2. Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
   3. Anchor wall cleating necessary for proper setting for countertops not supported by casework.
   4. Install countertops level and true in line. Use concealed shims as required to maintain not more than 1/8-inch-in-96-inch variation from a straight, level plane.
   5. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c.and to walls with adhesive.
   6. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

F. Countertop Support Brackets:
   1. Install support brackets in accordance with manufacturer's written instructions.

2. Install brackets at locations and heights indicated on Drawings.
3. Install brackets rigidly to supporting substrate so that they are secure, plumb, and aligned.

3.4 FIELD QUALITY CONTROL

A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program certifying that woodwork, including installation, complies with requirements of the referenced standard for the specified grade.
   1. Inspection entity is to prepare and submit report of inspection.

3.5 ADJUSTING AND CLEANING

A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where impossible to repair, replace countertops. Adjust joinery for uniform appearance.

B. Clean countertops on exposed and semiexposed surfaces.

C. Protection: Provide kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of 48 inches o.c. Remove protection at Substantial Completion.

END OF SECTION

SECTION 123661.16 - SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Solid surface material countertops.
   2. Solid surface material backsplashes.
   3. Solid surface material end splashes.
   4. Solid surface material apron fronts.
   5. Solid surface material sinks.

B. Related Requirements:
   1. Section 017823 "Operation and Maintenance Data".

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials and sinks.

B. Sustainable Design Submittals:
   1. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
   2. Product Data: For adhesives, indicating VOC content.
   3. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
   4. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
   1. Show locations and details of joints.
   2. Show direction of directional pattern, if any.

D. Samples for Verification: For the following products:
   1. Countertop material, 6 inches square.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Furnish not less than 2 linear feet for every 100 linear feet or fraction thereof, of each type, color, pattern, and size of countertop product installed.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of countertops.

C. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and execution.
   1. Build mockup of typical countertop as indicated on Drawings.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.8 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

A. Solid Surface Material: Homogeneous-filled plastic resin complying with ISFA 2-01.
   1. Type: Provide Standard type unless Special Purpose type is indicated.
   2. Integral Sink Bowls: Comply with CSA B45.5/IAPMO Z124.
   3. Colors and Patterns: Match Architect's samples.

B. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

C. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range.

D. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

E. Plywood: Exterior Grade C-D Exposure 1 complying with DOC PS 1.

2.2 FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
   1. Grade: Custom.

B. Configuration:
   1. Front: As indicated.

2. Backsplash: As indicated.
3. End Splash: As indicated.

C. Countertops:
1. 3/4-inch- thick, solid surface material with front edge built up with same material.

D. Backsplashes: 3/4-inch- thick, solid surface material.

E. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
1. Install integral sink bowls in countertops in the shop.

F. Joints:
1. Fabricate countertops without joints where possible.
2. Where unavoidable, fabricate countertops in sections for joining in field.
a. Joint Locations: Not within 18 inches of a sink or cooktop and not where a countertop section less than 36 inches long would result, unless unavoidable.
b. Splined Joints: Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints. Make width of cuts slightly more than thickness of splines to provide snug fit. Provide at least three splines in each joint.

G. Cutouts and Holes:
1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
4. Counter-Mounted Cooktops: Prepare countertops in shop for field cutting openings for cooktops. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.
1. Adhesives shall have a VOC content of 70 g/L or less.
2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

2.4 ACCESSORIES

A. Grommets for Cable Passage through Countertops: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Color: As selected by Architect.

B. Counter Support Brackets: Manufactured, wall mounted, heavy duty, welded aluminum brackets for supporting countertops and vanities.
   1. Inside Wall Mounted Brackets:
      a. Size: As recommended by manufacturer for counter depths indicated.
      b. Finish: As selected by Architect.
         1) Color: As selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.

D. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

E. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
   1. Install metal splines in kerfs in countertop edges at joints. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
   2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

F. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

G. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.

H. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
   1. Seal edges of cutouts in particleboard subtops by saturating with varnish.

I. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

J. Countertop Support Brackets:
   1. Install support brackets in accordance with manufacturer's written instructions.
   2. Install brackets at locations and heights indicated on Drawings.
   3. Install brackets rigidly to supporting substrate so that they are secure, plumb, and aligned.

END OF SECTION

SECTION 123661.19 - QUARTZ AGGLOMERATE COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Quartz agglomerate countertops.
   2. Quartz agglomerate backsplashes.
   3. Quartz agglomerate end splashes.
   4. Quartz agglomerate apron fronts.

B. Related Requirements:
   1. Section 017823 "Operation and Maintenance Data".

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials.

B. Sustainable Design Submittals:
   1. Product Data: Product Data: Environmental Product Declaration (EPD).
   2. Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
   3. Product Data: For adhesives, indicating VOC content.
   4. Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
   5. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.

C. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.
   1. Show locations and details of joints.
   2. Show direction of directional pattern, if any.

D. Samples for Initial Selection: For each type of material exposed to view.

E. Samples for Verification: For the following products:
   1. Countertop material, 6 inches square.
   2. One full-size quartz agglomerate countertop, with front edge and backsplash, 8 by 10 inches, of construction and in configuration specified.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For quartz agglomerate countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 2 linear feet (3 linear m) for every 100 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of countertop product installed.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of countertops.

C. Mockups: Build mockups to demonstrate aesthetic effects and to set quality standards for fabrication and execution.
   1. Build mockup of typical countertop as indicated on Drawings.
   2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.8 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 QUARTZ AGGLOMERATE COUNTERTOP MATERIALS

A. Quartz Agglomerate: Solid sheets consisting of quartz aggregates bound together with a matrix of polymers, resins, and pigment and complying with ISFA 3-01.

B. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

C. Environmental Product Declaration: Provide Type III Product Specific Environmental Product Declaration with external verification in which the manufacturer is recognized as the participant by the program operator in accordance with ISO 14025, and EN15804 or ISO 21930 and that have at least a cradle to gate scope.
   1. Colors and Patterns: Match Architect's samples.

D. General Emissions Evaluation: Products must be tested and determined compliant in accordance with California Department of Public Health (CDPH) Standard Method v1.2-2017. Evaluation must state the applicable exposure scenario, total VOC (TVOC) content range.

E. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.

F. Plywood: Exterior Grade C-D Exposure 1 complying with DOC PS 1.

2.2 FABRICATION

A. Fabricate countertops according to quartz agglomerate manufacturer's written instructions and the AWI/AWMAC/WI's "Architectural Woodwork Standards."
   1. Grade: Custom.

B. Configuration:
   1. Front: As indicated.
   2. Backsplash: As indicated.
   3. End Splash: As indicated.

C. Countertops: 3/4-inch- thick, quartz agglomerate with front edge built up with same material.

D. Backsplashes: 3/4-inch- thick, quartz agglomerate.

E. Fabricate tops with shop-applied edges and backsplashes unless otherwise indicated. Comply with quartz agglomerate manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

F. Joints:
   1. Fabricate countertops without joints where possible.
   2. When joints are unavoidable, fabricate countertops in sections for joining in field.
      a. Joint Locations: Not within 18 inches of a sink or cooktop and not where a countertop section less than 36 inches long would result, unless unavoidable.
      b. Joint Type, Bonded: 1/32 inch or less in width.
      c. Joint Type, Sealant Filled: 1/16 inch in width.
      d. Splined Joints: Accurately cut kerfs in edges at joints for insertion of metal splines to maintain alignment of surfaces at joints. Make width of cuts slightly more than thickness of splines to provide snug fit. Provide at least three splines in each joint.

G. Cutouts and Holes:
   1. Undercounter Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
      a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16 inch into fixture opening.
   2. Counter-Mounted Plumbing Fixtures: Prepare countertops in shop for field cutting openings for counter-mounted fixtures. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.
   3. Fittings: Drill countertops in shop for plumbing fittings, undercounter soap dispensers, and similar items.
   4. Counter-Mounted Cooktops: Prepare countertops in shop for field cutting openings for cooktops. Mark tops for cutouts and drill holes at corners of cutout locations. Make corner holes of largest radius practical.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by quartz agglomerate manufacturer.
   1. Adhesives shall have a VOC content of 70 g/L or less.

2. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
3. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers." Formaldehyde emissions shall not exceed 9 mcg/cu. m or 7 ppb, whichever is less.

B. Sealant for Countertops: Comply with applicable requirements in Section 079200 "Joint Sealants."

2.4 ACCESSORIES

A. Grommets for Cable Passage through Countertops: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
   1. Color: As selected by Architect.

B. Counter Support Brackets: Manufactured, wall mounted, heavy duty, welded aluminum brackets for supporting countertops and vanities.
   1. Inside Wall Mounted Brackets:
      a. Size: As recommended by manufacturer for counter depths indicated.
      b. Finish: As selected by Architect.
         1) Color: As selected by Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive quartz agglomerate countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet, 1/4 inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with quartz agglomerate manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

C. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.

D. Secure countertops to subtops with adhesive according to quartz agglomerate manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with quartz agglomerate manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

E. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
   1. Install metal splines in kerfs in countertop edges at joints. Fill kerfs with adhesive before inserting splines and remove excess immediately after adjoining units are drawn into position.
   2. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.

F. Install backsplashes and end splashes by adhering to wall and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears.

G. Install aprons to backing and countertops with adhesive. Mask areas of countertops and splashes adjacent to joints to prevent adhesive smears. Fasten by screwing through backing. Predrill holes for screws as recommended by manufacturer.

H. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
   1. Seal edges of cutouts in particleboard subtops by saturating with varnish.

I. Apply sealant to gaps at walls; comply with Section 079200 "Joint Sealants."

J. Countertop Support Brackets:
   1. Install support brackets in accordance with manufacturer's written instructions.
   2. Install brackets at locations and heights indicated on Drawings.
   3. Install brackets rigidly to supporting substrate so that they are secure, plumb, and aligned.

END OF SECTION

SECTION 124816 - ENTRANCE FLOOR GRILLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Recessed floor grilles and frames.

1.2 COORDINATION

A. Coordinate size and location of recesses in concrete to receive floor grilles and frames.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for entrance floor grilles and frames.

B. Sustainable Design Submittals:
   1. Product Data: For flooring products indicating compliance with General Emissions Evaluation.

C. Shop Drawings:
   1. Items penetrating floor grilles and frames, including door control devices.
   2. Divisions between grille sections.
   3. Perimeter floor moldings.

D. Samples: For the following products, in manufacturer's standard sizes:
   1. Floor Grille: Assembled section of floor grille.
   2. Frame Members: Sample of each type and color.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For floor grilles and frames to include in maintenance manuals.

1.5 FIELD CONDITIONS

A. Field Measurements: Indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. C/S Group; "Pedimat G1".

2.2 ENTRANCE FLOOR GRILLES, GENERAL

A. Structural Performance: Provide floor grilles and frames capable of withstanding the following loads and stresses within limits and under conditions indicated:
   1. Wheel load of 400 lb per wheel.

B. Accessibility Standard: Comply with applicable provisions in the DOJ's "2010 ADA Standards for Accessible Design".

2.3 FLOOR GRILLES

A. General: Provide manufacturer's standard floor-grille assemblies consisting of treads of type and profile indicated, interlocked or joined together by cross members, and with support legs (if any) and other components needed to produce a complete installation.

B. Aluminum Floor Grilles: Provide manufacturer's standard floor grilles with extruded members, top-surfaced tread rails, and as follows:
   1. Tread Rails: Extruded-aluminum tread rails.
      a. Aluminum Color: Mill finish.
   2. Top Surface: Heavy-duty carpet, 33 oz./sq. yd.
      a. Top Surface Color: As selected by Architect from manufacturer's full range of industry colors.

C. Lockdown: Manufacturer's standard.

2.4 FRAMES

A. Provide manufacturer's standard frames of size and style for grille type, for permanent recessed installation in subfloor, complete with installation anchorages and accessories. Unless otherwise indicated, fabricate frame of same material and finish as grilles.

2.5 SUPPORT SYSTEM

A. Level Bed Applications: Provide manufacturer's standard, vinyl cushion support system.

2.6 MATERIALS

A. Aluminum Sheet: ASTM B209, alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of Alloy 5005-H15.

B. Extruded Aluminum: ASTM B221, Alloy 6061-T6 or Alloy 6063-T5, T6, or T52 as standard with manufacturer.

2.7 FABRICATION

A. Shop fabricate floor grilles to greatest extent possible in sizes as indicated. Unless otherwise indicated, provide each grille as a single unit; do not exceed manufacturer's recommended maximum sizes for units that are removed for maintenance and cleaning. Where joints in grilles are necessary, space symmetrically and away from normal traffic lanes.

B. Fabricate frame members in single lengths or, where frame dimensions exceed maximum available lengths, provide minimum number of pieces possible, with hairline joints equally spaced and pieces spliced together by straight connecting pins.

C. Coat surface of aluminum in contact with cementitious materials with manufacturer's standard protective coating.

2.8 ALUMINUM FINISHES

A. Mill finish.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and floor conditions for compliance with requirements for location, size, minimum recess depth, and other conditions affecting installation of floor grilles and frames.

B. Examine roughing-in for drainage piping systems to verify actual locations of piping connections before floor grille and frame and drain pan installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install recessed floor grilles and frames to comply with manufacturer's written instructions at locations indicated and with top of floor grilles and frames in relationship to one another and to adjoining finished flooring as recommended by manufacturer. Set floor-grille tops at height for most effective cleaning action. Coordinate top of floor-grille surfaces with doors that swing across grilles to provide clearance under door.

3.3 PROTECTION

A. After completing frame installations, provide temporary filler of plywood or fiberboard in floor-grille recesses and cover frames with plywood protective flooring. Maintain protection until construction traffic has ended and Project is near Substantial Completion.

END OF SECTION

SECTION 126100 - FIXED UPHOLSTERED SEATING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fixed upholstered seating.

1.2 ACTION SUBMITTALS

A. Product Data:
   1. Fixed upholstered seating.

B. Product Data Submittals: For each product.
   1. Include construction details, material descriptions, dimensions of components, and finishes for fixed upholstered seating.

C. Sustainable Design Submittals:
   1. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.
   2. Chain-of-Custody Certificates: For certified wood products.

D. Shop Drawings:
   1. Include plans, elevations, sections, and attachment details.
   2. Seating Layout: Show seating layout, seating width and height

E. Samples for Initial Selection: For each type of exposed color, finish, texture, and pattern indicated.
   1. Include Samples of accessories involving color and finish selection.

F. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For fixed upholstered seating to include in operation and maintenance manuals.
   1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
      a. Methods for maintaining upholstery fabric.
      b. Precautions for cleaning materials and methods that could be detrimental to seating finishes and performance.

1.4 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of fixed upholstered seating that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Wear and deterioration of fabric and stitching beyond normal use.
      b. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
   2. Warranty Periods: As follows, from date of Substantial Completion.
      a. Structural: Five Years
      b. Plastic, Wood, and Paint Components: Five Years

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

B. Obtain each type of seating required, including accessories and mounting components, from single source from single manufacturer.
   1. Upholstery Fabric: Obtain fabric of a single dye lot for each color and pattern of fabric required.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics of Upholstered Seating:
   1. Fabric and Padding:
      a. Fabric: Class 1 in accordance with DOC CS 191 or 16 CFR 1610, tested in accordance with California Technical Bulletin 117-2000.
      b. Padding: Comply with California Technical Bulletin 117-2000.
   2. Upholstery Assembly: Assembly to comply with component-testing requirements of California Technical Bulletin 117-2013.

2.3 FIXED UPHOLSTERED SEATING

A. Fabric Upholstered Seating:
   1. Seat: One part, fully upholstered construction with removable upholstery cover and as follows:
      a. Top Padding Thickness: Minimum 3 inchesat front and rear edges.
      b. Seat Bottom: Hardwood-veneer-faced

B. Seating Dimensions: Refer to Drawings.

2.4 MATERIALS AND FINISHES

A. Composite Wood Products: Products shall be made without urea formaldehyde.

B. Composite Wood Products: Products shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Certified Wood: Wood products (including laminate) shall comply with requirements of ASTM D7612-10 (FSC, SFI, ATSM, CSA or PEFC certifications are acceptable).

D. Concealed Plywood: HPVA HP-1 hardwood plywood or DOC PS 1 softwood plywood as standard with manufacturer.

E. Exposed Plywood: HPVA HP-1, Face Grade A, hardwood-veneer core with color-matched hardwood-veneer faces.

F. Plastic Laminate: ISO 4586-3, manufacturer's standard grade.
   1. Color and Pattern: As indicated on drawings
   2. Provide with UV inhibitors to retard fading.
   3. Color and Texture: As indicated on Drawings.

G. Fabric: Manufacturer's standard with flame-retardant treatment if required to meet performance requirements.

H. Upholstery Padding: Flexible, cellular, molded or slab polyurethane foam.

I. Metal Finish: Finish exposed metal parts with manufacturer's standard polyurethane coating.
   1. Color: As indicated on Drawings.

2.5 FABRICATION

A. Upholstery: Fabricate fabric-covered cushions with molded padding beneath fabric and with fabric covering free of welts, creases, stretch lines, and wrinkles. For each upholstered component, install pile and pattern run in a consistent direction.

2.6 EXAMINATION

A. Examine floors, and other adjacent work and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Verify that electrical connections are properly located.

C. Verify that HVAC air-distribution locations are correct.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

2.7 INSTALLATION

A. Install seating in locations indicated and fasten to substrates in accordance with manufacturer's written installation instructions.
   1. Install seating capable of complying with performance requirements without failure or other conditions that might impair the seating's usefulness.

2.8 ADJUSTING

A. Repair minor abrasions and imperfections in finishes with coating that matches factory-applied finish.

B. Replace damaged and malfunctioning components that cannot be acceptably repaired.

C. Replace upholstery fabric damaged during installation or work of other trades.

END OF SECTION

SECTION 131200 - ALUMINUM ROOFTOP HELISTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes one aluminum Helistop. Package also includes aluminum decking for Helistop and walkway,aluminum support structure, access and egress provisions, safety netting, integrated fire suppression, fuel-water separators, drainage, lighting package, snowmelt equipment, non-skid paint, FAA markings, and installation.

1.2 RELATED SECTIONS

A. Division 01 - Section Section 013573 "Delegated Design Requirements and Procedures" for definitions, submittal procedures, responsibilities, and scheduling requirements associated with delegated design assignment indicated in this Section.

B. Division 05 – Metals: Provisions for and construction of Helistop and walkway structural steel.

C. Division 09 – Painting: Painting other than paint required by this section.

D. Division 21 – Fire Suppression

E. Division 22 – Plumbing: Provisions for and connection to supplied equipment including fuel-water separators.

F. Division 26 – Electrical: Provisions for and connection to supplied equipment including lighted windcone, obstruction lights, perimeter lights, walkway floodlights, fuel-water separators, radio lighting controller, hydronic snowmelt skid, and fire suppression skids and pull stations.

1.3 REFERENCES

A. American Welding Society AWS D1.1 – Structural Welding Code – Steel or International equivalent.

B. American Welding Society AWS D1.4 – Structural Welding Code – Reinforcing steel or International equivalent.

C. NFPA 418 – Standard for Heliports, 2024 Edition

D. FAA Advisory Circular 150/5390-2D, Heliport Design, Dated January 2023

E. FAA AC 150/5390-2D

F. FAA 150/5345-53D-addendum

G. NFPA 418 (2024)

H. ISO 9001, ISO14001, ISO 45001, 3834-2

I. ASCE 7-16

J. ADM, AA Aluminum Design Manual

1.4 SYSTEM DESCRIPTION

A. General Description: Aluminum passive firefighting helipad deck planks (Basis of Design: Bayards SafeDeck) and Deck Integrated Firefighting System (Basis of Design: Marsol Technologies Deck Integrated Fire Fighting System) must be capable of suppressing a post-crash fire with the application of water only. Deck plank extrusion profiles must be minimum 17” wide to minimize flexing. Planks must be assembled and sealed to provide a no-leak helipad surface. All liquids are captured and drained, with no leakage onto the building below. Helipad surface coatings may not be used to achieve no-leak performance. Coatings shall only be used as required for FAA-specified markings. Bare aluminum is preferred elsewhere for minimal maintenance.

1. Touchdown and Liftoff Area (TLOF) shall support loading of the design helicopter in accordance with FAA AC 150/5390-2D Sections 2.7.3.1 and 2.7.3.2.
2. Provide aluminum walkway per Drawings. Provide safety netting, Hydronic Snowmelt, fuel-water separators, lighting package, non-skip paint, and FAA markings.
3. Helipad, ramp, and stairways shall have a bare aluminum non-slip surface, with a media blasted surface to reduce glare and provide a surface coefficient of friction of 0.65.

1.5 SYSTEM PERFORMANCE REQUIREMENTS

A. Provide Helistop to accommodate the following loading requirements of the design helicopter.Gross weight and Impact loading consist of two-point loads 8’-0” apart.

1. Gross weight of helicopter plus snow load plus dead load. Gross weight is defined as ½ of the helicopter maximum take-off weight at each point.
2. Impact load of the helicopter plus dead load. Impact load is defined as ¾ of the helicopter maximum take-off weight at each point.
3. Live load plus dead load in accordance with the govering building Code.
4. Concentrated load of 250 pounds applied over any one square foot of safety netting or 25 psf live load.

1.6 PRE-FABRICATION MEETINGS

A. Pre-fabrication Meeting: Conduct each meeting at Project site.

1. Meeting shall be held at least six weeks prior to fabrication of Helistop. Arrange meeting at Project site with the Architect, Contractor, manufacturers' technical representatives and all others necessary to review procedures, products to be used, and schedule for the Work. Give at least two weeks notice to Architect and other concerned parties.
2. Review required submittals.
3. Review weather and forecasted weather conditions and procedures for working with unfavorable conditions.
4. Review schedule and intended sequence of work.
5. Review the purpose and method of integration of field quality assurance programs developed by Contractor and suppliers/subcontractors responsible for the Work.
6. Review purpose and method of integration of field quality assurance program administered by the Testing and Inspection Agency.

1.7 PREINSTALLATION MEETING

A. Preinstallation Meeting: Conduct each meeting at Project site.
   1. Meeting shall be held at least three weeks prior to installation of Helistop. Arrange meeting(s) at Project site with the Architect, Contractor, testing agency, manufacturer's technical representatives, and all others necessary to review procedures, products to be used, and schedule for the Work. Give at least two weeks notice to Architect and other concerned parties.
   2. Review required submittals.
   3. Review weather and forecasted weather conditions and procedures for working with unfavorable conditions.
   4. Review schedule and intended sequence of work.
   5. Review changes arising from the performance testing program.
   6. Review the purpose and method of integration of field quality assurance programs developed by Contractor and suppliers/subcontractors responsible for the Work.
   7. Review purpose and method of integration of field quality assurance program administered by the Testing and Inspection Agency.

1.8 SUBMITTALS

A. Delegated-Design Submittal: Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements. Provide delegated design submittals for the following:
   1. For Helistop, evidence of compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation. Include the following items, but not limited to, in the Delegated Design Submittal:
      a. Project Shop Drawings.
      b. Structural Calculations.
      c. Demonstration of thermal movement accommodation.
      d. Verification of meeting Deflection Criteria.
      e. Accommodation for drainage.
      f. Noise and vibration control.

B. Helistop manufacturer shall review shop drawings of steel substructure prior to steel fabrication and coordinate Helistop shop drawings with substructure.

C. Product Data: Submit manufacturer's specifications to evidence compliance with these specifications. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

D. Shop Drawings: Include project specific plans, elevations, sections, full-size details, transitions to adjacent enclosure assemblies, and attachments to other work.
   1. Include details of provisions for assembly expansion and contraction and for draining moisture occurring within the assembly to the exterior.
   2. To limit vibration transfer to the roof, stairs and ramp shall be self-supported at the main roof and shall include resilient connection at the main Helistop pad.
   3. Include full-size isometric details of each Helistop framing intersection, showing the following:
      a. Joinery, including concealed welds.

b. Anchorage.
c. Expansion provisions.
d. Flashing and drainage.

E. Engineering Calculations:
1. Submit engineering calculations.
2. Engineering calculations shall be submitted concurrently with the corresponding shop drawings.
3. All calculations shall bear the stamp of a professional engineer registered in the State of Arizona.

F. Statement of Certification:
1. Submit statement certified by the professional engineer that the design of the structural components of the Helistop is in compliance with provisions of the Contract Documents and the Local Building Codes and is in keeping with generally accepted engineering practice.

G. Closeout Submittals
1. Maintenance Data: For Helistops to include in maintenance manuals.

1.9 QUALITY ASSURANCE

A. Manufacturer Qualifications: An entity capable of fabricating Helistop systems that meet or exceed performance requirements indicated, and capable of documenting performance requirements by certification, labeling and inclusion lists.
1. Helistop manufacturer shall have an approved and documented quality control system.
2. Each structural component of the Helistop shall be designed by a registered structural engineer, in accordance with the local building codes, and said engineer shall be employed by the Helistop manufacturer.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer’s unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

C. The helipad structure shall be delivered on wood skids inside of standard shipping containers.

D. Storage, if required, should protect the aluminum components from impact and scratches, contact with steel or other contaminants, and must not sit directly on concrete.

1.11 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer’s absolute limits.

1.12 WARRANTY

A. Warranty Period: Manufacturer warrants manufactured products and installed systems for 1 year after final acceptance. Manufacturer warrants lighting equipment for 10 years on the housings and 3 years on the electrical components.

B. Product Warranty: Manufacturer will repair or replace all parts that are defective during the warranty period.

C. System Warranty: Manufacturer will repair or replace all parts or components of the system that are defective during the warranty period.

PART 2 - PRODUCTS AND SUPPLIES

2.1 BASIS OF DESIGN

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Bayards Helidecks, BV or equivalent.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design Helistop and connection to building structure, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
   1. Material properties indicated in this Section shall be considered as minimum properties.
   2. Comply with performance requirements specified, without failure due to defective manufacture, fabrication, installation, or other defects in construction.
   3. Helistop shall withstand all movements of supporting structure indicated on Drawings including, but not limited to, story drift, rotation, twist, column shortening, shrinkage, long-term creep, live loads, wind loads, deflection from uniformly distributed and concentrated live loads, cantilevered beam behavior (deflections in both upwards and downwards directions and resultant rotations), and loads, interim and otherwise, resulting from means and methods.
   4. Failure also includes the following:
      a. Thermal stresses transferring to building structure.
      b. Noise or vibration created by wind and thermal and structural movements.
      c. Loosening or weakening of fasteners, attachments, and other components.
   5. Structural Loads:
      a. Wind Design Criteria: As indicated on the Structural Drawings.
      b. Snow and Ice Loads: As indicated on the Structural Drawings.
      c. Other Design Loads: As indicated on the Structural Drawings.

2.3 EQUIPMENT

A. Helistop Decking and Walkway:
   1. Basis of Design: Bayards SafeDeck.
   2. Custom designed rooftop aluminium helipad, constructed from a set of parts and equipment, delivered as a complete set.
   3. Helipad structure
      a. Landing surface sub-structure of aluminium truss or beams.
      b. Landing surface of SafeDeck™ extruded aluminium planks, or equivalent
      c. Aluminium ramp from helipad to patient receiving location.

d. TLOF and FATO markings per FAA requirements.

4. Helistop walkway shall be HP0355 design to connect to the Helislat tongue and groove system. In addition, the walkway shall have the same internal snow melt cavity to coordinate with the Helislat™ system. HP0355 shall also be 6005-T5 alloy and be 1½” in height and 12” in width.

B. Drainage Gutter: Manufacturer’s standard HP0259 gutter along low side of deck. Gutter shall have multiple 4” downspout connections.

C. Safety Net: All safety netting shall be 5’-0” wide minimum and be design build in accordance with manufacturer specifications. All safety netting shall be made from structural tubing and 1¼” 9-gauge fencing. All safety netting components shall be galvanized steel. Helistop supplier shall supply safety netting, supports, and all necessary hardware. Safety netting shall be designed in accordance with structural requirements.

D. Fuel/Water Separator: (2) HP0285 weather, gravity separators having three chambers, discharge, heater with integral thermostat and high oil level indicator. Tank shall have a minimum fuel storage capacity of 300 gallons. The tank shall have (1) 6” inlet and (1) 6” outlet. Separator to be located as shown on the contract documents. Piping for separator shall be 6” black iron or as stipulated by State or Local Code. Piping running from gutter to separator and from separator to designated location as shown.

E. To limit vibration transfer to the roof, stairs and ramp shall be self-supported at the main roof and shall include resilient connection at the main Helistop pad.

F. Accessories and Anchors:
1. Provide manufacturer’s standard 1/8” neoprene isolation between all aluminum and steel support structure as required.
2. Provide manufacturer’s standard HP0552 clamping hardware to attach aluminum decking to steel beams.

G. Spring Vibration Isolation:
1. Helistop shall be mounted on spring vibration isolation.
2. Isolation springs shall include the following:
   a. Spring and neoprene or spring and isomer in series.
   b. Seismic isolation.
   c. Static deflection shall not be less than 2 inches.
   d. Natural frequency shall not exceed 15 Hz with 90% or better attenuation at 25Hz-2500 Hz.
3. Load:
   a. Load shall be distributed between 9 support points as indicated on the Structural Drawings.
   b. Estimated 19,500 lb load at the central support point.
   c. Estimated 12,040 lb load at the remaining 8 support points.
   d. 1000 lbs allowable Horizontal Lateral Load
   e. Final load and spring selection shall be coordinated with Architect based on weight of final helistop selection and anticipated helicopter load and impact.

4. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   a. Helios by Pliteq, "NOMAD2", or equal by Masson Industries; or Vibro-Acoustics by Swegon.
   b. Provide number of springs as required, but not less than 19 springs.

H. Lighting Fixtures:
   1. Provide HP2090G Green/IR LED perimeter lights as shown on drawings.
   2. Provide HP3080P Red/IR LED obstruction lights as shown on drawings.
   3. Provide HP0649 LED floodlights to illuminate walkway as shown on Drawings.

I. Windcone Assembly: Provide (1) HP0908 internally lighted LED windcone assembly as shown on Drawings.

J. Firefighting system
   1. Basis of Design: Marsol Technologies Deck Integrated Fire Fighting System
   2. Aluminum passive firefighting helipad deck planks passively prevent and fight fire by safely draining and removing spilled fuel.
   3. DIFF nozzles are built into the deck and activated manually by pull stations.
   4. Scope of supply includes manually operated hose reel stations.
   5. The system shall be capable of extinguishing a fire with water only (without foam. This allows for extinguishing a fire without AFFF discharge and the associated environmental cleanup.
   6. Hand held fire extinguishers with a rating of 20-A: 60-B per NFPA 418 to be provided near helipad.

K. Hydronic Snowmelt System: Provide snowmelt circulating skid, all deck tubing, and manifolds. All deck tubing shall be rubber 5/8” ID x 1” OD. Deck manifolds shall be stainless steel with ball valves for balancing and individual tube isolation on both supply and return manifolds. Circulating skid to include two pumps, one for redundancy, heat exchanger, air separator, expansion tank, etc. Piping from heat source to skid and from skid to deck manifolds to be supplied and installed by Mechanical Contractor.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine and verify that receiving substrate surfaces of the structure have no defects or errors which would result in poor or potentially defective application or cause latent defects in workmanship.

3.2 PREPARATION

A. Substrate Adequacy: Prepare the structure to ensure proper and adequate structural support of the materials specified.

B. Substrate Surface: Prepare substrate surfaces to ensure proper and adequate installation, in accordance with the Drawings and approved Shop Drawings or manufacturer’s requirement.

C. Field Measurement/Verifications: Field measure and verify dimensions as requested.

D. Protection of Adjacent Areas or Surfaces: Protect adjacent areas and surfaces from damage as a result of the Work of this Section.

3.3 ERECTION

A. Erect in accordance with manufacturer's latest published requirements, instructions, specifications, details, and approved Shop Drawings.

B. Helistop members shall be set, leveled, aligned, and anchored in method approved by the Helistop manufacturer.
   1. Erection Tolerances:
      a. Plumb: 1/8 inch in 10 feet (3.2 mm in 3 m); 1/4 inch in 40 feet .
      b. Level: 1/8 inch in 20 feet (3.2 mm in 6 m); 1/4 inch in 40 feet .
      c. Location: Limit variation from plane to 1/8 inch in 12 feet (3.2 mm in 3.7 m); 1/2 inch (12.7 mm) over total length.

C. Helistop manufacturer shall provide full-time installation crew to coordinate installation. Contractor shall certify in writing at completion that Helistop is installed in accordance with manufacturer's recommendations.

D. Helistop manufacturer shall coordinate requirements for on-site support required for erection of items supplied and is responsible for supplying and delivering to the site components required for complete and usable installation whether or not shown or specified by these documents.

E. Field drill holes in Helistop purlins to align with holes provided in steel column studs. Bolt field connections. HP0552 clamping hardware shall be used to connect deck to steel structure as required. Provide temporary shoring and bracing members as required.

F. Set deck members to proper slope as shown such that entire deck surface drains to perimeter gutter system. Provide elevations and alignment as required.

G. Install isolation material between dissimilar metals to prevent galvanic action furnished by Helistop supplier.

3.4 COMMISSIONING

A. After assembly, helipad shall be tested and commissioned under supervision of a factory supervisor.

B. Commissioning shall meet all requirements of NFPA 3, NFPA 4, and NFPA 418.

C. On-site training may be provided to familiarize the owner and operator with the systems.

3.5 PAINTING

A. Complete painted markings following erection. Markings shall be in colors as indicated on the Drawings and as required by FAA guideline150/5390-2D. Paint shall be manufacturers' standard non-skid deck paint. Application shall be according to manufacturer's written instructions. Provide abrasive additive to maintain the Helistop deck's non-skid surface.

3.6 MAINTENANCE AND SUSTAINABILITY

A. Aluminum alloys shall be selected that do not degrade due to oxidation or require special coatings to protect them from the elements.

B. Intent is to reduce environmental impact through water-only firefighting, eliminating the need for hazardous foam agents.

C. Annual inspections to confirm regulatory compliance as well as the correct and safe operation of all the helipad's associated systems and the general condition of its surface and structure are recommended.

END OF SECTION

SECTION 131224 - EXTERIOR WATER FEATURE

PART 1 - GENERAL

1.1 DESCRIPTION

A. This Section includes:
   1. A fully functioning commercial-institutional Water Feature, as indicated.

1.2 PREPARATION

1. Review site conditions including grading/drainage, utility runs, etc. to validate water feature system layout.
2. Stake layout in field for review and approval by Architect prior to construction. Layout includes locations of stream channel routing, basins, pump vaults, auto fill valves, and drains.
3. Coordinate utility connections indicated on plans including civil reclaimed water supply and connection to storm sewer system, electrical feeds, and BAS communications.
4. Identify all weather limitations to construction.

1.3 INSTALLER QUALIFICATIONS

A. Submit evidence of Installer to include the following:
   1. Evidence of successful experience in the construction of not less than two Water Containment Vessels in the last two years, similar in scope and complexity to the Water Containment Vessel required for this project with respect to:
      a. Not less than 800 square feet of total water surface area on site.
      b. VFD Pumps controlled with remote communication.
      c. WebCNTR connection to Hospital System.
   2. Provide a list of not less than three comparative Water Containment Vessel complete with verified names, addresses, telephone numbers of the representative, the Contracting Officer, the mechanical, electrical, and plumbing subcontractors, and the general contractor.
   3. Provide narrative description of each comparative listed Water Containment Vessel, including but not limited to date of construction start and completion, water surface area, type of catch basin/gutter system, type and size of filtration system, type and size of water treatment system, and type of automatic control system.

1.4 SUBMITTALS

A. Product Data: Manufacturer's material and finish data, installation instructions, and general recommendations for each specified product.

B. Shop Drawings of items specified showing plumbing, electrical connections, layout, profiles, methods of joining, and anchorage details only for details that are not included in sealed plans.
   1. Submit a Basis-of-Design for liner installation.
   2. Submit each shop drawing with a cover page for review stamps.

1.5 WARRANTY

A. All equipment shall be warranted by the manufacturer or contractor for a minimum of two years following the date of Substantial Completion.

1.6 OPERATION AND MAINTENANCE MANUALS

A. General:
   1. Provide one or all of the following Close-Out docs (a,b,c.) per owner's direction during construction:
      a. Printed Format in Binders
      b. Files on a Flash Drive
   2. Contents: Organize into manageable size. Arrange contents alphabetically by system, subsystem, and equipment. Provide Two (2) copies.
      a. Include a section for Operating Standards:
         1) Operating procedures
         2) Operating logs
         3) Wiring diagrams
         4) Piped systems diagrams
         5) Precautions against improper use
      b. Include a Section for Maintenance:
         1) Product information
         2) Maintenance Procedures including routine/seasonal tasks, schedule, cleaning/testing requirements.
         3) Repair Instructions, materials and sources
         4) Re-ordering information to include equipment/product information.
         5) Spare Parts List.

B. Training:
   1. Contractor shall provide two separate start-up/training sessions with the owner's maintenance staff.
      a. Contractor shall inform the owner at a minimum of one week prior to each of the training sessions.
         1) The first session should occur once the mechanical system is operational and the water feature is fully operational.
            a) Training to include daily operations and related tasks.
         2) A second session shall be provided 2-3 weeks after the first session.
      b. Contractor shall provide the owner with a video record of each session.

PART 2 - PRODUCTS

2.1 BASIS OF DESIGN

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.

2.2 EPDM LINER

A. EPDM 45 Mils Liners
   1. Descriptions
      a. Adapts readily to a variety of applications and irregular shapes
      b. Remains flexible in extreme temperatures
      c. Contains no plasticizers that can crack and split
      d. Readily accepts pipe and hose penetrations
   2. Desired EPDM liner thickness is 45 Mils

B. Contacts
   1. Field Lining Systems, Inc, 888-382-9301
   2. BTL Liners, 800-280-0712

2.3 PFV SERIES DIRECT BURIAL FIBERGLASS VAULT SYSTEMS

A. PFV Series In-Ground Vault System, fully pre-assembled (SCH 80 PVC) and tested, transition to Schedule 40 PVC at exit coupler of vault; composed of a heavy duty fiberglass reinforced plastic (FRP) vault with white gel-coat interior and light gray gel-coat exterior, FRP access cover (sand/tan) with stainless steel hinge attachment, locking hardware tab (lock not included), containing a flooded suction pump with integrated strainer basket; multicyclone filter; water fill station assembly (if applicable), combination flow meter/check valve option, 3" vent connections with ventilation fan; integral sump pump and well with 2" pressure drain connection; automatic submersible sump pump; U.L. 508 listed 110v, 100-amp electrical panel, includes: main disconnect switch; all connection to vault equipment and light excluding VFD pumps. To include circuit breaker (single phase application), Three phase pumps electrical shall stop at J-Box with direct 1" connection for remote 3 phase disconnects and control systems, Note: GFCI breakers and water level/low level cutoff control circuitry included if applicable; H.O.A. switches with illumination indication and labeling provided by others exterior of vault.

2.4 PLUMBING

A. General requirements covering PVC or CPVC pipe and fittings for both pressure rated and drainage, waste, and vent (DMW) applications. Included are general requirements for materials, dimensions, structural conformance, pressure ratings, testing, and workmanship. Additional requirements found in applicable referenced specifications.

B. Specification Documents:
   1. ASTM D1784 - Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
   2. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly(Vinyl Chloride) (PVC) Pipe and Fittings.
   3. Basic Materials:
      a. Pipe - Fittings fabricated from pipe stock certified by the National Sanitation Foundation (NSF) for use with potable water and in conformance with all applicable ASTM Specifications.
      b. Solvent Cements - Solvent cements shall be certified by NSF for use with potable water and in conformance with ASTM D2564.
      c. Injection Molded Components - Molded components used in fitting fabrication shall be certified by NSF for use with potable water and in conformance with applicable ASTM Specifications.
      d. Gaskets - Gaskets shall be in conformance with ASTM Specification F477.
   4. All Pipe to be labeled per ANSI A13.1

C. Pipe / Electrical Supports in Vaults
   1. All pipe supports manufactured to comply with the latest edition of MSS-SP-58. Where applicable, design and manufacture of these products must also conform to ANSI/ASME Code for Pressure Piping, B31.1; UL203 Standard for Pipe Hanger Equipment and Fire Protection Service; Metal Framing Manufacturers Association, MFMA-2 and Local Building Codes.

2. All selection and installation of pipe supports shall conform to MSS-SP-69 and other specifications that may apply are listed in this document.
3. Structural Loads: Static and dynamic forces at points of attachment must be considered to insure structural integrity of vault or equipment. Supports must be selected so as to minimize the effect of piping system loading on the structure.
4. Materials: Appropriate materials and protective coatings shall be used to prevent failure from environmental and galvanic corrosion. Material that comes in contact with pipe shall be compatible with piping material so that neither has a deteriorating effect on the other.
5. Pipe Attachments: Rigid plastic pipe (ABS, PVC, CPVC, etc…) shall be supported with a welded-in support shield to spread the load-bearing surface.

D. PVC PAINT
1. All vault components above ground and interior piping system shall be finished with PVC 94. Product Code: TOPPVC. Manufactured product of HMG Paints LTD; www.hmgpaint.com.
2. Submit product for both fiberglass and pvc application.
   a. A 1K Vinyl Acrylic with exceptional flexibility and adhesion. For direct application to plastic substrates.
   b. Maximum VOC content (RFU): 1.720kgs/ltr.
   c. Wide variety of colors available. Coordinate color choice with project Architect.
3. Technical Information:
   a. Coverage: 10 square meters per litre
   b. Flashpoint: 4 degrees Celsius
   c. Storage: 12 months in original sealed containers.
4. Application Methods:
   a. Aerosol
   b. Compliant Spray Gun
   c. Brush

E. Tile, Grout for basins, scuppers, rock
1. Refer to Landscape Drawings.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 133419 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Structural-steel framing.
   2. Metal roof panels.
   3. Metal wall panels.
   4. Thermal insulation.
   5. Personnel doors and frames.
   6. Door canopies.
   7. Snow retention bars.
   8. Windows.
   9. Accessories.

B. Related Requirements:
   1. Section 013573 "Delegated Design Requirements and Procedures".
   2. Section 083323 "Overhead Coiling Doors" for coiling doors in metal building systems.

1.3 DEFINITIONS

A. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in standards referenced by this Section.

1.4 COORDINATION

A. Coordinate sizes and locations of concrete foundations and casting of anchor-rod inserts into foundation walls and footings. Anchor rod installation, concrete, reinforcement, and formwork requirements are specified in Division 3.

B. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to metal building systems including, but not limited to, the following:
      a. Condition of foundations and other preparatory work performed by other trades.
      b. Structural load limitations.
      c. Construction schedule. Verify availability of materials and erector's personnel, equipment, and facilities needed to make progress and avoid delays.
      d. Required tests, inspections, and certifications.

e. Unfavorable weather and forecasted weather conditions and impact on construction schedule.

2. Review methods and procedures related to metal roof panel assemblies including, but not limited to, the following:
   a. Compliance with requirements for purlin and rafter conditions, including flatness and attachment to structural members.
   b. Structural limitations of purlins and rafters during and after roofing.
   c. Flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect metal roof panels.
   d. Temporary protection requirements for metal roof panel assembly during and after installation.
   e. Roof observation and repair after metal roof panel installation.
3. Review methods and procedures related to metal wall panel assemblies including, but not limited to, the following:
   a. Compliance with requirements for support conditions, including alignment between and attachment to structural members.
   b. Structural limitations of girts and columns during and after wall panel installation.
   c. Flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
   d. Temporary protection requirements for metal wall panel assembly during and after installation.
   e. Wall observation and repair after metal wall panel installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of metal building system component.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
      a. Metal roof panels.
      b. Metal wall panels.
      c. Thermal insulation and vapor-retarder facings.
      d. Personnel doors and frames.
      e. Windows.
      f. Louvers.

B. Shop Drawings: Indicate components by others. Include full building plan, elevations, sections, details and the following:
   1. Anchor-Rod Plans: Submit anchor-rod plans and templates before foundation work begins. Include location, diameter, and minimum required projection of anchor rods required to attach metal building to foundation. Indicate column reactions at each location.
   2. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.
      a. Show provisions for attaching bridge crane components.

3. Metal Roof and Wall Panel Layout Drawings: Show layouts of panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, clip spacing, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.
   a. Show roof-mounted items including roof hatches, equipment supports, pipe supports and penetrations, lighting fixtures, and items mounted on roof curbs.
   b. Show wall-mounted items including personnel doors, vehicular doors, windows, louvers, and lighting fixtures.
   c. Show translucent panels.
4. Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches**:**
   a. Door canopies.
   b. Flashing and trim.
   c. Gutters.
   d. Downspouts.

C. Samples for Initial Selection: For units with factory-applied finishes.

D. Samples for Verification: For the following products:
1. Panels: Nominal 12 inches long by actual panel width. Include fasteners, closures, and other exposed panel accessories.
2. Flashing and Trim: Nominal 12 inches long. Include fasteners and other exposed accessories.
3. Vapor-Retarder Facings: Nominal 6-inch-square Samples.
4. Windows: Full-size, nominal 12-inch-long frame Samples showing typical profile.
5. Accessories: Nominal 12-inch-long Samples for each type of accessory.

E. Door Schedule: For doors and frames. Use same designations indicated on Drawings. Include details of reinforcement.
1. Door Hardware Schedule: Include details of fabrication and assembly of door hardware. Organize schedule into door hardware sets indicating complete designations of every item required for each door or opening.
2. Keying Schedule: Detail Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

F. Delegated-Design Submittal: For metal building systems.
1. Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements
2. Include analysis data indicating compliance with performance requirements and design data signed and sealed by the qualified professional engineer responsible for their preparation.

G. INFORMATIONAL SUBMITTALS
1. Qualification Data: For erector and manufacturer.
2. Welding certificates.
3. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:
   a. Name and location of Project.
   b. Order number.
   c. Name of manufacturer.

d. Name of Contractor.
e. Building dimensions including width, length, height, and roof slope.
f. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
g. Governing building code and year of edition.
h. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
i. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
j. Building-Use Category: Indicate category of building use and its effect on load importance factors.

4. Erector Certificates: For qualified erector, from manufacturer.
5. Material Test Reports: For each of the following products:
   a. Structural steel including chemical and physical properties.
   b. Bolts, nuts, and washers including mechanical properties and chemical analysis.
   c. Tension-control, high-strength, bolt-nut-washer assemblies.
   d. Shop primers.
   e. Nonshrink grout.

H. Field quality-control reports.

I. Surveys: Show final elevations and locations of major members. Indicate discrepancies between actual installation and the Contract Documents. Have surveyor who performed surveys certify their accuracy.

J. Sample Warranties: For special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panel finishes and door hardware to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.
   1. Accreditation: Manufacturer's facility accredited according to the International Accreditation Service's AC472, "Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems."
   2. Engineering Responsibility: Preparation of comprehensive engineering analysis and Shop Drawings by a professional engineer who is legally qualified to practice in jurisdiction where Project is located.

B. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

C. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with panel installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.

1.11 WARRANTY

A. Special Warranty on Metal Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

B. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.
   1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Butler Manufacturing Company; a division of BlueScope Buildings North America, Inc.

B. Source Limitations: Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.

2.2 SYSTEM DESCRIPTION

A. Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior.

B. Primary-Frame Type:
   1. Rigid Clear Span: Solid-member, structural-framing system without interior columns.

C. End-Wall Framing: Manufacturer's standard, for buildings not required to be expandable, consisting of primary frame, capable of supporting one-half of a bay design load.

D. Secondary-Frame Type: Manufacturer's standard purlins and joists and exterior-framed (bypass) girts.

E. Eave Height: As indicated by nominal height on Drawings.

F. Bay Spacing: As indicated on Drawings.

G. Roof Slope: As indicated.

H. Roof System: Manufacturer's standard standing-seam, vertical-rib, metal roof panels.
   1. Liner Panels: Tapered rib.

I. Exterior Wall System: Manufacturer's standard concealed-fastener, flush-profile, metal wall panels.
   1. Liner Panels: Flush profile.

2.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design metal building system.
   1. Material properties indicated in this Section shall be considered as minimum properties.

B. Structural Performance: Metal building systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."
   1. Design Loads: As indicated.
   2. Bridge Crane Loadings: As indicated.
   3. Deflection and Drift Limits: Design metal building system assemblies to withstand serviceability design loads without exceeding deflections and drift limits recommended in AISC Steel Design Guide No. 3 "Serviceability Design Considerations for Steel Buildings."

C. Seismic Performance: Metal building system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

E. Fire-Resistance Ratings: Where assemblies are indicated to have a fire-resistance rating, provide metal panel assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 or ASTM E 108 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Indicate design designations from UL's "Fire Resistance Directory," FM Global's "Approval Guide," or from the listings of another qualified testing agency.

F. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
   1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

G. Structural Performance for Metal Roof and Wall Panels: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
   1. Wind Load Design Criteria: As indicated on the Drawings.
   2. Snow and Ice Loads: As indicated on the Drawings.
   3. Other Design Loads: As indicated on the Drawings.

H. Air Infiltration for Metal Roof Panels: Air leakage of not more than 0.06 cfm/sq. ft.when tested according to ASTM E 1680 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft..

I. Air Infiltration for Metal Wall Panels: Air leakage of not more than 0.06 cfm/sq. ft.when tested according to ASTM E 283 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

J. Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

K. Water Penetration for Metal Wall Panels: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

L. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
   1. Uplift Rating: UL 90.

M. Energy Star Listing: Roof panels that are listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

N. Energy Performance: Provide roof panels according to one of the following when tested according to CRRC-1:

1. Three-year, aged, Solar Reflectance Index of not less than **64** when calculated according to ASTM E 1980.

O. Thermal Performance for Opaque Elements: Provide the following maximum U-factors and minimum R-values when tested according to ASTM C 1363 or ASTM C 518:
   1. Roof:
      a. R-Value: R-30 ci.
   2. Walls:
      a. R-Value: R-13 + R-14 ci.

2.4 STRUCTURAL-STEEL FRAMING

A. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings."

B. Bolted Connections: Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts."

C. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.

D. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse rafters, corner columns, and canopy wall framing; and wind bracing.
   1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.
   2. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted.

E. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating, to comply with the following:
   1. Purlins: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch- wide flanges.
      a. Depth: needed to comply with system performance requirements.
   2. Girts: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees from flange, with minimum 2-1/2-inch- wide flanges.
      a. Depth: As required to comply with system performance requirements.
   3. Eave Struts: Unequal-flange, C-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; to provide adequate backup for metal panels.
   4. Flange Bracing: Minimum 2-by-2-by-1/8-inch structural-steel angles or 1-inch-diameter, cold-formed structural tubing to stiffen primary-frame flanges.
   5. Sag Bracing: Minimum 1-by-1-by-1/8-inch structural-steel angles.
   6. Purlin and Girt Clips: Manufacturer's standard clips fabricated from steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.

7. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
8. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

F. Canopy Framing: Manufacturer's standard structural-framing system, designed to withstand required loads; fabricated from shop-welded, built-up steel plates or structural-steel shapes. Provide frames with attachment plates and splice members, factory drilled for field-bolted assembly.

G. Bracing: Provide adjustable wind bracing using any method as follows:
1. Rods: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50; or ASTM A 529/A 529M, Grade 50; minimum 1/2-inch- diameter steel; threaded full length or threaded a minimum of 6 inches at each end.
2. Cable: ASTM A 475, minimum 1/4-inch- diameter, extra-high-strength grade, Class B, zinc-coated, seven-strand steel; with threaded end anchors.
3. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.
4. Rigid Portal Frames: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
5. Fixed-Base Columns: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
6. Diaphragm Action of Metal Panels: Design metal building to resist wind forces through diaphragm action of metal panels.

H. Anchor Rods: Headed anchor rods as indicated in Anchor Rod Plan for attachment of metal building to foundation.

I. Materials:
1. W-Shapes: ASTM A 992/A 992M
2. Channels, Angles, M-Shapes, and S-Shapes: ASTM A 36/A
3. Plate and Bar: ASTM A 36/A
4. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
5. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B or C, structural tubing.
6. Structural-Steel Sheet: Hot-rolled, ASTM A 1011/A 1011M
7. Metallic-Coated Steel Sheet: ASTM A 653/A 653M
8. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
   a. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M
9. Non-High-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A, carbon-steel, hex-head bolts; ASTM A 563 carbon-steel hex nuts; and ASTM F 844 plain (flat) steel washers.
   a. Finish: Hot-dip zinc coating, ASTM F 2329, Class C.

10. Structural Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy-hex steel structural bolts; ASTM A 563 heavy-hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.
    a. Finish: Hot-dip zinc coating, ASTM F 2329, Class C
11. Threaded Rods: ASTM A 193/A 193M
    a. Nuts: ASTM A 563 heavy-hex carbon steel.
    b. Washers: ASTM A 36/A 36M carbon steel.
    c. Finish: Hot-dip zinc coating, ASTM F 2329, Class C

J. Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.
1. Clean and prepare in accordance with SSPC-SP2.
2. Coat with manufacturer's standard primer. Apply primer to primary and secondary framing to a minimum dry film thickness of 1 mil.
    a. Prime secondary framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil on each side.

2.5 METAL ROOF PANELS

A. Standing-Seam, Vertical-Rib, Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels.
1. Material: Aluminum-zinc alloy-coated steel sheet, 0.034-inch thickness. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
    a. Exterior Finish: Three-coat fluoropolymer.
    b. Color: As selected by Architect.
2. Clips: Two-piece floating to accommodate thermal movement.
3. Joint Type: Mechanically seamed.
4. Basis of Design: Butler Manufacturing Company; a division of BlueScope Buildings North America, Inc., "MR-24 Roof System".

B. Finishes:
1. Exposed Coil-Coated Finish:
    a. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.6 SNOW RETENTION BARS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
1. PMC Industries, Inc. (www.aceclamp.com), "ColorSnap".
2. Components: Extruded aluminum rail, color strip, ice flags, clamps, top block, hex head bolt, connector link.

3. Extruded Materials (Rails and Ice Flag): 6000 Series tempered aluminum alloy complying with ASTM B221.
4. Stainless Steel Materials (Connector Link and Hex Head Bolts): 300 Series stainless steel complying with ASTM A582/12.
5. Roof Clamp Style: Compatible with geometry and dimensions of roof standing seam profile.
6. Color: As selected by Architect.

2.7 METAL WALL PANELS

A. Concealed-Fastener, Flush-Profile, Metal Wall Panels: Formed with vertical panel edges and a flush surface; with flush joint between panels; with 1-inch-wide flange for attaching interior finish; designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side joints.
   1. Material: Aluminum-zinc alloy-coated steel sheet, 0.034-inchthickness. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
      a. Exterior Finish: Fluoropolymer.
      b. Color: As selected by Architect.
   2. Panel Coverage: 6 inches.
   3. Panel Height: 3 inches.

B. Flush-Profile, Metal Liner Panels: Solid panels formed with vertical panel edges and intermediate stiffening ribs symmetrically spaced between panel edges; with flush joint between panels; designed for interior side of metal wall panel assemblies and installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side joints.
   1. Material: Aluminum-zinc alloy-coated steel sheet, 0.030-inchthickness. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
      a. Exterior Finish: Siliconized polyester.
      b. Color: As selected by Architect.
   2. Sound Absorption: NRC not less than 1.00 when tested according to ASTM C 423.
   3. Panel Coverage: 12 inches.
   4. Panel Height: 1.5 inches.

C. Finishes:
   1. Exposed Coil-Coated Finish:
      a. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
      b. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a minimum dry film thickness of 0.2 mil for primer and 0.8 mil for topcoat.
   2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.8 DOOR CANOPIES

A. Fabricated from G-90 galvanized 10 gauge (0.138 inches) structural steel plate.
   1. Gable configuration with 4:12 slope.
   2. All welded construction, welds ground smooth.
   3. Stiffeners, trim, and stainless steel fasteners as recommended by the manufacturer.
   4. Powder coated finish is color as selected by the Architect.

B. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Metallic Products, "Ice Shield Canopy".

2.9 THERMAL INSULATION

A. Faced Metal Building Insulation: ASTM C 991, Type II, glass-fiber-blanket insulation; 0.5-lb/cu. ft.density; 2-inch-wide, continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less.

B. Mineral-Fiber-Blanket Insulation: ASTM C 665, type indicated below; consisting of fibers manufactured from glass, slag wool, or rock wool.
   1. Unfaced: Type I (blankets without membrane covering), passing ASTM E 136 for combustion characteristics.

C. Retainer Strips: For securing insulation between supports, 0.025-inchnominal-thickness, formed, metallic-coated steel or PVC retainer clips colored to match insulation facing.

D. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.10 PERSONNEL DOORS AND FRAMES

A. Swinging Personnel Doors and Frames: As specified in Section 081113 "Hollow Metal Doors and Frames."

2.11 WINDOWS

A. Aluminum Windows: Metal building system manufacturer's standard, with self-flashing mounting fins, and as follows:
   1. Type, Performance Class, and Performance Grade: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 and as follows:
      a. Horizontal-Sliding Units: HS-CW30.
      b. Fixed Units: FW-CW30.
   2. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 0.064-inch thickness at any location for main frame and sash members.
      a. Thermally Improved Construction: Fabricate window units with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.

3. Mullions: Between adjacent windows, fabricated of extruded aluminum matching finish of window units.
4. Fasteners, Anchors, and Clips: Nonmagnetic stainless steel, aluminum, or other noncorrosive material, compatible with aluminum window members, trim, hardware, anchors, and other components of window units. Fasteners shall not be exposed, except for attaching hardware.
    a. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.128 inch thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, spline grommet nuts.
5. Hardware: Manufacturer's standard; of aluminum or stainless steel, including the following:
    a. Cam-action sweep sash lock and keeper at meeting rails.
    b. Spring-loaded, snap-type lock at jambs.
    c. Lift handles for single-hung units.Nylon sash rollers for horizontal-sliding units.
6. Sliding-Type Weather Stripping: Woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric; complying with AAMA 701/702.
7. Insect Screens: Provide removable insect screen on each operable exterior sash, with screen frame finished to match window unit, and as follows:
    a. Glass-Fiber Mesh Fabric: 18-by-14mesh of PVC-coated, glass-fiber threads, woven and fused to form a fabric mesh; complying with ASTM D 3656.

B. Glazing: Comply with requirements specified in Section 088000 "Glazing."
1. Heat-Strengthened Float Glass: ASTM C1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear), Quality-Q3.
2. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of 6-mm-thick clear float glass separated by a dehydrated interspace, qualified according to ASTM E2190.
3. Safety Glass where indicated or required by Code: Category II materials complying with testing requirements in 16 CFR 1201.
    a. Provide safety glazing labeling.
4. Glazing Stops: Screw-applied or snap-on glazing stops coordinated with Section 088000 "Glazing" and with glazing system indicated. Match material and finish of window frames.
5. Factory-Glazed Fabrication: Glaze window units in the factory to greatest extent possible and practical for applications indicated. Comply with requirements in Section 088000 "Glazing."

C. Finish:
1. Baked-Enamel Finish, Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 0.7 mil, medium gloss.
    a. Color: As selected by Architect.

2.12 ACCESSORIES

A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
   1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
   1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
   2. Clips: Manufacturer's standard, formed from stainless-steel sheet, designed to withstand negative-load requirements.
   3. Cleats: Manufacturer's standard, mechanically seamed cleats formed from stainless-steel sheet or nylon-coated aluminum sheet.
   4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
   5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
   6. Thermal Spacer Blocks: Where metal panels attach directly to purlins, provide thermal spacer blocks of thickness required to provide 1-inchstandoff; fabricated from extruded polystyrene.

C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.
   1. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
   2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
   3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch-thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

D. Flashing and Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inchnominal uncoated steel thickness, prepainted with coil coating; finished to match adjacent metal panels.
   1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.

2. Opening Trim: Aluminum-zinc alloy-coated steel sheet, 0.030-inch nominal uncoated steel thickness, prepainted with coil coating. Trim head and jamb of door openings, and head, jamb, and sill of other openings.

E. Gutters: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inchnominal uncoated steel thickness, prepainted with coil coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch-long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."
1. Gutter Supports: Fabricated from same material and finish as gutters.
2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.

F. Downspouts: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match metal wall panels. Fabricate in minimum 10-foot-long sections, complete with formed elbows and offsets.
1. Mounting Straps: Fabricated from same material and finish as gutters.

G. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

H. Materials:
1. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.
   a. Fasteners for Metal Roof Panels: Self-drilling, Type 410 stainless steel or self-tapping, Type 304 stainless-steel, with EPDM washer under heads of fasteners bearing on weather side of metal panels.
   b. Fasteners for Metal Wall Panels: Self-drilling, Type 410 stainless steel or self-tapping, Type 304 stainless-steel**,** with EPDM sealing washers bearing on weather side of metal panels.
   c. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
   d. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
2. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mildry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
3. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
4. Metal Panel Sealants:
   a. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene-compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape of manufacturer's standard size.
   b. Joint Sealant: ASTM C 920; one part elastomeric polyurethane or polysulfide; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended by metal building system manufacturer.

2.13 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.
   1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
   2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.

B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.

C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.
   1. Make shop connections by welding or by using high-strength bolts.
   2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.
   3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
   4. Weld clips to frames for attaching secondary framing if applicable, or punch for bolts.
   5. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.

D. Secondary Framing: Shop fabricate framing components to indicated size and section by roll forming or break forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.
   1. Make shop connections by welding or by using non-high-strength bolts.
   2. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.

E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.
   1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

2.14 SOURCE QUALITY CONTROL

A. Special Inspection: Owner will engage a qualified special inspector to perform source quality control inspections and to submit reports.
   1. Accredited Manufacturers: Special inspections will not be required if fabrication is performed by an IAS AC472-accredited manufacturer approved by authorities having jurisdiction to perform such Work without special inspection.

a. After fabrication, submit copy of certificate of compliance to authorities having jurisdiction, certifying that Work was performed according to Contract requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.
1. Engage land surveyor to perform surveying.

C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.

B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION OF STRUCTURAL FRAMING

A. Erect metal building system according to manufacturer's written instructions and drawings.

B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.

C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.

D. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
   1. Level and plumb individual members of structure.
   2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.

F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.
   1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt type and joint type specified.
      a. Joint Type: Snug tightened or pretensioned as required by manufacturer.

G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.
   1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
   2. Locate and space wall girts to suit openings such as doors and windows.
   3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

H. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
   1. Tighten rod and cable bracing to avoid sag.
   2. Locate interior end-bay bracing only where indicated.

I. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.

J. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.4 METAL PANEL INSTALLATION, GENERAL

A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Examination: Examine primary and secondary framing to verify that structural-panel support members and anchorages have been installed within alignment tolerances required by manufacturer.
   1. Examine roughing-in for components and systems penetrating metal panels, to verify actual locations of penetrations relative to seams before metal panel installation.

C. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.

a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.

2. Install metal panels perpendicular to structural supports unless otherwise indicated.
3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Locate metal panel splices over structural supports with end laps in alignment.
6. Lap metal flashing over metal panels to allow moisture to run over and off the material.

D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

E. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.

1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.5 METAL ROOF PANEL INSTALLATION

A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.

1. Install ridge caps as metal roof panel work proceeds.
2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.

B. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.

1. Install clips to supports with self-drilling or self-tapping fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
3. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
4. Rigidly fasten eave end of metal roof panels and allow ridge end free movement for thermal expansion and contraction. Predrill panels for fasteners.
5. Provide metal closures at peaks, rake edges, rake walls, and each side of ridge caps.

C. Metal Roof Panel Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 feet on slope and location lines and within 1/8-inchoffset of adjoining faces and of alignment of matching profiles.

3.6 METAL WALL PANEL INSTALLATION

A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
   2. Shim or otherwise plumb substrates receiving metal wall panels.
   3. When two rows of metal panels are required, lap panels 4 inchesminimum.
   4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
   5. Rigidly fasten base end of metal wall panels and allow eave end free movement for thermal expansion and contraction. Predrill panels.
   6. Flash and seal metal wall panels with weather closures at eaves and rakes, and at perimeter of all openings. Fasten with self-tapping screws.
   7. Install screw fasteners in predrilled holes.
   8. Install flashing and trim as metal wall panel work proceeds.
   9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated on Drawings; if not indicated, as necessary for waterproofing.
   10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
   11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

B. Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.

C. Installation Tolerances: Shim and align metal wall panels within installed tolerance of 1/4 inch in 20 feet, noncumulative; level, plumb, and on location lines; and within 1/8-inchoffset of adjoining faces and of alignment of matching profiles.

3.7 THERMAL INSULATION INSTALLATION

A. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface, according to manufacturer's written instructions.
   1. Set vapor-retarder-faced units with vapor retarder toward warm side of construction unless otherwise indicated. Do not obstruct ventilation spaces except for firestopping.
   2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to the surrounding construction to ensure airtight installation.
   3. Install factory-laminated, vapor-retarder-faced blankets straight and true in one-piece lengths, with both sets of facing tabs sealed, to provide a complete vapor retarder.

B. Blanket Roof Insulation: Comply with the following installation method:
   1. Over-Framing Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal roof panels fastened to secondary framing.

2. Between-Purlin Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder-facing tabs up and over purlin, overlapping adjoining facing of next insulation course and maintaining continuity of retarder. Hold in place with bands and crossbands below insulation.
3. Over-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Install layer of filler insulation over first layer to fill space formed by metal roof panel standoffs. Hold in place by panels fastened to standoffs.
   a. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
4. Two-Layers-between-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder-facing tabs up and over purlin, overlapping adjoining facing of next insulation course and maintaining continuity of retarder. Install layer of filler insulation over first layer to fill space between purlins formed by thermal spacer blocks. Hold in place with bands and crossbands below insulation.
   a. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
5. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

C. Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal wall panels fastened to secondary framing.
1. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
2. Sound-Absorption Insulation: Where sound-absorption requirement is indicated for metal liner panels, cover insulation with polyethylene film and provide inserts of wire mesh to form acoustical spacer grid.

D. Board Wall Insulation: Extend board insulation in thickness indicated to cover entire wall. Hold in place by metal wall panels fastened to secondary framing. Comply with manufacturers' written instructions.
1. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

3.8 DOOR AND FRAME INSTALLATION

A. General: Install doors and frames plumb, rigid, properly aligned, and securely fastened in place according to manufacturers' written instructions. Coordinate installation with wall flashings and other components. Seal perimeter of each door frame with elastomeric sealant used for metal wall panels.

B. Personnel Doors and Frames: Install doors and frames according to NAAMM-HMMA 840. Fit non-fire-rated doors accurately in their respective frames, with the following clearances:
1. Between Doors and Frames at Jambs and Head: 1/8 inch.
2. Between Edges of Pairs of Doors: 1/8 inch.
3. At Door Sills with Threshold: 3/8 inch.
4. At Door Sills without Threshold: 3/4 inch.
5. At fire-rated openings, install frames according to, and doors with clearances specified in, NFPA 80.

C. Door Hardware:
   1. Install surface-mounted items after finishes have been completed at heights indicated in DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
   2. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
   3. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
   4. Set thresholds for exterior doors in full bed of sealant complying with requirements for concealed mastics specified in Section 079200 "Joint Sealants."

3.9 WINDOW INSTALLATION

A. General: Install windows plumb, rigid, properly aligned, without warp or rack of frames or sash, and securely fasten in place according to manufacturer's written instructions. Coordinate installation with wall flashings and other components. Seal perimeter of each window frame with elastomeric sealant used for metal wall panels.
   1. Separate dissimilar materials from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in AAMA/WDMA/CSA 101/I.S.2/A440.

B. Set sill members in bed of sealant or with gaskets, for weathertight construction.

C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

D. Mount screens directly to frames with tapped screw clips.

3.10 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
   2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
   3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.

B. Door Canopies: Comply with performance requirements and manufacturer's written installation instructions. Provide support framing to accept door canopies as recommended by manufacturer.

C. Snow Retention Bars: Comply with performance requirements and manufacturer's written installation instructions.
   1. Install clamp fully assembled, with non-penetrating fasteners on the standing seam metal ribs. Set extruded bar below the fasteners and slide up until it snaps into place. Tighten bolts on the clips.

2. Insert color-matching metal strip into the bar's front-facing groove.
3. Install aluminum ice flags on the retention system mid-way between the roof seams.

D. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feetwith no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inchdeep, filled with mastic sealant (concealed within joints).

E. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than 36 incheso.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

F. Downspouts: Join sections with 1-1/2-inchtelescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
1. Provide elbows at base of downspouts to direct water away from building.
2. Tie downspouts to underground drainage system indicated.

G. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

3.11 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform field quality control special inspections and to submit reports.

B. Product will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.12 ADJUSTING

A. Doors: After completing installation, test and adjust doors to operate easily, free of warp, twist, or distortion.

B. Door Hardware: Adjust and check each operating item of door hardware and each door to ensure proper operation and function of every unit. Replace units that cannot be adjusted to operate as intended.

C. Windows: Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and at weather stripping to ensure smooth operation and weathertight closure. Lubricate hardware and moving parts.

3.13 CLEANING AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.

B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

C. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing, bearing plates, and accessories.
   1. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or by SSPC-SP 3, "Power Tool Cleaning."
   2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

D. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

E. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
   1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

F. Snow Retention Bars: Clean snow retention bars after installation. Replace damaged components.

G. Doors and Frames: Immediately after installation, sand rusted or damaged areas of prime coat until smooth and apply touchup of compatible air-drying primer.
   1. Immediately before final inspection, remove protective wrappings from doors and frames.

H. Windows: Clean metal surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances. Clean factory-glazed glass immediately after installing windows.

END OF SECTION

SECTION 133419 - METAL BUILDING SYSTEMS-WWTP

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Structural-steel framing.
   2. Metal roof panels.
   3. Metal wall panels.
   4. Thermal insulation.
   5. Personnel doors and frames.
   6. Windows.
   7. Accessories.

B. Related Requirements:
   1. Section 083323 "Overhead Coiling Doors" for coiling vehicular doors in metal building systems.

1.3 DEFINITIONS

A. Terminology Standard: See MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction not otherwise defined in this Section or in standards referenced by this Section.

1.4 COORDINATION

A. Coordinate sizes and locations of concrete foundations and casting of anchor-rod inserts into foundation walls and footings. Anchor rod installation, concrete, reinforcement, and formwork requirements are specified in Division 3.

B. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.5 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to metal building systems including, but not limited to, the following:
      a. Condition of foundations and other preparatory work performed by other trades.
      b. Structural load limitations.
      c. Construction schedule. Verify availability of materials and erector's personnel, equipment, and facilities needed to make progress and avoid delays.
      d. Required tests, inspections, and certifications.
      e. Unfavorable weather and forecasted weather conditions and impact on construction schedule.

2. Review methods and procedures related to metal roof panel assemblies including, but not limited to, the following:
   a. Compliance with requirements for purlin and rafter conditions, including flatness and attachment to structural members.
   b. Structural limitations of purlins and rafters during and after roofing.
   c. Flashings, special roof details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect metal roof panels.
   d. Temporary protection requirements for metal roof panel assembly during and after installation.
   e. Roof observation and repair after metal roof panel installation.
3. Review methods and procedures related to metal wall panel assemblies including, but not limited to, the following:
   a. Compliance with requirements for support conditions, including alignment between and attachment to structural members.
   b. Structural limitations of girts and columns during and after wall panel installation.
   c. Flashings, special siding details, wall penetrations, openings, and condition of other construction that will affect metal wall panels.
   d. Temporary protection requirements for metal wall panel assembly during and after installation.
   e. Wall observation and repair after metal wall panel installation.

1.6 ACTION SUBMITTALS

A. Product Data: For each type of metal building system component.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
      a. Metal roof panels.
      b. Metal wall panels.
      c. Thermal insulation and vapor-retarder facings.
      d. Personnel doors and frames.
      e. Windows.
      f. Louvers.

B. Shop Drawings: Indicate components by others. Include full building plan, elevations, sections, details and the following:
   1. Anchor-Rod Plans: Submit anchor-rod plans and templates before foundation work begins. Include location, diameter, and minimum required projection of anchor rods required to attach metal building to foundation. Indicate column reactions at each location.
   2. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.
      a. Show provisions for attaching bridge crane components.
   3. Metal Roof and Wall Panel Layout Drawings: Show layouts of panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, clip spacing, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.

a. Show roof-mounted items including roof hatches, equipment supports, pipe supports and penetrations, lighting fixtures, and items mounted on roof curbs.
b. Show wall-mounted items including personnel doors, vehicular doors, windows, louvers, and lighting fixtures.
c. Show translucent panels.

4. Accessory Drawings: Include details of the following items, at a scale of not less than 1-1/2 inches per 12 inches**:**
   a. Flashing and trim.
   b. Gutters.
   c. Downspouts.

C. Samples for Initial Selection: For units with factory-applied finishes.

D. Samples for Verification: For the following products:
1. Panels: Nominal 12 inches long by actual panel width. Include fasteners, closures, and other exposed panel accessories.
2. Flashing and Trim: Nominal 12 inches long. Include fasteners and other exposed accessories.
3. Vapor-Retarder Facings: Nominal 6-inch- square Samples.
4. Windows: Full-size, nominal 12-inch- long frame Samples showing typical profile.
5. Accessories: Nominal 12-inch- long Samples for each type of accessory.

E. Door Schedule: For doors and frames. Use same designations indicated on Drawings. Include details of reinforcement.
1. Door Hardware Schedule: Include details of fabrication and assembly of door hardware. Organize schedule into door hardware sets indicating complete designations of every item required for each door or opening.
2. Keying Schedule: Detail Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations.

F. Delegated-Design Submittal: For metal building systems.
1. Refer to Section 013573 "Delegated Design Requirements and Procedures" for delegated design submittal procedures and requirements
2. Include analysis data indicating compliance with performance requirements and design data signed and sealed by the qualified professional engineer responsible for their preparation.

G. Informational Submittals
1. Qualification Data: For erector and manufacturer.
2. Welding certificates.
3. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:
   a. Name and location of Project.
   b. Order number.
   c. Name of manufacturer.
   d. Name of Contractor.
   e. Building dimensions including width, length, height, and roof slope.
   f. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
   g. Governing building code and year of edition.

h. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
i. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
j. Building-Use Category: Indicate category of building use and its effect on load importance factors.

4. Erector Certificates: For qualified erector, from manufacturer.
5. Material Test Reports: For each of the following products:
   a. Structural steel including chemical and physical properties.
   b. Bolts, nuts, and washers including mechanical properties and chemical analysis.
   c. Tension-control, high-strength, bolt-nut-washer assemblies.
   d. Shop primers.
   e. Nonshrink grout.

H. Field quality-control reports.

I. Surveys: Show final elevations and locations of major members. Indicate discrepancies between actual installation and the Contract Documents. Have surveyor who performed surveys certify their accuracy.

J. Sample Warranties: For special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panel finishes and door hardware to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.
   1. Accreditation: Manufacturer's facility accredited according to the International Accreditation Service's AC472, "Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems."
   2. Engineering Responsibility: Preparation of comprehensive engineering analysis and Shop Drawings by a professional engineer who is legally qualified to practice in jurisdiction where Project is located.

B. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

C. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

1.10 FIELD CONDITIONS

A. Weather Limitations: Proceed with panel installation only when weather conditions permit metal panels to be installed according to manufacturers' written instructions and warranty requirements.

1.11 WARRANTY

A. Special Warranty on Metal Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

B. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.
   1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. Butler Manufacturing Company; a division of BlueScope Buildings North America, Inc.

B. Source Limitations: Obtain metal building system components, including primary and secondary framing and metal panel assemblies, from single source from single manufacturer.

2.2 SYSTEM DESCRIPTION

A. Provide a complete, integrated set of mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior.

B. Primary-Frame Type:
   1. Rigid Clear Span: Solid-member, structural-framing system without interior columns.

C. End-Wall Framing: Manufacturer's standard, for buildings not required to be expandable, consisting of primary frame, capable of supporting one-half of a bay design load.

D. Secondary-Frame Type: Manufacturer's standard purlins and joists and exterior-framed (bypass) girts.

E. Eave Height: As indicated by nominal height on Drawings.

F. Bay Spacing: As indicated on Drawings.

G. Roof Slope: As indicated.

H. Roof System: Manufacturer's standard standing-seam, vertical-rib, metal roof panels.
   1. Liner Panels: Tapered rib.

I. Exterior Wall System: Manufacturer's standard concealed-fastener, flush-profile, metal wall panels.
   1. Liner Panels: Flush profile.

2.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a registered design professional, as defined in Section 013573 "Delegated Design Requirements and Procedures" to design metal building system.
   1. Material properties indicated in this Section shall be considered as minimum properties.

B. Structural Performance: Metal building systems shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."
   1. Design Loads: As indicated.
   2. Bridge Crane Loadings: As indicated.
   3. Deflection and Drift Limits: Design metal building system assemblies to withstand serviceability design loads without exceeding deflections and drift limits recommended in AISC Steel Design Guide No. 3 "Serviceability Design Considerations for Steel Buildings."

C. Seismic Performance: Metal building system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

E. Fire-Resistance Ratings: Where assemblies are indicated to have a fire-resistance rating, provide metal panel assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 or ASTM E 108 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Indicate design designations from UL's "Fire Resistance Directory," FM Global's "Approval Guide," or from the listings of another qualified testing agency.

F. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.
   1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

G. Structural Performance for Metal Roof and Wall Panels: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:
   1. Wind Load Design Criteria: As indicated.

H. Air Infiltration for Metal Roof Panels: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 1680 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft..

I. Air Infiltration for Metal Wall Panels: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E 283 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

J. Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E 1646 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

K. Water Penetration for Metal Wall Panels: No water penetration when tested according to ASTM E 331 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

L. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
   1. Uplift Rating: UL 90.

M. Energy Star Listing: Roof panels that are listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.

N. Energy Performance: Provide roof panels according to one of the following when tested according to CRRC-1:
   1. Three-year, aged, Solar Reflectance Index of not less than **64** when calculated according to ASTM E 1980.

O. Thermal Performance for Opaque Elements: Provide the following maximum U-factors and minimum R-values when tested according to ASTM C 1363 or ASTM C 518:
   1. Roof:
      a. R-Value: R-30 ci.
   2. Walls:
      a. R-Value: R-14 ci..

2.4 STRUCTURAL-STEEL FRAMING

A. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings."

B. Bolted Connections: Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts."

C. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.

D. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse rafters, and corner columns; and wind bracing.
   1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.
   2. Rigid Clear-Span Frames: I-shaped frame sections fabricated from shop-welded, built-up steel plates or structural-steel shapes. Interior columns are not permitted.

E. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating, to comply with the following:
   1. Purlins: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; minimum 2-1/2-inch- (64-mm-) wide flanges.
      a. Depth: needed to comply with system performance requirements.
   2. Girts: C- or Z-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes. Form ends of Z-sections with stiffening lips angled 40 to 50 degrees from flange, with minimum 2-1/2-inch- (64-mm-) wide flanges.
      a. Depth: As required to comply with system performance requirements.
   3. Eave Struts: Unequal-flange, C-shaped sections; fabricated from built-up steel plates, steel sheet, or structural-steel shapes; to provide adequate backup for metal panels.
   4. Flange Bracing: Minimum 2-by-2-by-1/8-inch (51-by-51-by-3-mm) structural-steel angles or 1-inch- (25-mm-) diameter, cold-formed structural tubing to stiffen primary-frame flanges.
   5. Sag Bracing: Minimum 1-by-1-by-1/8-inch (25-by-25-by-3-mm) structural-steel angles.
   6. Purlin and Girt Clips: Manufacturer's standard clips fabricated from steel sheet. Provide galvanized clips where clips are connected to galvanized framing members.
   7. Framing for Openings: Channel shapes; fabricated from cold-formed, structural-steel sheet or structural-steel shapes. Frame head and jamb of door openings and head, jamb, and sill of other openings.
   8. Miscellaneous Structural Members: Manufacturer's standard sections fabricated from cold-formed, structural-steel sheet; built-up steel plates; or zinc-coated (galvanized) steel sheet; designed to withstand required loads.

F. Bracing: Provide adjustable wind bracing using any method as follows:
   1. Rods: ASTM A 36/A 36M; ASTM A 572/A 572M, Grade 50 (345); or ASTM A 529/A 529M, Grade 50 (345); minimum 1/2-inch- (13-mm-) diameter steel; threaded full length or threaded a minimum of 6 inches (152 mm) at each end.
   2. Cable: ASTM A 475, minimum 1/4-inch- (6-mm-) diameter, extra-high-strength grade, Class B, zinc-coated, seven-strand steel; with threaded end anchors.

3. Angles: Fabricated from structural-steel shapes to match primary framing, of size required to withstand design loads.
4. Rigid Portal Frames: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
5. Fixed-Base Columns: Fabricated from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads.
6. Diaphragm Action of Metal Panels: Design metal building to resist wind forces through diaphragm action of metal panels.

G. Anchor Rods: Headed anchor rods as indicated in Anchor Rod Plan for attachment of metal building to foundation.

H. Materials:
1. W-Shapes: ASTM A 992/A 992M
2. Channels, Angles, M-Shapes, and S-Shapes: ASTM A 36/A
3. Plate and Bar: ASTM A 36/A
4. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
5. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B or C, structural tubing.
6. Structural-Steel Sheet: Hot-rolled, ASTM A 1011/A 1011M
7. Metallic-Coated Steel Sheet: ASTM A 653/A 653M
8. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet, metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
   a. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M
   b.
9. Non-High-Strength Bolts, Nuts, and Washers: ASTM A 307, Grade A, carbon-steel, hex-head bolts; ASTM A 563 (ASTM A 563M) carbon-steel hex nuts; and ASTM F 844 plain (flat) steel washers.
   a. Finish: Hot-dip zinc coating, ASTM F 2329, Class C.
10. Structural Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy-hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy-hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.
    a. Finish: Hot-dip zinc coating, ASTM F 2329, Class C
11. Threaded Rods: ASTM A 193/A 193M
    a. Nuts: ASTM A 563 (ASTM A 563M) heavy-hex carbon steel.
    b. Washers: ASTM A 36/A 36M carbon steel.
    c. Finish: Hot-dip zinc coating, ASTM F 2329, Class C

I. Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.
1. Clean and prepare in accordance with SSPC-SP2.
2. Coat with manufacturer's standard primer. Apply primer to primary and secondary framing to a minimum dry film thickness of 1 mil (0.025 mm).
   a. Prime secondary framing formed from uncoated steel sheet to a minimum dry film thickness of 0.5 mil (0.013 mm) on each side.

2.5 METAL ROOF PANELS

A. Standing-Seam, Vertical-Rib, Metal Roof Panels: Formed with vertical ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under one side of panels and engaging opposite edge of adjacent panels.
   1. Material: Aluminum-zinc alloy-coated steel sheet, 0.039-inch thickness. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
      a. Exterior Finish: Three-coat fluoropolymer.
      b. Color: As selected by Architect.
   2. Clips: Two-piece floating to accommodate thermal movement.
   3. Joint Type: Mechanically seamed.
   4. Panel Coverage: 16 inches.
   5. Panel Height: 2 inches.

B. Finishes:
   1. Exposed Coil-Coated Finish:
      a. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
   2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.6 METAL WALL PANELS

A. Concealed-Fastener, Flush-Profile, Metal Wall Panels: Formed with vertical panel edges and a flush surface; with flush joint between panels; with 1-inch- wide flange for attaching interior finish; designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side joints.
   1. Material: Aluminum-zinc alloy-coated steel sheet, 0.039-inch thickness. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
      a. Exterior Finish: Fluoropolymer.
      b. Color: As selected by Architect.
   2. Panel Coverage: 6 inches.
   3. Panel Height: 3 inches.

B. Flush-Profile, Metal Liner Panels: Solid panels formed with vertical panel edges and intermediate stiffening ribs symmetrically spaced between panel edges; with flush joint between panels; designed for interior side of metal wall panel assemblies and installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side joints.
   1. Material: Aluminum-zinc alloy-coated steel sheet, 0.030-inch thickness. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
      a. Exterior Finish: Siliconized polyester.
      b. Color: As selected by Architect.
   2. Sound Absorption: NRC not less than 1.00 when tested according to ASTM C 423.

3. Panel Coverage: 12 inches.
4. Panel Height: 1.5 inches.

C. Finishes:
1. Exposed Coil-Coated Finish:
a. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
b. Three-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear top-coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
c. Siliconized Polyester: Epoxy primer and silicone-modified, polyester-enamel topcoat; with a minimum dry film thickness of 0.2 mil for primer and 0.8 mil for topcoat.
2. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

2.7 THERMAL INSULATION

A. Faced Metal Building Insulation: ASTM C 991, Type II, glass-fiber-blanket insulation; 0.5-lb/cu. ft. density; 2-inch- wide, continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less.

B. Mineral-Fiber-Blanket Insulation: ASTM C 665, type indicated below; consisting of fibers manufactured from glass, slag wool, or rock wool.
1. Unfaced: Type I (blankets without membrane covering), passing ASTM E 136 for combustion characteristics.

C. Retainer Strips: For securing insulation between supports, 0.025-inch nominal-thickness, formed, metallic-coated steel or PVC retainer clips colored to match insulation facing.

D. Vapor-Retarder Tape: Pressure-sensitive tape of type recommended by vapor-retarder manufacturer for sealing joints and penetrations in vapor retarder.

2.8 PERSONNEL DOORS AND FRAMES

A. Swinging Personnel Doors and Frames: As specified in Section 081113 "Hollow Metal Doors and Frames."

2.9 WINDOWS

A. Aluminum Windows: Metal building system manufacturer's standard, with self-flashing mounting fins, and as follows:
1. Type, Performance Class, and Performance Grade: Comply with AAMA/WDMA/CSA 101/I.S.2/A440 and as follows:
a. Horizontal-Sliding Units: HS-CW30.
b. Fixed Units: FW-CW30.

2. Aluminum Extrusions: ASTM B 221, alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish, but not less than 0.064-inch thickness at any location for main frame and sash members.
    a. Thermally Improved Construction: Fabricate window units with an integral, concealed, low-conductance thermal barrier; located between exterior materials and window members exposed on interior side; in a manner that eliminates direct metal-to-metal contact.
3. Mullions: Between adjacent windows, fabricated of extruded aluminum matching finish of window units.
4. Fasteners, Anchors, and Clips: Nonmagnetic stainless steel, aluminum, or other noncorrosive material, compatible with aluminum window members, trim, hardware, anchors, and other components of window units. Fasteners shall not be exposed, except for attaching hardware.
    a. Reinforcement: Where fasteners screw-anchor into aluminum less than 0.128 inch thick, reinforce interior with aluminum or nonmagnetic stainless steel to receive screw threads, or provide standard, noncorrosive, pressed-in, spline grommet nuts.
5. Hardware: Manufacturer's standard; of aluminum or stainless steel, including the following:
    a. Cam-action sweep sash lock and keeper at meeting rails.
    b. Spring-loaded, snap-type lock at jambs.
    c. Lift handles for single-hung units.Nylon sash rollers for horizontal-sliding units.
6. Sliding-Type Weather Stripping: Woven-pile weather stripping of wool, polypropylene, or nylon pile and resin-impregnated backing fabric; complying with AAMA 701/702.
7. Insect Screens: Provide removable insect screen on each operable exterior sash, with screen frame finished to match window unit, and as follows:
    a. Glass-Fiber Mesh Fabric: 18-by-14 mesh of PVC-coated, glass-fiber threads, woven and fused to form a fabric mesh; complying with ASTM D 3656.

B. Glazing: Comply with requirements specified in Section 088000 "Glazing."

C. Glazing:
1. Factory-Glazed Fabrication: Glaze window units in the factory to greatest extent possible and practical for applications indicated. Comply with requirements in Section 088000 "Glazing."

D. Finish:
1. Baked-Enamel Finish, Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 0.7 mil, medium gloss.
    a. Color: As selected by Architect.

2.10 ACCESSORIES

A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
   1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
   1. Closures: Provide closures at eaves and ridges, fabricated of same material as metal roof panels.
   2. Clips: Manufacturer's standard, formed from stainless-steel sheet, designed to withstand negative-load requirements.
   3. Cleats: Manufacturer's standard, mechanically seamed cleats formed from stainless-steel sheet or nylon-coated aluminum sheet.
   4. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
   5. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal roof panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.
   6. Thermal Spacer Blocks: Where metal panels attach directly to purlins, provide thermal spacer blocks of thickness required to provide 1-inch standoff; fabricated from extruded polystyrene.

C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.
   1. Closures: Provide closures at eaves and rakes, fabricated of same material as metal wall panels.
   2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
   3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- thick, flexible closure strips; cut or premolded to match metal wall panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

D. Flashing and Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match adjacent metal panels.
   1. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, eaves, rakes, corners, bases, framed openings, ridges, fasciae, and fillers.

2. Opening Trim: Aluminum-zinc alloy-coated steel sheet, 0.030-inch nominal uncoated steel thickness, prepainted with coil coating. Trim head and jamb of door openings, and head, jamb, and sill of other openings.

E. Gutters: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."
   1. Gutter Supports: Fabricated from same material and finish as gutters.
   2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.

F. Downspouts: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil coating; finished to match metal wall panels. Fabricate in minimum 10-foot- long sections, complete with formed elbows and offsets.
   1. Mounting Straps: Fabricated from same material and finish as gutters.

G. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

H. Materials:
   1. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads. Provide fasteners with heads matching color of materials being fastened by means of plastic caps or factory-applied coating.
      a. Fasteners for Metal Roof Panels: Self-drilling, Type 410 stainless steel or self-tapping, Type 304 stainless-steel, with EPDM washer under heads of fasteners bearing on weather side of metal panels.
      b. Fasteners for Metal Wall Panels: Self-drilling, Type 410 stainless steel or self-tapping, Type 304 stainless-steel**,** with EPDM sealing washers bearing on weather side of metal panels.
      c. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
      d. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
   2. Corrosion-Resistant Coating: Cold-applied asphalt mastic, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
   3. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.
   4. Metal Panel Sealants:
      a. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene-compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape of manufacturer's standard size.
      b. Joint Sealant: ASTM C 920; one part elastomeric polyurethane or polysulfide; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended by metal building system manufacturer.

2.11 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.
   1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
   2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.

B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.

C. Primary Framing: Shop fabricate framing components to indicated size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.
   1. Make shop connections by welding or by using high-strength bolts.
   2. Join flanges to webs of built-up members by a continuous, submerged arc-welding process.
   3. Brace compression flange of primary framing with steel angles or cold-formed structural tubing between frame web and purlin web or girt web, so flange compressive strength is within allowable limits for any combination of loadings.
   4. Weld clips to frames for attaching secondary framing if applicable, or punch for bolts.
   5. Shop Priming: Prepare surfaces for shop priming according to SSPC-SP 2. Shop prime primary framing with specified primer after fabrication.

D. Secondary Framing: Shop fabricate framing components to indicated size and section by roll forming or break forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.
   1. Make shop connections by welding or by using non-high-strength bolts.
   2. Shop Priming: Prepare uncoated surfaces for shop priming according to SSPC-SP 2. Shop prime uncoated secondary framing with specified primer after fabrication.

E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.
   1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

2.12 SOURCE QUALITY CONTROL

A. Special Inspection: Owner will engage a qualified special inspector to perform source quality control inspections and to submit reports.
   1. Accredited Manufacturers: Special inspections will not be required if fabrication is performed by an IAS AC472-accredited manufacturer approved by authorities having jurisdiction to perform such Work without special inspection.

a. After fabrication, submit copy of certificate of compliance to authorities having jurisdiction, certifying that Work was performed according to Contract requirements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with erector present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Before erection proceeds, survey elevations and locations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments to receive structural framing, with erector present, for compliance with requirements and metal building system manufacturer's tolerances.
   1. Engage land surveyor to perform surveying.

C. Proceed with erection only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition.

B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place unless otherwise indicated.

3.3 ERECTION OF STRUCTURAL FRAMING

A. Erect metal building system according to manufacturer's written instructions and drawings.

B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.

C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.

D. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
   1. Set plates for structural members on wedges, shims, or setting nuts as required.
   2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
   3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
   1. Level and plumb individual members of structure.
   2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.

F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.
   1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt type and joint type specified.
      a. Joint Type: Snug tightened or pretensioned as required by manufacturer.

G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.
   1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
   2. Locate and space wall girts to suit openings such as doors and windows.
   3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

H. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
   1. Tighten rod and cable bracing to avoid sag.
   2. Locate interior end-bay bracing only where indicated.

I. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.

J. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.4 METAL PANEL INSTALLATION, GENERAL

A. Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Examination: Examine primary and secondary framing to verify that structural-panel support members and anchorages have been installed within alignment tolerances required by manufacturer.
   1. Examine roughing-in for components and systems penetrating metal panels, to verify actual locations of penetrations relative to seams before metal panel installation.

C. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to

adjacent metal panel finishes.
a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
2. Install metal panels perpendicular to structural supports unless otherwise indicated.
3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Locate metal panel splices over structural supports with end laps in alignment.
6. Lap metal flashing over metal panels to allow moisture to run over and off the material.

D. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

E. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.
1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.5 METAL ROOF PANEL INSTALLATION

A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.
1. Install ridge caps as metal roof panel work proceeds.
2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.

B. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.
1. Install clips to supports with self-drilling or self-tapping fasteners.
2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
3. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
4. Rigidly fasten eave end of metal roof panels and allow ridge end free movement for thermal expansion and contraction. Predrill panels for fasteners.
5. Provide metal closures at peaks, rake edges, rake walls, and each side of ridge caps.

C. Metal Roof Panel Installation Tolerances: Shim and align metal roof panels within installed tolerance of 1/4 inch in 20 feet on slope and location lines and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.6 METAL WALL PANEL INSTALLATION

A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
   2. Shim or otherwise plumb substrates receiving metal wall panels.
   3. When two rows of metal panels are required, lap panels 4 inches minimum.
   4. When building height requires two rows of metal panels at gable ends, align lap of gable panels over metal wall panels at eave height.
   5. Rigidly fasten base end of metal wall panels and allow eave end free movement for thermal expansion and contraction. Predrill panels.
   6. Flash and seal metal wall panels with weather closures at eaves and rakes, and at perimeter of all openings. Fasten with self-tapping screws.
   7. Install screw fasteners in predrilled holes.
   8. Install flashing and trim as metal wall panel work proceeds.
   9. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated on Drawings; if not indicated, as necessary for waterproofing.
   10. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
   11. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

B. Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer.

C. Installation Tolerances: Shim and align metal wall panels within installed tolerance of 1/4 inch in 20 feet, noncumulative; level, plumb, and on location lines; and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 THERMAL INSULATION INSTALLATION

A. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface, according to manufacturer's written instructions.
   1. Set vapor-retarder-faced units with vapor retarder toward warm side of construction unless otherwise indicated. Do not obstruct ventilation spaces except for firestopping.
   2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to the surrounding construction to ensure airtight installation.
   3. Install factory-laminated, vapor-retarder-faced blankets straight and true in one-piece lengths, with both sets of facing tabs sealed, to provide a complete vapor retarder.

B. Blanket Roof Insulation: Comply with the following installation method:
   1. Over-Framing Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal roof panels fastened to secondary framing.

2. Between-Purlin Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder-facing tabs up and over purlin, overlapping adjoining facing of next insulation course and maintaining continuity of retarder. Hold in place with bands and crossbands below insulation.
3. Over-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Install layer of filler insulation over first layer to fill space formed by metal roof panel standoffs. Hold in place by panels fastened to standoffs.
   a. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
4. Two-Layers-between-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder-facing tabs up and over purlin, overlapping adjoining facing of next insulation course and maintaining continuity of retarder. Install layer of filler insulation over first layer to fill space between purlins formed by thermal spacer blocks. Hold in place with bands and crossbands below insulation.
   a. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
5. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

C. Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal wall panels fastened to secondary framing.
   1. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.
   2. Sound-Absorption Insulation: Where sound-absorption requirement is indicated for metal liner panels, cover insulation with polyethylene film and provide inserts of wire mesh to form acoustical spacer grid.

D. Board Wall Insulation: Extend board insulation in thickness indicated to cover entire wall. Hold in place by metal wall panels fastened to secondary framing. Comply with manufacturers' written instructions.
   1. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

3.8 DOOR AND FRAME INSTALLATION

A. General: Install doors and frames plumb, rigid, properly aligned, and securely fastened in place according to manufacturers' written instructions. Coordinate installation with wall flashings and other components. Seal perimeter of each door frame with elastomeric sealant used for metal wall panels.

B. Personnel Doors and Frames: Install doors and frames according to NAAMM-HMMA 840. Fit non-fire-rated doors accurately in their respective frames, with the following clearances:
   1. Between Doors and Frames at Jambs and Head: 1/8 inch.
   2. Between Edges of Pairs of Doors: 1/8 inch.
   3. At Door Sills with Threshold: 3/8 inch.
   4. At Door Sills without Threshold: 3/4 inch.

5. At fire-rated openings, install frames according to, and doors with clearances specified in, NFPA 80.

C. Door Hardware:
1. Install surface-mounted items after finishes have been completed at heights indicated in DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
3. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
4. Set thresholds for exterior doors in full bed of sealant complying with requirements for concealed mastics specified in Section 079200 "Joint Sealants."

3.9 WINDOW INSTALLATION

A. General: Install windows plumb, rigid, properly aligned, without warp or rack of frames or sash, and securely fasten in place according to manufacturer's written instructions. Coordinate installation with wall flashings and other components. Seal perimeter of each window frame with elastomeric sealant used for metal wall panels.
1. Separate dissimilar materials from sources of corrosion or electrolytic action at points of contact with other materials by complying with requirements specified in AAMA/WDMA/CSA 101/I.S.2/A440.

B. Set sill members in bed of sealant or with gaskets, for weathertight construction.

C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

D. Mount screens directly to frames with tapped screw clips.

3.10 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.

1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

C. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

D. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
1. Provide elbows at base of downspouts to direct water away from building.
2. Tie downspouts to underground drainage system indicated.

E. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

3.11 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform field quality control special inspections and to submit reports.

B. Product will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

3.12 ADJUSTING

A. Doors: After completing installation, test and adjust doors to operate easily, free of warp, twist, or distortion.

B. Door Hardware: Adjust and check each operating item of door hardware and each door to ensure proper operation and function of every unit. Replace units that cannot be adjusted to operate as intended.

C. Windows: Adjust operating sashes and ventilators, screens, hardware, and accessories for a tight fit at contact points and at weather stripping to ensure smooth operation and weathertight closure. Lubricate hardware and moving parts.

3.13 CLEANING AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780/A 780M and manufacturer's written instructions.

B. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

C. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing, bearing plates, and accessories.

1. Clean and prepare surfaces by SSPC-SP 2, "Hand Tool Cleaning," or by SSPC-SP 3, "Power Tool Cleaning."
2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

D. Touchup Painting: Cleaning and touchup painting are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

E. Metal Panels: Remove temporary protective coverings and strippable films, if any, as metal panels are installed. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.
   1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

F. Doors and Frames: Immediately after installation, sand rusted or damaged areas of prime coat until smooth and apply touchup of compatible air-drying primer.
   1. Immediately before final inspection, remove protective wrappings from doors and frames.

G. Windows: Clean metal surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances. Clean factory-glazed glass immediately after installing windows.

END OF SECTION

SECTION 134900 - RADIATION PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Lead sheet, strip, and plate.
   2. Lead-lined gypsum board.
   3. Lead glass.
   4. Lead-lined hollow-metal frames.
   5. Lead-lined flush wood doors.
   6. Informational signs.

1.2 DEFINITIONS

A. Lead Equivalence: The thickness of lead that provides the same attenuation (reduction of radiation passing through) as the material in question under the specified conditions.
   1. Lead equivalence specified for materials used in diagnostic x-ray rooms is as measured at 100 kV unless otherwise indicated.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review methods and procedures related to radiation protection, including, but not limited to, the following:
      a. Sequence and schedule of radiation protection work in relation to other work.
      b. Supplementary lead shielding at duct, pipe, and conduit penetrations of radiation protection.
      c. Methods of attaching other construction and equipment to lead-lined finishes.
      d. Notification procedures for work that requires modifying radiation protection.
      e. Requirements for field quality control.

1.4 ACTION SUBMITTALS

A. Product Data:
   1. Lead sheet, strip, and plate.
   2. Lead-lined gypsum board.
   3. Lead glazing plastic.
   4. Lead-lined hollow-metal frames.
   5. Lead-lined flush wood doors.
   6. Informational signs.

B. Product Data Submittals:
   1. Doors and Frames: Include construction details, material descriptions, core descriptions, fire-resistance ratings, temperature-rise ratings, and finishes.

C. Sustainable Design Submittals:
   1. Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.

2. Product Data: For composite wood products, indicating compliance with requirements for formaldehyde emissions.

D. Shop Drawings: Show layout of radiation-protected areas, indicating lead thickness or lead equivalence of components. Show components and installation conditions not fully dimensioned or detailed in product data.
1. Show ducts, pipes, conduit, and other objects that penetrate radiation protection; include details of penetrations.
2. Show details of joints between radiation protection materials.
3. Include door details, including elevations, frame dimensions and profile, glazed light, and clearances and undercuts.

E. Samples: For units with factory-applied color finishes.

F. Product Schedule: For observation windows and doors and frames, prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with final door hardware schedule.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: For assemblies with radiation protection materials, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Items penetrating radiation protection materials, including the following:
a. Electrical services.
b. Air outlets and inlets.
c. Sprinklers.
d. Access panels.

B. Sample Warranty: For warranty.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. Certified Wood: Provide an invoice including vendor's chain-of-custody number, product cost, and entity being invoiced.

C. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Lead-Lined Gypsum Panels: Store inside under cover, and keep dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

B. Lead-Lined, Hollow-Metal Frames: Comply with requirements in Section 081113 "Hollow Metal Doors and Frames" for delivery, storage, and handling.

C. Lead-Lined Wood Doors: Comply with requirements in Section 081416 "Flush Wood Doors" for delivery, storage, and handling.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install radiation protection until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

1.9 WARRANTY

A. Warranty for Lead-Lined Wood Doors: Comply with requirements in Section 081416 "Flush Wood Doors."

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

A. Obtain each type of radiation protection product from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Provide materials and workmanship, including joints and fasteners, that maintain continuity of radiation protection at all points and in all directions equivalent to materials specified in thicknesses and locations indicated.

B. Materials, thicknesses, and configurations of radiation protection products indicated are based on radiation protection design prepared by Contractor's radiation health physicist.

C. Lead-Lined Assemblies: Unless otherwise indicated, provide lead thickness in lead-lined assemblies of not less than lead thickness indicated for assemblies in which they are installed.

D. Lead Glazing: Unless otherwise indicated, provide lead equivalence of not less than that indicated for assembly in which glazing is installed.

E. Fire-Rated and Smoke-Control Door and Frame Assemblies: Comply with Section 081113 "Hollow Metal Doors and Frames" and Section 081416 "Flush Wood Doors".

2.3 LEAD SHEET, STRIP, AND PLATE

A. Lead Sheet, Strip, and Plate: ASTM B749, Alloy UNS No. L51121 (chemical-copper lead).

2.4 LEAD-LINED GYPSUM BOARD

A. Lead-Lined Gypsum Board: 5/8-inch- thick gypsum board complying with Section 092900 "Gypsum Board," of width and length required for support spacing and to prevent cracking during handling, and with a single sheet of lead laminated to the back of the board.
   1. Lead Sheet Lining: Full width and length of board. Extend lead sheet lining 1 inch beyond one vertical edge of board.
   2. Furnish 2-inch- wide lead strips for backing joints.
   3. Furnish finishing materials, accessories, and trim for lead-lined gypsum board complying with Section 092900 "Gypsum Board."

2.5 LEAD GLASS

A. Lead Glass: Lead-barium, polished glass containing not less than 60 percent heavy metal oxides, including not less than 48 percent lead oxide by weight.
   1. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.
   2. Laminated Safety Glass: ASTM C1172 lead glass with thickness as needed to provide lead equivalence indicated laminated with polyvinyl butyral interlayer to clear float glass on both sides of lead glass.

2.6 LEAD-LINED HOLLOW-METAL FRAMES

A. Hollow-Metal Frames: Steel frames complying with NAAMM-HMMA 861, except as indicated.
   1. Provide borrowed lite observation window frames of split or telescoping design with welded corners, allowing frame to be installed after construction of partition.
      a. Construct so lead lining overlaps glazing material perimeter by at least 3/8 inch, and furnish removable stops.
      b. Form sill with an opening for sound transmission. Offset sound passage to make opening lightproof and to maintain required lead equivalence at all points and in all directions.
   2. Provide door observation window frames from steel sheet with minimum thickness of 0.0667 inch.
   3. Furnish with additional reinforcements and internal supports to adequately carry the weight of lead-lined doors. Install reinforcements and supports before installing lead lining.
   4. Line frame with lead sheet of thickness not less than that required for doors and walls where frames are used. Form lead sheet to match frame contour, continuous in each jamb and across the head, lapping the stops. Form lead shields around areas prepared to receive hardware. Fabricate lead lining wide enough to maintain an effective lap with lead of adjacent shielding.
   5. Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

2.7 LEAD-LINED FLUSH WOOD DOORS

A. Lead-Lined Flush Wood Doors: Solid-core wood doors with lead sheet laminated to each side of core, with faces applied over lead lining.
   1. Construction: Hot pressed, bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before applying lead lining and faces.
   2. Core: Particleboard.
   3. Lead Lining: Continuous sheets of lead extending from top to bottom and edge to edge; with total lead thickness of that indicated in the Physicist's Report.
   4. Plastic-Laminate Faces: High-pressure decorative laminate complying with ISO 4586-3, ; applied to crossbands over core.
   5. ANSI/WDMA I.S.1-A Performance Grade: Extra Heavy Duty.

B. Certified Wood: Wood products shall comply with requirements of ASTM D7612-10 (FSC, SFI, ATSM, CSA or PEFC certifications are acceptable).

C. Certified Wood: Wood products shall be certified according to the American Tree Farm System's "AFF Standard," the AF&PA's Sustainable Forestry Initiative, FSC STD-01-001 and FSC STD-40-004, or the standards of the Programme for Endorsement of Forest Certification.
   1. Composite Wood Products: Products shall be made using ultra-low-emitting formaldehyde resins as defined in the California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.
   2. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

D. Prepare doors to receive glazed lights; factory cut and trim openings through doors.

E. Metal Frames for Glazed Lights: Lead-lined frame formed of 0.048-inch- thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated.

F. Shield cutouts for locksets with lead sheet of same thickness used in door. Lap lining of cutouts with door lining.

G. Furnish lead-lined astragals for pairs of doors.

H. Factory fit doors to suit frame openings indicated with 1/16-inch clearance at heads and jambs and minimum clearance at bottom. Factory machine doors for hardware not surface applied.

2.8 INFORMATIONAL SIGNS

A. High-Pressure-Laminate Signs: High-pressure laminate engraving stock with contrasting face and core, machine engraved from master templates for accurately formed letters, numbers, and symbols.
   1. Color: As selected by Architect from manufacturer's full range of colors.
   2. Provide copy indicated or as directed.
   3. Indicate lead equivalence in millimeters and heights of radiation protection in inches.

B. Rooms Where the Level of Protection Is Uniform Throughout: Provide one sign for each room indicating lead equivalence of partitions, ceilings, floors, doors, and other portions of radiation protection enclosure. Indicate height of radiation protection above floor, or indicate that partitions are radiation protected to full height.

C. Rooms Where the Level of Protection Is Not Uniform Throughout: Provide one sign for each room with different lead equivalences in different locations. Indicate, in tabular form, lead equivalence of each wall, partition, ceiling, floor, door, and window. Indicate height of radiation protection above floor, or indicate that partitions are radiation protected to full height. Indicate where lead equivalence changes or is not continuous.

D. Rooms Where Some Partitions Are without Radiation Protection: Provide one sign for each partition that contains radiation protection, and indicate its lead equivalence. Indicate height of radiation protection above floor, or indicate that partitions are radiation protected to full height.

E. Rooms Where Only the Door Has Radiation Protection: Provide one sign for each door indicating its lead equivalence.

F. Mounting: Provide manufacturer's standard adhesive.

2.9 DOOR AND DOOR FRAME FABRICATION

A. Hardware Preparation: Factory prepare doors and frames to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with door hardware schedule and templates furnished, as specified in Section 087100 "Door Hardware."

2.10 MISCELLANEOUS MATERIALS

A. Glazing Compounds, Gaskets, and Accessories: Comply with requirements in Section 088000 "Glazing."

B. Accessories and Fasteners: Manufacturer's standard fasteners and accessories as required for installation, maintaining same lead equivalence as rest of system.

C. Asphalt Coating: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.

D. Asphalt Felt: ASTM D226/D226M.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates with Installer present for compliance with requirements, installation tolerances, and other conditions affecting performance of radiation protection.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF LEAD SHEET, STRIP, AND PLATES

A. Proceed with installation only after concrete surfaces are clean, dry, and free of depressions and sharp projections that could damage or penetrate lead sheet.

B. Coat concrete surfaces with asphalt emulsion before installing lead sheet.

C. Lead Sheet, 1/8 Inch Thick or Less: Install in a single layer with a 2-inch minimum lap at joints.

D. Lead Sheet More Than 1/8 Inch Thick: Install in two or more layers with a 2-inch minimum lap at joints, or in a single layer with joints butted and covered with a 4-inch-wide lead strip of same thickness.

E. Extend lead sheet at least 12 inches beyond radiation shielding in walls of treatment room.

F. In floor slabs above shielded rooms, where lead sheet is indicated, extend lead sheet at least 12 inches beyond radiation shielding in walls of room below.

G. At door openings, extend lead sheet at least 12 inches beyond radiation protection in walls and at least 12 inches beyond door opening on both sides.

H. After installation, apply two coats of asphalt emulsion on top surface of lead sheet and protect from damage until concrete topping is placed.

3.3 INSTALLATION OF LEAD-LINED GYPSUM BOARD

A. Install and finish lead-lined gypsum board in accordance with Section 092900 "Gypsum Board."

B. Install lead-lined gypsum board panels with long edge parallel to supports and lead lining facing supports. Provide blocking at end joints.

C. Install lead-lined gypsum board panels in sequence, so lead lining that extends beyond edge of gypsum board is covered by next panel installed.

D. At joints where lead lining does not extend beyond edge of gypsum board panels, install lead strips 2 inches wide and same thickness as lead lining to face of framing and blocking. Secure lead strips with construction adhesive.

E. Provide shims at face of supports and blocking, where lead lining does not overlap, to provide a uniform plane across panel surfaces.

F. Fasten lead-lined gypsum board to framing, with steel drill screws spaced as recommended in writing by lead-lined gypsum board manufacturer.

G. Two-Layer System: Apply a facing sheet of gypsum board vertically over base sheet, using laminating adhesive recommended in writing by gypsum board manufacturer. Offset joints in finish layer from joints in base layer, and fasten at top and bottom of sheet to support finish panel until adhesive has set.

H. Openings: Extend lead-lined gypsum board into frames of openings, lapping lead lining with lead frames or frame linings at least 1 inch. Arrange board around openings, so neither horizontal nor vertical joints occur at corners of openings.

I. Install control and expansion joints where indicated, with appropriate trim accessories. Install lead strip on face of framing, extending across joint, and lap with lead lining of gypsum board.

3.4 INSTALLATION OF LEAD-LINED DOORS AND DOOR FRAMES

A. Install lead-lined steel doors and door frames in accordance with Section 081113 "Hollow Metal Doors and Frames."
   1. Apply a coat of asphalt mastic or paint to lead lining in door frames where lead comes in contact with masonry or concrete.

B. Install lead-lined wood doors in accordance with Section 081416 "Flush Wood Doors."

C. Lead-Lined Hollow-Metal Door Frames: Comply with ANSI/NAAMM-HMMA 840 unless otherwise indicated. Except for frames located in existing walls or partitions, place frames before constructing walls. Set frames accurately in position, plumb, and brace securely until permanent anchors are set.
   1. Provide three anchors per jamb, located adjacent to hinge on hinge jamb and at corresponding heights on strike jamb.
   2. In masonry construction, use wire or T-strap anchors, and apply a coat of asphalt mastic or paint to lead lining where lead comes in contact with masonry or grout.
   3. In metal stud construction, use wall anchors attached to studs with screws.

D. Lead-Lined Split-Frame Observation Windows: Install lead-lined hollow-metal frames with split or telescoping design, with leaded side of frame on radiation side of wall.

E. Lap lead lining of frames over lining in walls at least 1 inch.

F. Lead Lining of Frames: Line inside of frames with lead of thickness of not less than that required in doors and walls where frames are used. Form lead to match frame contour, continuous in each jamb and across the head, lapping the stops. Form lead shields around areas prepared to receive hardware. Lap lining over lining in walls at least 1 inch.

G. Install leaded side of frame on radiation side of wall. Lap lead lining of frames over lining in walls at least 1 inch.

H. Lead Glazing: Comply with installation requirements in Section 088000 "Glazing" and with manufacturer's written instructions.

I. Line astragals with lead sheet.

J. Hardware: Line covers, escutcheons, and plates to provide effective shielding at cutouts and penetrations of frames and doors. See Section 087100 "Door Hardware" for other installation requirements.

3.5 INSTALLATION OF PENETRATING ITEMS

A. At penetrations of lead linings, provide lead shields to maintain continuity of protection.

B. Provide lead linings, sleeves, shields, and other protection in thickness of not less than that required in assembly being penetrated.

C. Secure shields at penetrations using adhesive or wire ties but not penetrating fasteners unless indicated on Drawings.

D. Outlet Boxes and Conduit: Cover or line with lead sheet lapped over adjacent lead lining at least 1 inch. Wrap conduit with lead sheet for a distance of not less than 10 inches from box.

E. Duct Openings: Unless otherwise indicated, line or wrap ducts with lead sheet for distance from partition/ceiling equal to 3 times the largest opening dimension. Lap lead sheet with adjacent lead lining at least 1 inch.

F. Piping: Unless otherwise indicated, wrap piping with lead sheet for a distance of not less than 10 inches from point of penetration.

3.6 FIELD QUALITY CONTROL

A. Employ an independent testing laboratory to perform the following tests, and arrange for the Architect and Owner to witness the tests.

B. Correct deficiencies in or remove and replace shielding and accessories that inspection reports indicate does not comply with specified requirements.
   1. Additional testing and inspecting at Contractor's expense will be performed to determine if replaced or additional work complies with specified requirements.

C. Uncover and repair or replace defective work, including finishes and other work covering defective work. Arrange and pay for additional testing until no more corrections are required.

D. The Owner will engage through the Contractor a qualified testing agency to perform tests and inspections after radiology equipment has been installed and placed in operating condition.

E. Correct deficiencies in or remove and replace radiation protection that inspection reports indicate does not comply with specified requirements.

3.7 PROTECTION

A. Lock radiation-protected rooms once doors and locks are installed, and limit access to only those persons performing work in the rooms.

END OF SECTION

SECTION 134920 - RFI/EMI SHIELDING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes radio frequency shielding for a MRI facility as detailed in equipment manufacturer's drawings. Fully shield the scan room, including floor, walls, ceiling, door and penetrations. Isolate the finish inside the scan room from the shielding using a fire-retardant wood stud wall. Provide acoustical insulation, electrical outlets, and electrical switches, and finish surface for the interior stud wall. Provide mounting hardware for internal items requiring attachment to the shield walls. Install attachments prior to performance testing.

B. Related Requirements:
1. Division 03: Concrete slab substrate, level within 1/4 inch in any 10 foot section, cured for minimum 7 days prior to start of enclosure installation.
2. Division 07: Properly weatherproof entire area in which shielded enclosure will be installed. Protect MRI Exam Room from moisture, standing water, running water prior to, during, and following enclosure installation to ensure enclosure integrity and specified earth ground isolation.
3. Division 09: Finish Work enveloping shielded enclosure, or preparing surfaces to receive shielded enclosure. Field painting or other architectural finishes, either internal or external to enclosure.
4. Division 22: Pipe connections to or from the installed wave guide beyond cutoff pipe penetrations.
5. Division 22: Dielectric connection to exterior side of each mechanical pipe penetration of a suitable material to maintain a minimum of 1000 ohms DC. Resistance to earth ground, constructed of material suitable to conditions of service on which it is installed.
6. Division 23: Connections of ductwork to or from the installed wave guide shielded air vents.
7. Divisions 22 and 23: Special filtering, other than that specified within this section, either mechanical or electrical, related specifically to the installation of the MRI imaging system.
8. Division 26: Electrical connections to the installed RF power and/or signal filters, either internally or externally to the enclosure.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM)
1. E84 - Test Method for Surface Burning Characteristics of Building Materials.
2. E90 - Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.

B. American Welding Society (AWS)
1. D1 - Structural Welding Code.

C. Builders Hardware Manufacturers testing Association (BHMA)
1. A156.5 - Auxiliary Locks & Associated Products

D. Federal Specification (Fed. Spec.)
1. QQ-S-571E - Solder; Tin Alloy, Tin-Lead Alloy, and Lead Alloy.

2. NN-P-530E - Plywood, Flat Panel.
3. MM-L-751H - Lumber, Softwood.

E. Military Standards (MIL-STD)
1. 220A - Method of Insertion-Loss Measurement.
2. 285 - Method of Attenuation Measurements for Electromagnetic Shielding Enclosures for Electrical Test Purposes.

F. Underwriters Laboratories (UL)
1. 1283 - Electromagnetic Interference Filters.

1.3 DEFINITIONS

A. RFI: Radio Frequency Interference.

B. EMI: Electromagnetic Interference.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. LEED Submittals:
1. Certificates for Credit MR 6 and Credit MR 7: Chain-of-custody certificates indicating that wood doors complies with forest certification requirements. Include documentation that manufacturer is certified for chain of custody by an FSC-accredited certification body. Include statement indicating cost for each certified wood product.
2. Product Data for Credit IEQ 4.4: For composite wood products, documentation indicating that product contains no urea formaldehyde.

C. Laboratory Test Reports for Credit IEQ 4: For adhesives and composite wood products, documentation indicating that products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Shop Drawings: Show layout of shielded areas, dimensioned details of fabrication, connections, penetrations, and related Work.

E. Samples for Initial Selection: Manufacturers' color charts consisting of units or sections of units showing the full range of colors and finishes available for each type of prefinished item indicated.
1. For factory-finished wood doors, show the full range of colors available for stained finishes.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For shielding and accessories, to include in operation and maintenance manuals.

B. Service Agreement Proposal: Submit a proposal from Installer to Owner for continuing service, in the form of a standard annual service agreement, starting on date warranty service is concluded; except for systems that include a warranty for life of installation. State services, obligations, conditions, and terms for agreement period and for future renewal options.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Require the manufacturer to be regularly and presently manufacturing radio frequency shielding as specified as one of its principal products, and manufacturer's product submitted to have been in satisfactory and efficient operation or five installations similar and equivalent to this Project for five years. Submit list of installations.

B. Welding Qualifications: Qualify procedures and personnel according to AWS Structural Welding Code for the types of materials being welded.

C. Electrical Filter Certification: Provide electrical filters that are certified and labeled under UL-1283 or another approved testing laboratory, and have a rating that meets the Performance Requirements indicated.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 01 Section "Project Management and Coordination." Review methods and procedures related to MRI shielding including, but not limited to, the following:
   1. Sequence and schedule of MRI shielding work in relation to other work.
   2. Supplementary radio MRI shielding and filters at duct, pipe, and conduit penetrations of shielding.
   3. Methods of attaching other construction and equipment to shielding enclosure.
   4. Notification procedures for work that requires modifying MRI shielding.

E. Provide the following upon request:
   1. Qualification Data: For qualified Installer.
   2. Field-Quality Control Reports: Submit reports of inspections or tests, including analysis and interpretation of test results, each report properly identified. Identify test methods used and record test results.
      a. Ground isolation monitoring test.
      b. Qualification test.
      c. Acceptance test.
   3. Certificates: Submit statement signed by responsible official of a manufacturer of a product, system or material, attesting that the product, system or material meets specified requirements, dated after the award of this Contract, naming the Project, and listing the specific requirements which are being certified.
   4. Listing of Product Installations: Submit a listing of a minimum of five installations where units similar to those proposed for use, have been installed and have been in successful service a minimum period of 5 years, including purchaser, address of installation, service organization, and date of installation.
   5. Quality Assurance Plan: Submit detailed procedures which define methods of compliance with the Contract Documents, inspection and material procurement records, system and material testing and certification records, and written records and drawings indicating location of welds made by each welder or welding operator.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions of MRI area by field measurements before fabrication and indicate measurements on Shop Drawings.

B. Heating of installation area to minimum of 68 degrees for a period of 24 hours prior to, and during installation.

1.8 COORDINATION

A. Verify performance criteria and coordinate installation with MRI system and magnet manufacturer prior to installation.

1.9 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace shielding and assembly components that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Ceasing to meet performance requirements indicated, whether due to building movement, thermal expansion and contraction, or vibration, or other factors.
   2. Warranty shall also include installation and finishing that may be required due to repair or replacement of shielding.
   3. Enclosure Warranty Period: Life of installation.
   4. EMI Electrical Filters, RF Shielded Doors, RF Shielded Windows, Pipe Penetrations, and Air Vent RF Filters: One year.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Provide attenuation in accordance with requirements of MRI system manufacturer. Refer to shielding requirements, layout drawings, and details.

B. RFI Shielding: Provide a shielded enclosure with a single ground point to reduce interference levels of radio frequency signals, having a minimum attenuation of radio frequency waves emanating from external sources, when tested in accordance with MIL-STD-285, as follows:
   1. 90 dB or more from 63.86 MHz to 76.6 MHz.
   2. Isolation between RH shield and ground: 1000 ohms.
   3. Electric Field Attenuation: 100 Db from 1 MHz to 100 MHz.
   4. Plane Wave Attenuation: 100 dB from 50 MHz to 100 MHz.

C. Band Width Test as follows:
   1. 15.95, 16.79, 25.71, 59.72, 63.43, and 100 MHz.

D. Fire Hazard Classification: Maximum 25 for flame spread and 50 for smoke developed in accordance with ASTM E84.

E. Shielding Material Conductivity: Not less than conductivity rating of 1.

F. Galvanic Corrosion Resistance:
   1. Use of the following in manufacture and installation of shielded enclosure is not permitted:
      a. Dissimilar metals that exhibit an anodic voltage differential greater than 0.25 volts.
      b. Copper or aluminum in direct contact with bare concrete.
      c. Zinc plated RF framing in direct contact with copper RF medium.

d. Copper plated steel or brass RF framing in direct contact with galvanized steel.

2. Use of the following in manufacture and installation of shielded enclosure is permitted.
   a. Bronze or brass flame spray treatment of steel or aluminum RF contact surfaces.
3. Design RF shielding medium to display an anodic voltage differential index of less than 0.40 volts and a cathodic group number of 1 (0.00 volts) to 9 (0.40 volts).
4. Construct shielding system with proper materials so that ionic conduction across joints and RF seams is less than 0.10 volts.

2.2 MANUFACTURERS

A. Basis of Design (Product Standard): Contract Documents are based on products and systems indicated to establish a standard of quality. Other manufacturers offering products having equivalent characteristics may be considered, provided deviations are minor and comply with requirements of Contract Documents as judged by the Architect.
   1. GE. "Signa Artis1.5T MRI".

2.3 SYSTEM DESCRIPTION

A. General: Provide shielding enclosure complying with Performance Requirements and acceptable to manufacturer of magnetic resonance imaging equipment, complete with view window, doors, filters, and vents.

B. Provide RF seam and joint construction methods to provide the maximum in shield conductivity, low impedance, RF attenuation, and reduction of eddy current generation at RF seams and joints.

2.4 MATERIALS

A. RFI Shielding Material: Annealed pure copper, galvanized steel, or other metal complying with conductivity and galvanic corrosion resistance specified in Performance Requirements.

B. Dimension Lumber Framing: Maximum moisture content 15 percent, 1 3/4 inch thick D select or better kiln dried pine, FS MM L 751H, and fire-retardant treated according to AWPA, Interior Type A unless otherwise indicated. Provide stainless steel or other fasteners that are noncorrosive when in contact with wood treatment.

2.5 FABRICATION

A. Fabricate as needed to meet Performance Requirements indicated.
   1. Clamp-together and taped systems are not acceptable.

B. Flooring: Provide shielded flooring within entire area of MRI exam room. Verify compatibility of floor and grout coating with finish flooring specified in Division 09.
   1. Monolithic or fully seamed copper membrane or other material meeting Performance Requirements.
   2. Provide electrical isolation of enclosure and floor system by use of a two-part, thermosetting resin applied directly to concrete floor substrate.

3. Moisture Barrier: Thermosetting resin acceptable to enclosure manufacturer. Prepare substrate in accordance with moisture barrier manufacturer™™s requirements. If shot-blasting is required, shot-blast surfaces with an apparatus that abrades concrete surface, contains dispensed shot within apparatus, and recirculates shot by vacuum pickup. Install moisture barrier on concrete floor substrate according to resin manufacturer's instructions.
4. Membrane Adhesive: Adhere floor membrane to moisture barrier with an adhesive compatible with both copper and moisture barrier.
5. Epoxy Grout Coating: Over-coat copper membrane with a chemically cured epoxy grout. Install grout overcoat to minimum 1/2 inch thickness over entire exam room surface. Grout coating shall withstand the direct loading of the magnet cryostat and patient table.

C. Panels:
1. Panels for walls and ceiling: wood framing or rigid structural panels faced with shielding system. Design the panel system to provide continuous, uniform and constant pressure contact against the shielding elements of the panels.
2. Provide walls which are self-supporting from floor to ceiling with bracing against the parent room construction at door side. Maximum deflection of walls under a static load of 334 newtons (75 pounds) applied normal to the wall surfaces at any point: 1/250 of the span between supports.
3. Ceilings may be self-supporting or supported by insulated hangers from the structure above. Design ceilings to have a deflection under total weight of their construction, including ceiling finish, of not more than 1/480 of the span.
4. Provide fasteners at 100-mm (4-inch) spacing.

D. Interior Finishes: Provide 50 by 100-mm (2 by 4-inch) and 50 by 150-mm (2 by 150-mm (6-inch) nominal wood studs at 400-mm (16-inch) spacing for application of wall finishes, and to recess mechanical and electrical utility boxes.

E. MRI Door:
1. Factory assembled shielded door unit that includes continuous seal around the entire perimeter of the door, with total assembly having shielding equal to that of shielded enclosure, complete with door leaf, door frame, threshold, and hardware.
   a. Provide acoustical doors, frames, and seals to meet Performance Requirements indicated.
2. Door facing: plastic laminate to match the doors specified in Division 8 wood door section.
3. Door hardware:
   a. Latch handles and trim: forged brass, finish US26D.
   b. Door latch: adjustable integral roller cam latch mechanism, incapable of being mechanically disabled in closed position, containing no ferromagnetic parts.
   c. Door lock with night latch: BHMA A156.5, 626 finish.
   d. Door leaf hinges: minimum 113-mm (4-1/2-inch) brass or stainless steel, fully mortised, with minimum of two ball-bearing swing joints per hinge, minimum of three hinges per leaf; or continuous piano hinge.
   e. Threshold: Tapered ramp directly fastened to the jambs, electrically contiguous with door frame and compatible with adjacent materials.

F. Glass and Glazing
   1. Glass for observation windows at the exterior wall occurring in shielded enclosures: clear float glass or clear tempered float glass, 6 mm (1/4 inch) thick, as specified in Division 8 section for glass and glazing. Glaze each glazed opening with two layers of glass encapsulating the copper screen shielding material within the dead air space of double glazed assembly, to provide a minimum of 70% clear viewing area.
   2. Observation Windows
      a. Prefabricated window units as indicated with shielded frame and glass.

G. Exterior window glazing.

H. Custom wood frame enclosure as indicated with shielded frame and glass.

I. Ventilation: Design the waveguide type air vent filters to provide proper air passage for cooling and ventilation while also maintaining effective RF shielding. Provide metal collars and non- conducting boots to connect to the ductwork. Provide suitable collars and boots, where required, for connection to diffusers or grilles located in suspended ceilings or in light and air valance, in accordance with additional requirements in Division 23.

J. All services must pass through either a filter or a waveguide as follows:
   1. Filters: Provide for all electrical services that pass through the shielded assembly.
      a. Provide incoming electrical power, lighting and communication lines with radio frequency filters, one for each electrical conductor, including grounds and neutrals, with integral waveguide penetrations, designed to attenuate RF energy on the incoming power feeders a minimum of 100 dB of insertion loss from 150 kHz to 1 gHz. Insertion loss of communication line filters: stop band of 100 dB from 150 kHz to 1 gHz and pass band of 1 dB from 0 to 3000 Hz, as measured by MIL-STD-220A.
      b. Provide conduit feeding the filter boxes with isolation coupling at the box for ground isolation.
   2. Waveguides: Provide waveguide isolated penetrations for all piping and other forms of distribution of any fluids, liquid or gaseous, moving through the shielded structure.

K. Isolation: Provide isolation around structural supports and building steel as required for installation of shielded system, to comply with performance requirement for isolation between RF shield and ground.

L. Cryogenic Gas Exhaust Waveguide Vent: Provide waveguide below RF shield cutoff of type and size as required by MRI system manufacturer. Construct cryogenic waveguide vent of stainless steel suitable to maintain a shielding effectiveness equal to that of shielded enclosure, and to resist structural failure during a magnet quench event.

2.6 ACCESSORIES

A. Ferrous Metal Detector: For screening occupants for ferrous objects prior to entering MRI suite, equipped with color-coded and auditory alert, and complying with recommendations of American College of Radiology.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Arrange for technical representative of radio frequency enclosure manufacturer to examine areas to receive radio frequency shielding for compliance with requirements, installation tolerances, and other conditions affecting performance of radio frequency shielding. After this site visit, technical representative of radio frequency enclosure manufacturer shall provide the following:
   1. List of discrepancies between drawings and field conditions.
   2. List of activities that must be performed before enclosure installation may begin.
   3. List of unsatisfactory field conditions that must be corrected before enclosure installation may begin.

B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 COORDINATION

A. Coordinate the Work with other trades performing related work under other Sections with regard to locations of piping, ducts, conduit, junction boxes, and the accommodation of the work under other sections that is concealed by or otherwise affecting the Work. Notify trades performing related work in advance of installation of the Work.

3.3 INSTALLATION

A. Assemble enclosure RF panels into straight walls with true, level and plumb surfaces in strict accordance with approved shop drawings. Align and secure RF joints.

B. Perform installation by system manufacturer, or under manufacturer's direct supervision.

C. Do not handle any properly prepared magnetic material with electromagnets. Do not use magnetic base drills on the material.

D. Provide removable panels for installation of magnet. After magnet is installed, re-install removable panels and restore integrity of shielding.

E. Floor:
   1. Provide RF-shielded flooring within entire area of MRI exam room (inclusive of any indicated cable trenching or access flooring).
   2. Provide electrical isolation of enclosure and RF floor system by use of a two-part, thermosetting resin applied directly to concrete floor substrate.
   3. Install moisture barrier at concrete floor substrate according to resin manufacturer's instructions.
   4. Provide monolithic copper floor membrane with seams fully soldered, adhered to moisture barrier with membrane adhesive
   5. Over-coat copper membrane with grout, installed to minimum 13-mm (1/2-inch) thickness over entire exam room surface, finished flush with adjacent floor finishes.

F. Panels: Lay panels in a straight line with true, level and even surfaces, and with joints in alignment.

G. Filters and Waveguides:

1. Install where indicated and as specified. Coordinate installation with installation of plumbing, HVAC, and electrical systems.
2. Do not use penetration mounting screws to attach ducts or other items.

H. External attachment of any other trade to the shield penetrations cannot occur until the final ground test has been conducted. Any connection present during this test must be removed at no additional labor or material cost.

3.4 INTERIOR FINISHES

A. Require the installation of interior finishes, including gypsum wallboard, wood trim, and grilles, to be supervised by the RF-shielded enclosure manufacturer.

3.5 CLEANING

A. Thoroughly clean exposed surfaces of dirt, finger marks and foreign matter resulting from handling or installation. Leave the Work free from defects.

3.6 FIELD QUALITY CONTROL

A. Employ an independent testing laboratory to perform the following tests, and arrange for the Architect and Owner to witness the tests:
   1. Ground Isolation Monitoring: During entire construction of the RF-shielded enclosure and interior finishes, connect a relay operating ohmmeter at all times to insure that the shielded enclosure is isolated from building ground by a minimum of 1,000 ohms.
   2. Test the shielded enclosure in compliance with MIL-STD-285, as modified for hospital installations by an approved test plan submitted by the manufacturer, to demonstrate the performance requirements for attenuation. The following tests will be required:
      a. Qualification test: performed after the shielded enclosure is installed and before any other finishes or building construction is erected within the shielded enclosure.
      b. Acceptance test: performed after completion of the room and installation of MRI system, just before occupancy by the Owner.
   3. Acoustical testing: Acceptable field NIC values shall be within 5 dB of laboratory STC values, tested according to ASTM E 336, with results calculated according to ASTM E 413.

B. Correct deficiencies in or remove and replace shielding and accessories that inspection reports indicate does not comply with specified requirements.
   1. Additional testing and inspecting at Contractor's expense will be performed to determine if replaced or additional work complies with specified requirements.
   2. Uncover and repair or replace defective work, including finishes and other work covering defective work. Arrange and pay for additional testing until no more corrections are required.

C. The Owner will engage a qualified testing agency to perform tests and inspections after MRI equipment has been installed and placed in operating condition.

3.7 PROTECTION

A. Lock radio-frequency shielding enclosures once doors and locks are installed and limit access to those persons performing work in the rooms.

B. Until final acceptance of the Work, ensure that the integrity of this system is not compromised. If performance of the system or any of its components is damaged or impaired in any way, restore to perform as specified.

END OF SECTION

SECTION 142100 – ELECTRIC TRACTION ELEVATORS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Installation of Ten (10) Elevators: Nine (9) Gearless Traction (MRL Type) Elevators and One (1) Overhead Traction Freight Elevator:
   1. Public Elevators:
      a. Six (6) Gearless Traction (MRL Type) Passenger Elevators – 4,000-pound capacity operating at 200 feet per minute with front openings only.
   2. Staff & Patient Elevators:
      a. Three (3) Gearless Traction (MRL Type) Service Elevators – 5,000-pound capacity operating at 200 feet per minute with front openings only on one (1) elevator and front and rear openings on two (2) elevators.
   3. Freight Elevator:
      a. One (1) Overhead Traction Freight Elevator – 8,000-pound capacity operating at 200 feet per minute with front openings only.

B. All engineering, equipment, labor, and permits required to satisfactorily complete elevator installation required by Contract Documents.

C. Maintenance as described herein.

1.2 WORK INCLUDED

A. Installation of Ten (10) Elevators: Nine (9) Gearless Traction (MRL Type) Elevators and One (1) Overhead Traction Elevator.

1.3 DEFINITIONS

A. Terms used are defined in the latest edition of the Safety Code for Elevators and Escalators, ASME A17.1.

B. Reference to a device or a part of the equipment applies to the number of devices or parts required to complete the installation.

C. Provisions of this specification are applicable to all elevators unless identified otherwise.

1.4 QUALITY ASSURANCE

A. Approved Manufacturers and Installers:
   1. Traction Elevators:
      a. Kone
      b. Otis
      c. Schindler
      d. TK Elevator
      e. MEI
      f. Or preapproved equal
   2. Bidders shall provide products that fit within the dimensions shown on the drawings and identified in the specifications. If not, the deviations must be clearly

identified in the manufacturer's bid.

3. Compliance with Regulatory Agencies: Comply with most stringent applicable provisions of following Codes, laws, and/or Authorities, including revisions and changes in effect;
   a. Safety Code for Elevators and Escalators, ASME A17.1 (current edition)
   b. Guide for Inspection of Elevators, Escalators, and Moving Walks, ASME A17.2 (current edition)
   c. Elevator and Escalator Electrical Equipment, ASME A17.5 (current edition)
   d. National Electrical Code, NFPA 70
   e. ABAAS (Architectural Barriers Accessibility Act Standards)
   f. ADA Handicapped Accessibility Guidelines
   g. IBC
   h. Life Safety Code, NFPA 101
   i. Seismic design requirements in accordance with ASME A17.1, applicable local codes, authorities having jurisdiction (AHJ), and
      1) Comply with Elevator Safety Requirements for Seismic Risk Zone in accordance with ASME A17.1, ASCE 7, and other related requirements.
         a) Project Seismic Rick: As indicated on drawings.
      2) Provide earthquake emergency operations in accordance with ASME A17.1 requirements.
      3) Provide seismic switch in accordance with ASME A17.1 and ASCE 7 requirements.
   j. State of Arizona / Local codes and regulations

B. Warranty:
   1. Material and workmanship of installation shall comply in every respect with Contract Documents. Correct defective material or workmanship which develops within one (1) year from date of final acceptance of all work to satisfaction of Owner at no additional cost, unless due to ordinary wear and tear, or improper use or care by Owner.
   2. The definition of Defective includes but is not limited to; operation or control system failures, car performance below required minimum, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration, and similar unsatisfactory conditions.
   3. Make modifications, requirements, adjustments and improvements to meet performance requirements in Parts 2 and 3.

1.5 DOCUMENT VERIFICATION

A. In order to discover and resolve conflicts or lack of definition which might create problems, Contractor must review Contract Documents for compatibility with its product prior to submittal of quotation. Owner will not pay for change to structural, mechanical, electrical, or other systems required to accommodate Contractor's equipment.

1.6 SUBMITTALS

A. Within thirty (30) calendar days after award of contract and before beginning equipment fabrication, submit shop drawings and required materials for review as

outlined in Division I. Allow fifteen (15) calendar days for response to initial submittal.

1. Scaled or Fully Dimensioned Layout: Plan of pit, hoistway and machine room indicating equipment arrangement, elevation section of hoistway, details of car enclosures, hoistway entrances, and car/hall signal fixtures.
2. Design Information: Indicate equipment lists, reactions, and design information on layouts.
3. Applicable seismic design data; certified by a licensed Professional Structural Engineer.
4. Power Confirmation Information: Include motor horsepower, code letter, starting current, full load running current, and demand factor.
5. Fixtures: Cuts, samples, or shop drawings.
6. Finish Material: Submit 3-inch x 12-inch samples of actual finished material for Architect review of color, pattern, and texture. Compliance with other requirements is the exclusive responsibility of the Contractor. Include, if requested, signal fixtures, lights, graphics, Braille plates, and details of mounting provisions.

B. Acknowledge and/or respond to review comments within seven (7) calendar days of return. Promptly incorporate required changes due to inaccurate data or incomplete definition so that delivery and installation schedules are not affected. Contractor's revision response time is not justification for equipment delivery or installation delay.

1.7 PERMIT, TEST AND INSPECTION

A. Obtain and pay for permits, licenses, and inspection fees necessary to complete installation.

B. Perform test required by Governing Authority in accordance with procedure described in ASME A17.2 Guide for Inspection of Elevators, Escalators, and Moving Walks in the presence of Authorized Representative.

C. Supply personnel and equipment for test and final review by Consultant, as required in Part 3.

1.8 MAINTENANCE

A. Interim:

1. When elevator is near completion and ready for service, the General Contractor may accept elevator for interim use and place in service prior to substantial completion of project.
2. During this period General Contractor may pay a mutually agreed monthly amount per elevator for preventive maintenance. Indicate amount per unit per month with quotation.
3. Temporary acceptance form must be acceptable to General Contractor and signed prior to use.
4. General Contractor must provide or pay for temporary hoistway and car enclosures; protect installed equipment and finishes; pay for and return elevators to elevator sub-contractor for all cleaning, repairs, and replacement of materials

necessary to restore elevator to “as-new” condition prior to final acceptance.

B. Warranty Maintenance:
   1. Provide preventive maintenance and twenty-four (24) hour emergency callback service for one (1) year commencing on date of final acceptance by Owner. Systematically examine, adjust, clean, and lubricate all equipment. Repair or replace defective parts using parts produced by the Contractor of installed equipment. Maintain elevator machine room, hoistway, and pit in clean condition.
   2. Use competent personnel, acceptable to the Owner, supervised and employed by Contractor.
   3. Owner retains the option to delete cost of warranty maintenance from new equipment contract and remit twelve (12) equal installments directly to Contractor during period in which maintenance is being performed.

C. Preventive Maintenance: Quote monthly cost for a five (5) year Preventive Maintenance Agreement commencing upon completion of warranty maintenance. Use competent personnel, acceptable to the Owner, employed and supervised by the contractor.

PART 2 - PRODUCTS

2.1 SUMMARY

Public Elevators	Six (6) MRL type elevators arranged in three (3) duplex groups
	▪ Elevator Groups:
	  o Duplex Elevators #1A and 1B
	  o Duplex Elevators #3A and 3B
	  o Duplex Elevators #4A and 4B
	▪ Shape: Passenger
	▪ Loading Classification: Class A in compliance with ASME A17.1.
	▪ Capacity: 4,000 Pounds
	▪ Rated Speed: 200 FPM
	▪ Seismic Conditions: Yes, see drawings for detail on seismic design category
	▪ Supervisory Control: Microprocessor Based Standard Up/Down Button Type
	▪ Stops: 1, 2, 3, & 4, see drawings
	▪ Openings: Four (4) - Front Only, see drawings
	▪ Door Size: 4 feet 0 inches x 7 feet 0 inches Center Opening, see drawings
	▪ Travel: 52 feet 0 inches, see drawings
	▪ Hoistway Size: All Duplex Elevators (including divider beam): 20 feet 0 inches wide x 6 feet 11 inches deep, see drawings
	▪ Pit Depth: 5 feet 0 inches, see drawings
	▪ Overhead Height (including hoisting beam): 15 feet 8 inches, see drawings
	▪ Door Operation: High-Speed Heavy Duty @ ≥ 2 ½ FPS.
	▪ Car Enclosure: 9 feet 0 inches High - Steel Shell With interior finishes as shown on the architectural drawings
	▪ Operating Panels: One (1) Main Panel & One (1) Alternate Panel
	▪ Hall Stations: One (1) at each entrance
	▪ Hall Lanterns: One (1) above each entrance
	▪ Car Position Indicators; In Each Car Operating Panel
	▪ Fire Control Room Elevator Control Panel And Wiring
	▪ Signaling and operating devices and hoistway entrances – Standard Design

Staff & Patient Elevators	Three (3) MRL type elevators arranged in two (2) groups (one (1) duplex and one (1) simplex) ▪ Elevator Groups: o Duplex Elevators #6A and 6B o Simplex Elevator #2 ▪ Shape: Service ▪ Loading Classification: Class A in compliance with ASME A17.1. ▪ Capacity: 5,000 Pounds ▪ Rated Speed: 200 FPM ▪ Seismic Conditions: Yes, see drawings for detail on seismic design category ▪ Supervisory Control: Microprocessor Based Standard Up/Down Button Type o Elevator #6A & 6B: Provide Code Blue Service, activated via card reader / staff badging ▪ Stops: o Elevators #6A & 6B: 1, 2, 3, 4 & R, see drawings o Elevator #2: 1, 2, 3, & 4, see drawings ▪ Openings: o Elevators #6A & 6B: Five (5) - Front & Rear, see drawings o Elevator #2: Four (4) - Front Only, see drawings ▪ Door Size: 4 feet 6 inches x 7 feet 0 inches Side Opening, see drawings ▪ Travel: o Elevators #6A & 6B: 80 feet 0 inches, see drawings o Elevator #2: 52 feet 0 inches, see drawings ▪ Hoistway Size: o Duplex (including divider beam) Elevators #6A & 6B: 17 feet 2 inches wide x 11 feet 11 inches deep, see drawings o Simplex Elevator #2: 8 feet 5 inches wide x 10 feet 9 inches deep, see drawings ▪ Pit Depth: 5 feet 0 inches, see drawings ▪ Overhead Height (including hoisting beam): 15 feet 11 inches, see drawings ▪ Door Operation: High-Speed Heavy Duty @ ≥ 2 ½ FPS. ▪ Car Enclosure: 9 feet 0 inches High - Steel Shell With interior finishes as shown on the architectural drawings ▪ Operating Panels: One (1) Main Panel & One (1) Alternate Panel ▪ Hall Stations: One (1) at each entrance ▪ Hall Lanterns: One (1) above each entrance ▪ Car Position Indicators; In Each Car Operating Panel ▪ Fire Control Room Elevator Control Panel And Wiring

	▪ Signaling and operating devices and hoistway entrances – Standard Design

Freight Elevator	One (1) Overhead Traction type elevators arranged in one (1) group
	▪ Elevator Groups:
	  o Simplex Elevator #5
	▪ Shape: Service
	▪ Loading Classification: Class C3 in compliance with ASME A17.1.
	▪ Capacity: 8,000 Pounds
	▪ Rated Speed: 200 FPM
	▪ Seismic Conditions: Yes, see drawings for detail on seismic design category
	▪ Supervisory Control: Microprocessor Based Standard Up/Down Button Type
	  o Provide Code Blue Service, activated via card reader / staff badging
	▪ Stops: 1, 2, 3, & 4, see drawings
	▪ Openings: Four (4) - Front Only, see drawings
	▪ Door Size: 10 feet 0 inches x 8 feet 0 inches Bi-Parting, see drawings
	▪ Travel: 52 feet 0 inches, see drawings
	▪ Hoistway Size: 12 feet 10 inches x 12 feet 9 inches, see drawings
	▪ Pit Depth: 5 feet 2 inches, see drawings
	▪ Overhead Height (including hoisting beam): 17 feet 0 inches, see drawings
	▪ Door Operation: High-Speed Heavy Duty @ ≥ 2 ½ FPS.
	▪ Car Enclosure: 10 feet 0 inches High - Steel Shell With interior finishes as shown on the architectural drawings
	▪ Operating Panels: One (1) Main Panel
	▪ Hall Stations: One (1) at each entrance
	▪ Hall Lanterns: One (1) above each entrance
	▪ Car Position Indicators; In Each Car Operating Panel
	▪ Fire Control Room Elevator Control Panel And Wiring
	▪ Signaling and operating devices and hoistway entrances – Standard Design

Hoist Machine: Provide New MRL Type in Top of The Hoistway

Individual Car & Supervisory Control:	Microprocessor Based
	Standard up/down pushbutton type
Motor Control:	Provide New Variable Frequency Ac Microprocessor Based With Digital Closed-Loop Feedback
Capacity:	See Above
Operating Speed:	See Above
Seismic Conditions:	Yes, See Drawings for detail on seismic design category
Entrance Type & Finish:	See Above
	See Architectural Drawings for details
Door Operation:	Heavy Duty High Speed
Door Protection:	Infrared Screen Detectors
Compensation:	Encapsulated Chain Type, if required
Car Enclosure:	Custom Design, see Architectural drawings
	Steel Shell with Custom Interior Finishes
Signal Fixtures:	Standard Design, See Above
Communication System:	Hands Free Type
Additional Features –	
	Car And Counterweight Roller Guides
	Car Top Inspection Station
	Firefighters’ Service, Phase I And II, Including Alternate Floor Return
	Standby Power Transfer (Automatic To Main Floor) With Manual Override In Firefighters' Control Panel
	Accessibility Signage

Hoistway Access Switches
Top And Bottom Floors

Hoistway Door Unlocking Device At All Floors

Platform Isolation

Load-Weighing Device

Anti-Nuisance Feature

Independent Service Feature

Card Reader Provisions

Security Control Panel And Remote Wiring

Firefighters' Control Panel and Remote Wiring

Machine, Power Conversion Unit, And Controller Sound Isolation

Code Blue Service (Elevators #5, 6A, & 6B), activated via card reader / staff badging

2.2 CAR PERFORMANCE

A. Car Speed: ± 3 percent of contract speed under any loading condition.

B. Car Capacity: Safely lower, stop and hold 125 percent of rated load.

C. Car Stopping Zone: ±1/4 inch under any loading condition.

D. Door Opening Time: Seconds from start of opening to fully open;
   1. 2.5 Seconds per Foot

E. Door Closing Time: Seconds from start of closing to fully closed;
   1. 1.0 Second per Foot

F. Car Floor-to-Floor Performance Time: Seconds from start of doors closing until doors are 3/4 open and car level and stopped at next successive floor under any loading

condition or travel direction (12 foot 0 inch typical floor height);
1. 10.0 Seconds

G. Car Ride Quality:
1. Vertical Vibration (maximum): 12 – 17 milli-g
2. Horizontal Vibration (maximum): 10 – 15 milli-g
3. Vertical Jerk (maximum): 4.6 ± 1.0 ft./ sec3 (1.4 ± 0.3 m/ sec3)
4. Acceleration/Deceleration (maximum): 2.6 ± .33 ft./ sec2 (0.8 ± 0.13 m/ sec2)
5. Stopping Accuracy: ± 0.2 in. (± 5 mm)
6. Re-leveling Distance: ± 0.4 in. (± 10 mm)

H. Airborne Noise: Measured noise level of elevator equipment during operation shall not exceed 50 dBA in elevator lobbies and 60 dBA inside car under any condition including door operation and car ventilation exhaust blower on its highest speed.

I. When operating under normal conditions the elevator equipment shall not exceed a level of NC-30 for sensitive commercial spaces measured at a distance of not more than 5feet from a wall or floor/ceiling assembly. This shall include spaces adjacent to machine rooms and elevator shafts. In addition, no vibration shall be perceptible under the same conditions in tenant spaces. For the purposes of this specification, vibration shall be considered acceptable provided it is less than 4000 microinches per second. In order to achieve these standards, the following are required as a minimum:
1. Hoist motors and secondary deflector sheaves shall be mounted on a unitized base supported on vibration isolation in the form of neoprene pads providing at least 0.15 inches of static deflection.
2. For elevators using underslung hoists, isolation systems shall allow for any horizontal forces, and sheave beams shall also be provided with vibration isolation, similar to the hoist motors.
3. Elevator controls, transformers, etc. shall the provided with vibration isolation pads similar to Mason Industries ND mounts sized for 0.5 inch static deflection. Transformers greater in capacity than 35kVA shall be supported on spring isolators similar to Mason Industries type SLF, with minimum 1 inch static deflection. Provided a loop in the connecting electrical conduit and/or support resiliently with appropriate neoprene isolators. Do not wall support such equipment without isolation.
4. Provide the Elevator car and counterweight with low noise oversized guide wheels, similar to Elsco, with rubber tires.
5. Where required provide the elevator/counterweight guiderails with isolation pads, washers and bushings, as available from CDM or Mason for example.

2.3 OPERATION

A. Group Automatic: Traditional Up/Down button dispatch
1. Approved microprocessor-based, group dispatch, car and motion control systems.
2. Include as a minimum, the following features:
   a. Operate cars as a group, capable of balancing service and providing continuity of group operation with one (1) or more cars removed from the

system.

b. Register service calls from pushbuttons located at each floor and in each car. Slow cars and stop automatically at floors corresponding to registered calls. Make stops at successive floors for each direction of travel irrespective of order in which calls are registered except when bypassing hall calls to balance and improve overall service; stop only one (1) car in response to a particular hall call. Assign hall calls to specific cars and continually review and modify those assignments to improve service. Simultaneous to initiation of slow-down of a car for a hall call, cancel that call. Render hall pushbutton ineffective until car doors begin to close after passenger transfer. Cancel car calls in the same manner. Give priority to coincidental car and hall calls in car assignment.

c. Operate system to meet changing traffic conditions on a service demand basis. Include provisions for handling traffic which may be heavier in either direction, intermittent or very light. As traffic demands change, automatically and continually modify group and individual car assignment to provide the most-effective means to handle current traffic conditions. Provide means to sense long-wait hall calls and preferentially serve them. Give priority to coincidental car and hall calls in hall call assignment. Accomplish car direction reversal without closing and reopening doors.

d. Use easily reprogrammable system software. Design basic algorithm to optimize service based on equalizing system response to registered hall calls and equalizing passenger trip time to shortest possible time.

e. Serve floors below main floor in a manner which logically minimizes delay in passing or stopping at main floor in both directions of travel. Provide manual means to force a stop at the main floor when passing to or from lower levels.

3. Required Features:

a. Dispatch Protection: Backup dispatching shall function in the same manner as the primary dispatching.

b. Delayed Car Removal: Automatically remove delayed car from group operation.

c. Position Sensing: Update car position when passing or stopping at each landing.

d. Hall Pushbutton Failure: Provide multiple power sources and separate fusing for pushbutton risers.

e. Communication link: Provide serial or duplicate communication link for all group and individual car computers.

B. Other Items:

1. Load Weighing: Provide means for weighing car passenger load. Control system to provide dispatching at main floor in advance of normal intervals when car fills to capacity. Provide hall call by-pass when the car is filled to preset percentage of rated capacity and traveling in down direction. Field adjustment range: 10 to 100 percent.

2. Anti-Nuisance Feature: If car loading relative to weight in car is not commensurate with number of registered car calls, cancel car calls. Systems

employing either load weighing or door protective device for activation of this feature are acceptable.

3. Independent Service: Provide controls for operation of each car from its pushbuttons only. Close doors by constant pressure on desired destination floor button or door close button. Open doors automatically upon arrival at selected floor.
4. Code Blue Service (For elevators #5, 6A, & 6B): Activated by specific staff badging / card access. Provide elevator functionality to provide priority access and bypasses all registered calls to serve the activation floor and provide express travel to the passenger(s) selected floor stop. All previously registered calls declined as a result of code blue service shall be distributed to other elevators (where applicable).

C. Firefighter's Service: This service shall be initiated and operated as prescribed by code. In response to a Fire Phase I signal, the cars shall return to the designated floor. Car call buttons for the fire officer are only operative under Fire Phase II and shall be automatically exposed by placing the car on Fire Phase II operation. As an additional safeguard it shall be possible to manually open the floor button door by using the Fire Phase II key.

D. Automatic Car Stopping Zone: Stop car within ¼ inch above or below the landing sill. Maintain stopping zone regardless of load in car, direction of travel, distance between landings, hoist rope slippage or stretch.

E. Diagnostics: Equip controller with standard ports, interface boards, and drivers to accept maintenance, data logging, fault finding diagnostic and programming tools.

F. Motion Control: Microprocessor based AC variable-voltage, variable frequency with digitally encoded closed-loop velocity feedback suitable for operation specified and capable of providing smooth, comfortable car acceleration, retardation, and dynamic braking. Limit the difference in car speed between full load and no load to not more than ±3 percent of the contract speed.

G. Door Operation: Automatically open doors when car arrives at main floor. At expiration of normal dwell time, close doors. Reopen doors when car is designated for loading.

H. Power Door Operation: Open door and gate automatically when car arrives at a floor. Control door and gate closing by using constant-pressure buttons on car or at each floor. Provide passenger sequence operation. Provide reversing safety edge device on car gate. Provide automatic door and gate closing feature with warning buzzer.

I. Standby Lighting and Alarm: Car mounted battery unit with solid-state charger to operate alarm bell and car emergency lighting. Battery to be rechargeable with minimum 5-year life expectancy. Include required transformer. Provide constant pressure test button in service compartment of car operating panel. Provide lighting integral with portion of normal car lighting system.

J. Standby Power Operation: Upon loss of normal power, adequate standby power will be

supplied via building electrical feeders to simultaneously start and run car at contract car speed and capacity.

1. Automatically return car, nonstop to designated floor, open doors for approximately 3.0 seconds, close doors and park car.
2. Provide separate selection switches in firefighters' control panel.
   a. Switches shall be labeled "STANDBY POWER OVERRIDE" with positions marked "AUTO" and appropriate car numbers controlled by each respective switch. Key shall be keyed same as key utilized for firefighters' Phase I and II key switch. Key shall be removable in "AUTO" position only.
   b. Switch shall override automatic return and automatic selection functions, and cause the manually selected car to operate. Manual selection shall cause car to start and proceed to designated floor and open and close its doors before standby power is manually transferred to next selected car.
   c. Provide "STANDBY POWER" indicator lights (one (1) per car) in firefighters' control panel. Indicator light illuminates when corresponding car is selected, automatically or manually, to operate on standby power.
   d. Successive Starting: When normal power is restored or there has been a power interruption, individual cars in each bank shall restart at five (5) second intervals.

K. Card/Proximity Reader Security System: Provide provisions inside Car for reader unit. Mount reader unit in car station behind flush mounted lexan. Cross connect from car pushbuttons to control module in machine room. Reader control unit, mounting brackets, wiring materials, logic circuits, etc., by Security Subcontractor. Travelling cable by elevator contractor.

L. Camera Security System: Provide provisions inside cab for camera security system. Mount camera corner of cab. Camera, control unit, mounting brackets, wiring materials, logic circuits, etc., by Security Subcontractor. Travelling cable by elevator contractor.

2.4 MACHINE ROOM EQUIPMENT

A. Sound Isolation:
   1. Noise level relating to elevator equipment operation in machine room shall not exceed 80 dBA.
   2. All dBA readings shall be taken three (3) feet off the floor and three (3) feet from equipment using the "A" weighted scale.

B. Solid State Power Conversion and Regulation Unit: Provide solid-state, alternating current, variable voltage, variable frequency (ACV3F), I.G.B.T converter/inverter drives.
   1. Design unit to limit current, suppress noise, and prevent transient voltage feedback into building power supply. Provide internal heat sink cooing fans for the power drive portion of the converter panels. Conform to IEEE standards 519-1992 for line harmonics and switching noise.
   2. Isolate unit to minimize noise and vibration transmission. Provide isolation transformers, filter networks, and choke inductors.
   3. Suppress solid-state converter noises, radio frequency interference, and eliminate regenerative transients induced into the mainline feeders or the building

standby power generator.

4. Supplemental direct-current power for the operation of hoist machine brake, door operator, dispatch processor, signal fixtures, etc., from separate static power supply.
5. ACV3F Drive shall be regenerative and utilize IGBT converter/inverter and dynamic braking during overhauling condition.

C. Encoder: Direct drive, solid-state, digital type. Update car position at each floor and automatically restore after power loss.

D. Controller: UL/CSA labeled.
1. Compartment: Securely mount all assemblies, power supplies, chassis switches, relays, etc., on a substantial, self-supporting steel frame. Completely enclose equipment with covers. Provide means to prevent overheating.
2. Relay Design: Magnet operated with contacts of design and material to insure maximum conductivity, long life and reliable operation without overheating or excessive wear. Provide wiping action and means to prevent sticking due to fusion. Contacts carrying high inductive currents shall be provided with arc deflectors or suppressors.
3. Microprocessor-Related Hardware:
4. Provide built-in noise suppression devices which provide a high level of noise immunity on all solid-state hardware and devices.
   a. Provide power supplies with noise suppression devices.
   b. Isolate inputs from external devices (such as pushbuttons) with opto-isolation modules.
   c. Design control circuits with one (1) leg of power supply grounded.
   d. Safety circuits shall not be affected by accidental grounding of any part of the system.
   e. System shall automatically restart when power is restored.
   f. System memory shall be retained in the event of power failure or disturbance.
   g. Equipment shall be provided with Electro Magnetic Interference (EMI) shielding within FCC guidelines.
5. Wiring: CSA labeled copper for factory wiring. Neatly route all wiring interconnections and securely attach wiring connections to studs or terminals.
6. Permanently mark components (relays, fuses, PC boards, etc.) with symbols shown on wiring diagrams.
7. Provide controller or machine mounted auxiliary, lockable “open,” disconnect if mainline disconnect is not in sight of controller and/or machine.

2.5 HOISTWAY EQUIPMENT

A. Gearless Traction Hoist Machine:
1. The machine shall be of the gearless traction type with the traction sheave and brake drum mounted directly on the motor shaft. The machine shall be provided with a steel bedplate. Sound isolation pads shall be installed beneath the machine bed plate to reduce vibration and noise transmission to the building

structure.

2. The motor shall be designed for elevator service with high starting torque and low starting current and be provided with devices to protect against overloading. The motor shall be of alternating current, synchronous type with permanent magnet technology.
3. The brake shall be spring applied and electrically released and designed to hold the car at the floor after it has come to rest.
4. Sheaves: Machined grooves and sealed bearings. Provide mounting means to machine beams, machine bedplate, car and counterweight structural members, or building structure.

B. Geared Traction Hoist Machine (E5 Only):
1. The machine shall be of the geared traction type with a worm and gear-type reduction unit with motor, disc brake assembly and drive sheave mounted on a sound-isolated bedplate.
2. Provide means to arrest unintended motion or an over speeding ascending condition.
3. Provide a digital encoder, directly coupled to the hoist motor, for closed-loop velocity feedback.
4. Hoist machine installations that require block outs through machine room floor for other than hoist ropes shall be provided with a 14-gauge galvanized sheet metal enclosure over entire block out on underside of floor slab.

C. Machine and Equipment Support Beams:
1. Provide structural steel beams required for direct support of and attachment to building structure of hoist machine, deflector sheaves, overhead sheaves, governor, and hoist rope dead-end hitch assemblies.
2. Provide bearing plates, anchors, shelf angles, blocking, embedment, etc., for support and fastening of machine beams or equipment to the building structure.
3. Isolate machine and overhead sheave beams to prevent noise and vibration transmission to building structure.

D. Governor: Centrifugal-type, car driven machine room mounted with pull-through jaws and bi-directional shutdown switches. Provide required bracketing and supports for attachment to building structure.

E. Ascending Car Overspeed Protection Device: Provide a means to prevent an ascending elevator from striking the hoistway overhead structure. The device shall decelerate the elevator by applying the emergency brake. The device shall detect an ascending car overspeed of not greater than 10 percent higher than the speed that the governor is set to trip. The device, when activated, shall prevent operation of the elevator until the device has been manually reset.

F. Unintended Car Movement Protection Device: Provide a means to prevent unintended car movement away from the landing when the hoistway door is not in the closed and locked position. The device shall prevent movement of the elevator in the event of failure of the brake, coupling, shaft, control system or any other component upon which

the movement of the elevator is depend upon. The device, when activated, shall prevent operation of the elevator until the device has been manually reset.

G. Noise/Vibration Isolation: All elevator equipment including their supports and fastenings to building, shall be mechanically and electrically isolated from the building structure and main line power feeders to minimize objectionable noise and vibration transmission to car, building structure, or adjacent occupied areas of building.

H. Guide Rails: Planed steel T-sections for car and counterweight of suitable size and weight for the application, including brackets for attachment to building structure. Provide rail backing and intermediate counterweight tie brackets to meet Code requirements. No additional structural points of rail attachment, other than those shown on the Contract Documents, will be provided.

I. Buffers, Car and Counterweight: Oil type with blocking and support channels. Provide switch on buffer to limit car speed if buffer is compressed.

J. Counterweight: Steel frame with metal filler weights.

K. Counterweight Guide Shoes: Spring dampened roller guide shoes.

L. Counterweight Guard: Metal guard in pit.

M. Governor Rope and Encoder Tape Tensioning Sheaves: Mount sheaves and support frame on pit floor or guide rail. Provide frame with guides or pivot point to enable free vertical movement and proper tension of rope and tape.

N. Hoist and Governor Ropes:
   1. Polyurethane coated belts with high-tensile-grade, zinc-plated steel cords. Provide belts with not less than a FT-1 rating when tested to the vertical burn test requirements of UL62.
   2. 8 x 19 or 8 x 25 Seale construction, traction steel type. Fasten with staggered length, adjustable, spring isolated wedge type shackles.
   3. Governor rope to suit manufacturer’s specification.

O. Compensation: if required. Pit mounted guide assembly shall provide quiet, effective restraint without excessive wear of components. Inhibit rubbing or chafing against hoistway or equipment within hoistway or pit. Application must meet performance/noise level requirements.

P. Terminal Stopping: Provide normal and final devices. Provide emergency terminal speed limiting devices.

Q. Electrical Wiring and Wiring Connections:
   1. Conductors and Connections: Copper throughout with individual wires coded and connections on identified studs or terminal blocks. Use no splices or similar connections in wiring except at terminal blocks, control compartments, or junction boxes. Provide 10 percent spare conductors throughout. Run spare wires from car connection points to individual elevator controllers in the machine room.

Provide four (4) pairs of spare shielded communication wires in addition to those required to connect specified items. Tag spares in machine room.

2. Conduit: Painted or galvanized steel conduit, EMT or duct. Conduit size, ½ inch. Flexible heavy-duty service cord may be used between fixed car wiring and car door switches for door protective devices.
3. Traveling Cables: Flame and moisture-resistant outer cover. Prevent traveling cable from rubbing or chafing against hoistway or equipment within hoistway. Provide all wiring for card reader. Provide necessary wiring for CCTV.
4. Auxiliary Wiring: Connect fire alarm initiating devices, emergency two-way communication system, firefighters' phone, paging speaker, CCTV, card reader, intercom, and announcement speaker in each car controller in machine room.

R. Entrance Equipment:
1. Door Hangers: Two-point hanger roller with neoprene roller surface and suspension with eccentric upthrust roller adjustment.
2. Door Tracks: Bar or formed, cold-drawn removable steel tracks with smooth roller contact surface.
3. Door Interlocks: Operable without retiring cam. Paint interlock box flat black.
4. Door Closers: Spring, spirator or jamb/strut mounted counterweight type. Design and adjust to insure smooth, quiet mechanical close of doors.
5. Hoistway Door Unlocking Device: Provide unlocking device with escutcheon in door panel at all floors, with finish to match adjacent surface.
6. Hoistway Access Switches: Mount in wall entrance frame side jamb or sight guard at top and bottom floors. Provide switch with or without faceplate.

S. Floor Numbers: Stencil paint 4 inches high floor designations in contrasting color on inside face of hoistway doors or hoistway fascia in location visible from within car.

2.6 HOISTWAY ENTRANCES

A. Complete entrances bearing fire labels from a nationally recognized testing laboratory approved within the governing jurisdiction. Finish as shown on the architectural drawings and as described in outline above.

B. Frames: Finish as shown on the architectural drawings and as described in outline above.

C. 14 gauge hollow metal at all floors. Bolted and lapped head to jamb assembly at all floors. Provide Arabic floor designation/Braille plates, centered at 60 inches above finished floor, on both side jambs of all entrances. Provide plates at main egress landing with "Star" designation. For designated emergency car, provide "Star of Life" designation plates at height of 78 inches – 84 inches above finished floor on both side jambs at all floors. Braille indications shall be below Arabic floor designation. Provide cast floor designation/Braille plates as manufactured by SCS, Vision Mark or Entrada.

D. Door Panels: Finish as shown on the architectural drawings and as described in outline above.16 gauge steel, sandwich construction without binder angles. Provide a minimum of two (2) gibs per panel, one (1) at leading and one (1) at trailing edge with

gibs in the sill groove entire length of door travel. Construct door panels with interlocking, stiffening ribs.

E. Vertical Bi-Passing Freight Door Panels (E5 Only): 14-gauge formed steel plates welded into frame angles. Provide with safety astragals, vision panels and reinforced truckable sills. Provide pass type doors where required.
   1. Provide vision panel in each upper panel, 4’ wide by 10” high covered with metal plate completely perforated with ¾” diameter holes on 1” centers.
   2. Provide steel angles welded to top of each lower panel to meet adjacent floor surface to transfer load onto adjacent landing when door is fully opened and truckable sill is level with floor.
   3. 14-gauge furniture steel with Manufacturer's standard finish.

F. Sight Guards: Finish as shown on the architectural drawings and as described in outline above.14 gauge, same material and finish as hoistway entrance door panels. Construct without sharp edges.

G. Sills: Provide aluminum sills at each landing and on car.

H. Sill Supports: Structural or formed steel designed to support door sill based upon car loading classification. Mount to eliminate need for grout under the sill.

I. Fascia, Toe Guards and Hanger Covers: 14 gauge furniture steel with Contractor’s standard finish. Provide full height fascia, toe guards, and hangar covers where rear entrances are not provided.

J. Struts and Headers: Provide for vertical support of entrances and related material. Provide door open bumpers on entrances equipped with vertical struts.

2.7 CAR EQUIPMENT

A. Frame: Welded or bolted, rolled or formed steel channel construction to meet load classification specified.

B. Safety Device: Type “B,” flexible guide clamp.

C. Platform: Isolated type, constructed of steel, or steel and wood which is fireproofed on underside. Design and construct to accommodate Class A load classification requirements for the passenger and passenger/service elevators.

D. Platform Apron: Minimum 14 gauge steel, reinforced and braced to car platform front and rear with Contractor’s standard finish.

E. Guide Shoes: Roller type with three (3) or more spring dampened, sound-deadening rollers per shoe. Maximum roller rotation speed, 350 r.p.m.

F. Door Equipment:
   1. Door Hangers: Two-point hanger roller with neoprene roller surface and

suspension with eccentric upthrust roller adjustment.
2. Door Track: Bar or formed, cold-drawn removable steel track with smooth roller contact surface.
3. Door Header: Construct of minimum 12 gauge steel, shape to provide stiffening flanges.
4. Door Electrical Contact: Prohibit car operation unless car door is closed.
5. Door Clutch: Heavy-duty clutch, linkage arms, drive blocks and pickup rollers or cams to provide positive, smooth, quiet door operation. Design clutch so car doors can be closed, while hoistway doors remain open.
6. Restricted Opening Device: Restrict opening of car doors outside unlocking zone.

G. Door Operator: High speed, heavy-duty door operator capable of opening doors at no less than 2-1/2 f.p.s.. Accomplish reversal in no more than 2-1/2 inches of door movement. Provide solid-state door control with closed loop circuitry to constantly monitor and automatically adjust door operation based upon velocity, position, and motor current. Maintain consistent, smooth and quiet door operation at all floors, regardless of door weight or varying air pressure.

H. Door Control Device:
1. Infrared Reopening Device: Black, fully enclosed device with full screen infrared matrix or multiple beams extending vertically along leading edge of each door panel to minimum height of 7 foot 0 inch above finished floor. Provide extension of housing and lens additional beams full height of door panels. Device shall prevent doors from closing and reverse doors at normal opening speed if beams are obstructed while doors are closing, except during nudging operation. In event of device failure, provide for automatic shutdown of car at floor level with doors open
2. Nudging Operation: After beams of door control device are obstructed for a predetermined time interval (minimum 20.0 - 25.0 seconds), warning signal shall sound and doors shall attempt to close with a maximum of 2.5 foot pounds kinetic energy. Activation of the door open button shall override nudging operation and reopen doors.
3. Interrupted Beam Time: When beams are interrupted during initial door opening, hold door open a minimum of 3.0 seconds. When beams are interrupted after the initial 3.0 second hold open time, reduce time doors remain open to an adjustable time of approximately 1.0 - 1.5 seconds after beams are reestablished.
4. Differential Door Time: Provide separately adjustable timers to vary time that doors remain open after stopping in response to calls.
   a. Car Call: Hold open time adjustable between 3.0 and 5.0 seconds.
   b. Hall Call: Hold open time adjustable between 5.0 and 7.0 seconds. Use hall call time when car responds to coincidental calls.

I. Car Operating Panels
1. Provide car operating panels containing operating fixtures mounted to the return panels.
2. Suitably identify floor buttons, alarm button, door open button, door close button and emergency push-to-call button with SCS, Visionmark or Entrada cast tactile

symbols flush mounted.

3. Provide minimum ¾ inches diameter raised floor pushbuttons with illuminated collar to indicate call registration.
4. Provide alarm button to ring bell located on car, and sound distress signal at control panel. Provide for button to illuminate when actuated.
5. Provide keyed stop switch. Arrange switch to sound main control panel distress signal when actuated. Mark device to indicate "run" and "stop" positions.
6. Provide “door open” button to stop and reopen doors or hold doors in open position.
7. Provide “door close” button to activate door close cycle. Cycle shall not begin until normal door dwell time for a car or hall call has expired, except firefighters’ operation.
8. Provide Firefighters jewel.
9. Provide lockable firefighters’ panel:
    a. Phase II key switch
    b. Engraved firefighter’s operating instructions backfilled red
    c. Buzzer
    d. Call cancel button
10. Provide a lockable service panel. Include the following controls with function and operating positions identified by permanent signage or engraved legend within the service panel:
    a. Inspection switch
    b. Light switch
    c. Three-position exhaust blower switch
    d. Independent service switch
    e. Constant pressure test button for battery pack emergency lighting
    f. 120-volt, AC, GFCI protected electrical convenience outlet
    g. Stop switch
    h. Car lighting dimmer switch
11. Provide black paint filled (except as noted), engraved or approved etched signage as follows with approved size and font:
    a. Elevator number
    b. Car capacity (in pounds)
    c. Any other required notices
12. Provide provisions for card readers
13. Provide for flush mounted certificate frame properly sized & oriented for District

of Columbia Elevator Permit

J. Voice Announcements
   1. Provide a digital in-elevator announcing system which shall be activated by:
      a. Car arrival at a floor.
      b. Car going up or going down.
      c. Initiation of the following services:
         1) Fire Evacuation
         2) Firefighter's Service
         3) Overload
         4) Security Service
         5) Alarm Push Button

K. Car Top Control Station: Mount to provide safe access and utilization while standing in an upright position on car top.

L. Work Light and Duplex Plug Receptacle: GFCI protected outlet at top and bottom of car. Include on/off switch and lamp guard. Provide additional GFCI protected outlet on car top for installation of CCTV.

M. Communication System:
   1. Provide an ABAAS (Architectural Barriers Accessibility Act Standards) compliant “Push to Call,” two-way communication instrument in car with automatic dialing, tracking and recall features with shielded wiring to car controller in machine room. Provide dialer with automatic rollover capability.
      a. “Push to Call” button or adjacent light jewel shall illuminate and flash when call is acknowledged. Button shall match car operating panel pushbutton design. Provide uppercase "PUSH TO CALL," "HELP ON THE WAY" engraved signage adjacent to button.
      b. Provide “Push to Call” button tactile symbol, engraved signage, and Braille adjacent to button mounted integral with car front return panel.
   2. Firefighters’ telephone in car and firefighters’ panel, with all required shielded wires to machine room junction box.
   3. Install remote speakers provided in car canopy with drilled speaker pattern, with shielded wiring to machine room junction box. Provide all wiring necessary.
   4. Provide two-way communication between car and machine room and wiring as required.

2.8 CAR ENCLOSURES

A. Finish as shown on the architectural drawings and as described in outline above. Provide the following features.

B. Shell: Reinforced 14-gauge furniture steel formed panels with baked enamel interior

finish as selected. Apply sound-deadening mastic to exterior.

C. Interior wall finish: See architectural drawings

D. Canopy: Reinforced 12-gauge furniture steel formed panels with lockable, hinged emergency exit. Interior finish white reflective baked enamel.

E. Front Return Panels: Provide stainless steel satin #4 finishes. Reinforced 14 gauge with integral car operating panels and other equipment. Provide service compartment with recessed flush cover and cutouts for operating switches, etc. See architectural drawings.

F. Entrance Columns: Reinforced 14 gauge. See architectural drawings.

G. Transom: Provide stainless steel satin #4 finishes reinforced 14 gauge full width of enclosure. See architectural drawings.

H. Car Door Panels: Provide stainless steel satin #4 finishes. Reinforced minimum16 gauge. Architectural metal cladding shall wrap around leading and trailing edge of panel and return a minimum of ½ inch on rear side of leading edge of panel. See architectural drawings.

I. Base: with concealed ventilation cutouts. See architectural drawings.

J. Ventilation: Two-speed exhaust fan mounted to car canopy on isolated rubber grommets. Exhaust fan shall meet requirements of Item 2.03, H.

K. Lighting: Coordinate with emergency lighting requirements. Provide emergency lighting integral with portion of normal car lighting system. Include required transformer. See architectural drawings.

L. Suspended Ceiling: See architectural drawings.

M. Finish Floor Covering: See architectural drawings.

N. Sills: One (1) piece extrusion with extruded extension between car entrance columns to face of car front return. Extruded extension to match finish of sill. See architectural drawings.

O. Pads and Buttons or Hooks: Provide buttons and pads for each type of elevator in group. Provide pads with cutouts to access main car operating panel.

2.9 HALL CONTROL STATIONS

A. Pushbuttons: Provide hall control stations with up and down buttons at each level. Locate as necessary for ABAAS (Architectural Barriers Accessibility Act Standards) compliance. Provide approved engraved message and pictorial representation

prohibiting use of elevator during fire or other emergency situation as part of faceplate.

B. Provide a main landing fixture to incorporate firefighter's jewel, Phase I keyswitch, communication failure jewel, communication failure buzzer, communication failure override keyswitch, and all device operating instructions engrave and backfilled in black or red as required by code.

2.10 SIGNALS

A. Car Position Indicators: Provide the following features. Provide in each car operating panel. Integrate into the new control system alpha-numeric digital indicator containing floor designations and direction arrows a minimum of 2 inches high to indicate floor served and direction of car travel. When a car leaves or passes a floor, illuminate indication representing position of car in hoistway. Illuminate proper direction arrow to indicate direction of travel.

B. Floor Passing Tone: Provide an adjustable audible tone of 5-20 decibels and frequency of no higher than 1500 Hz, to sound as the car passes or stops at a floor served.

C. Hall Lanterns: Provide the following features. Integrate with the new control system to indicate travel direction. Illuminate up or down LED lights and sound tone once for up and twice for down direction as car arrives at floor. Sound level shall be adjustable from 20 - 80 dBA measured at 5 foot 0 inch in front of entrance and 3 foot 0 inch off floor. Illuminate light until the car doors start to close.

2.11 GROUP CONTROL AND DISPLAY PANELs

A. Firefighters' Control Panel: Locate in the fire control room. Fixture faceplate, stainless steel satin finish, including the following features;
   1. Car position and direction indicator (digital-readout or display type). Identify each position indicator with car number and group identification.
   2. Indicator showing operating status of car.
   3. Manual car standby power selection switches and power status indicators.
   4. Two-position firefighters' emergency return switches and indicators with engraved instructions filled red.
   5. Firefighters' telephone as required by code.
   6. Any other required communication devices required by code.
   7. Identify all indicators and manual switches with appropriate engraving.

B. Firefighters' Key Box: Flush-mounted box with lockable hinged cover. Engrave instructions for use on cover per Local Fire Authority requirements.

C. Communication Failure Detection: Provide means to detect and report a failure telephone and or communication lines to the elevators emergency telephones. Provide a jewel and audible alert in the main landing hall fixture with a keyed manual override for the audible alert.

D. Security Desk Control Panel: Provide new a control panel and monitor with the

capability to activate, display, monitor, or control at a minimum the following functions.

1. Touchpad to activate calls.
2. On/off means to place car in or out of service. When placed in “off” position, return car(s) nonstop to designated floor and park with door(s) open for adjustable period of 1 to 3 minutes. At expiration of time, restore car to service.
3. Car operating on normal/standby power.
4. Car position and direction of travel.
5. Car calls.
6. Hall calls.
7. Operating mode.
8. Door status.
9. Delayed car.
10. Load weighing and by-pass.
11. Car in/or out of service.
12. Alarm distress signal.

PART 3 - EXECUTION

3.1 SITE CONDITION INSPECTION

A. Prior to beginning installation of equipment, examine hoistway and machine room areas. Verify that no irregularities exist that affect execution of work specified.

B. Do not proceed with installation until work in place conforms to project requirements.

3.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver material in Contractor’s original, unopened protective packaging.

B. Store material in original protective packaging. Prevent soiling, physical damage, or moisture damage.

C. Protect equipment and exposed finishes from damage and stains during transportation, erection, and construction.

3.3 INSTALLATION

A. Install all equipment in accordance with Contractor’s instructions, referenced Codes, specification and approved submittals.

B. Install machine room equipment with clearances in accordance with referenced Codes and specification.

C. Install all equipment so it may be easily removed for maintenance and repair.

D. Install all equipment for ease of maintenance.

E. Install all equipment to afford maximum accessibility, safety, and continuity of

operation.

F. Remove oil, grease, scale, and other foreign matter from the following equipment and apply one (1) coat of field-applied machinery enamel.
   1. All exposed equipment and metal work installed as part of this work which does not have architectural finish.
   2. Machine room equipment, hoistway equipment including guide rails, guide rail brackets, and pit equipment.
   3. Neatly touch up damaged factory-painted surfaces with original paint color. Protect machine-finish surfaces against corrosion.

3.4 FIELD QUALITY CONTROL

A. Work at jobsite will be checked during course of installation. Full cooperation with reviewing personnel is mandatory. Accomplish corrective work required prior to performing further installation.

B. Have Code Authority acceptance inspection performed and complete corrective work.

3.5 ADJUSTMENTS

A. Install rails plumb and align vertically with tolerance of 1/16 inch in 100 feet 0 inch. Secure joints without gaps and file any irregularities to a smooth surface.

B. Static balance car to equalize pressure of guide shoes on guide rails.

C. Lubricate all equipment in accordance with Contractor’s instructions.

D. Adjust motors, power conversion units, brakes, controllers, leveling switches, limit switches, stopping switches, door operators, interlocks, and safety devices to achieve required performance levels.

3.6 CLEANUP

A. Keep work areas orderly and free from debris during progress of project. Remove packaging materials on a daily basis.

B. Remove all loose materials and filings resulting from work.

C. Clean machine room equipment and floor.

D. Clean hoistways, car, car enclosure, entrances, operating and signal fixtures.

3.7 ACCEPTANCE REVIEW AND TESTS

A. Consultants review shall be performed after the Governing Authority acceptance reviews and in accordance with the following.

B. Review procedure shall apply for individual elevators, portions of groups of elevators

and completed groups of elevators accepted on an interim basis or elevators and groups of elevators completed, accepted, and placed into operation.

C. Contractor shall perform review and evaluation of all aspects of its work prior to requesting Consultant's final review. Work shall be considered ready for Consultant's final contract compliance review when copies of Contractor's test and review sheets are available for Consultant's review and all elements of work or a designated portion thereof are in place and elevator or groups of elevators are deemed ready for service as intended.

D. Furnish labor, materials, and equipment necessary for Consultant’s review. Notify Consultant a minimum of five (5) working days in advance when ready for final review of elevator or group.

E. Consultant’s written list of observed deficiencies of materials, equipment and operating systems will be submitted to Contractor for corrective action. Consultant’s review shall include as a minimum:
   1. Workmanship and equipment compliance with Contract Documents.
   2. Contract speed, capacity, floor-to-floor, and door performance comply with Contract Documents.
   3. Performance of following is satisfactory:
      a. Starting, accelerating, running
      b. Decelerating, stopping accuracy
      c. Door operation and closing force
      d. Equipment noise levels
      e. Signal fixture utility
      f. Overall ride quality
      g. Performance of door control devices
      h. Operations of emergency two-way communication device
      i. Operations of firefighters' service
      j. Operations of floor lock-off provisions
      k. Operations of remote monitoring devices
      l. Operations of emergency brake device
   4. Test Results:
      a. In all test conditions, obtain specified contract speed, performance times, stopping accuracy without re-leveling, and ride quality to satisfaction of Owner and Consultant. Tests shall be conducted under both no load and full load condition.
      b. Temperature rise in motor windings limited to 50° Celsius above ambient. A full-capacity, one (1) hour running test, stopping at each floor for ten (10) seconds in up and down directions, may be required.

F. Performance Guarantee: Should Consultant’s review identify defects, poor workmanship, variance or noncompliance with requirements of specified Codes and/or ordinances, or variance or noncompliance with the requirements of Contract Documents, Contractor shall complete corrective work in an expedient manner to satisfaction of Owner and Consultant at no cost as follows;
   1. Replace equipment that does not meet Code or Contract Document

requirements.

2. Perform work and furnish labor, materials, and equipment necessary to meet specified operation and performance.
3. Perform retesting required by Governing Code Authority, Owner and Consultant.

G. A follow-up final contract compliance review shall be performed by Consultant after notification by Contractor that all deficiencies have been corrected. Provide Consultant with copies of the initial deficiency report marked to indicate items which Contractor considers complete. If additional reviews are required due to Contractor's gross non-compliance with initial and follow-up deficiency reports, consultant shall bill Contractor at normal billing rates plus expenses, and Contractor acknowledges it will pay for additional compliance reviews.

3.8 OWNER'S INFORMATION

A. Provide three (3) sets of neatly bound written information necessary for proper maintenance and adjustment of equipment within 30 days following final acceptance. Additionally, provide one (1) digital copy for inclusion in the facility manual. Final retention will be withheld until data is received by Owner and reviewed by Consultant. Include the following as minimums:

B. Straight-line wiring diagrams of "as-installed" elevator circuits, with index of location and function of components. Provide one (1) set reproducible master. Mount one (1) set wiring diagrams on panels, racked, or similarly protected, in elevator machine room. Provide remaining set rolled and in a protective drawing tube. Maintain all drawing sets with addition of all subsequent changes. These diagrams are Owner's property.

C. Lubrication instructions, including recommended grade of lubricants.

D. Parts catalogs for all replaceable parts including ordering forms and instructions.

E. Four (4) sets of keys for all switches and control features properly tagged and marked.

F. Diagnostic equipment complete with access codes, adjusters manuals and set-up manuals for adjustment, diagnosis and troubleshooting of elevator system, and performance of routine safety tests.

END OF SECTION

SECTION 149200 - PNEUMATIC TUBE SYSTEM – 6 INCH

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. System supplier shall provide all engineering, equipment, materials and labor for a complete six-inch (6") automated computer-controlled pneumatic tube system. This build will be for the Indian Health Services Whiteriver Hospital in Whiteriver AZ.

B. Provide all equipment for a new stand-alone 6” pneumatic tube system to be installed in the Whiteriver Hospital campus.

C. All work shall be completed in a workmanlike manner, complete in all respects including all items specified herein and as may be necessary for the satisfactory installation and operation of the specified system.

D. The Contractor shall install, test, and warrant the system operation and performance.

E. While the specification documents describe the design criteria and the general system/facility criteria, the System Supplier is encouraged to suggest innovative improvements that the System Supplier considers to be in the best interests of the project. Improvement suggestions do not alleviate the System Supplier from bidding to the base specification(s) outlined in this document. All improvements or deviations are to be properly documented as alternatives to the base bid. The specification documents consist of these specifications and system drawings. The System Supplier is responsible to field verify all dimensions and requirements of the project.

1.2 RELATED DOCUMENTS

A. Drawings and provisions of the Contract, including General and Supplemental Conditions apply to this section.

1.3 RELATED PUBLICATIONS

A. The Pneumatic tube system shall comply with the requisite standards both locally and nationally for the installation of the equipment. The standards shall include all amendments, addenda and errata. Some of these basic standard sections include:
   1. National Fire Protection Association (NFPA)
      a. NFPA 70
   2. ASTM International
      a. ASTM A123/A123M
   3. National Electrical Manufacturers Association (NEMA)
      a. MG 1 Motors and Generators

1.4 QUALITY ASSURANCE

A. All work shall be completed in a workmanlike manner, complete in all respects including all items specified herein and as may be necessary for the satisfactory installation and operation of the specified system.

B. All equipment shall be furnished by an approved system manufacturer. Approved system manufactures include:
   1. Pevco
   2. Swisslog TransLogic Pneumatic Tube Systems
   3. Atreo Group / Aerocom

C. The equipment manufacturer shall at the time of bid, manufacture and warrant the computer-controlled pneumatic tube systems as one of their principle products.
D. The System Supplier shall regularly and presently install and warrant the computer-controlled material distribution equipment as specified herein as one of their principle products.
E. A system supplier may purchase equipment from an approved equipment manufacturer if the system supplier and manufacturer are approved by the Owner. The system supplier will be responsible for the items in this specification, including the design, layout, installation, coordination, and warranty of the equipment and associated equipment service requirements. The system supplier must have a quality assurance program in place, demonstrable to the Owner.
F. The system supplier must demonstrate a minimum of five (5) years installation experience of the approved system manufacture's equipment.
G. The System Supplier shall be fully responsible to work with the Owner, Architect, General Contractor and appointed representatives to adequately coordinate space and mechanical requirements.
H. The pneumatic tube system is a performance-based design and specification. The bid drawings show general station locations and horizontal and vertical pathways for the system. It is the responsibility of the vendor to coordinate all tube routes and equipment placement and access.
I. Equipment and parts that have been discontinued by the system manufacturer at the time of installation shall not be utilized for this project. The System Supplier shall ensure that the parts and equipment will be available for the system a minimum of ten (10) years following the system acceptance.
J. All system software and control capabilities offered must be fully developed and functioning successfully in a minimum of (10) other facilities at the time of bid. It is the responsibility of the System Supplier to install a previous software version if persistent software problems are realized during installation and first twelve (12) months of the system use.
K. All electrical equipment, equipment assemblies and components shall be listed with Underwriter's Laboratory (UL) and all field wiring shall be in conformance with NEC requirements. UL listing must be current at the time of bid.
L. Building Information Modeling (BIM)
    1. System design shall include BIM to design, produce, coordinate, construct and document the pneumatic tube system and components.
    2. The deliverable Model shall be developed to include the system as it would be built and the processes of installing it, and to reflect final as-built conditions.
    3. The coordination of BIM may be done in phases (floor by floor, area by area) at the completion of coordination, a complete set of drawings for the system shall be provided.
    4. Coordinate equipment with other trades. Utilize the BIM model to perform visual, interference management, and other checks to ensure the proper coordination and access requirements for the system.
    5. Design coordination meetings to coordinate the model will be required.
M. A spare part inventory allowance of fifteen-thousand dollars ($15,000) shall be provided upon the Purchaser acceptance of the system. The supplier shall recommend

a spare parts list that includes the unit prices and estimated delivery times. The owner shall approve the spare parts list prior to delivery of the spare parts.

1.5 SUBMITTALS

A. The System Supplier shall submit product data and unit pricing for the system. Each component is considered complete including valves, control panels, motors, boards etc. The equipment required include:
   1. Stations
   2. Transfer Units / Diverters (1x4, and 1x6)
   3. Blower Units
   4. Straight tube per linear foot
   5. Bends
   6. Hanging material by linear foot (Including rods and clamps)
   7. Low voltage communication wiring per linear foot
   8. Leak-Resistant carriers
   9. Remote Personal Indicators

B. Provide at the time of tender with the proposal references of at least five (5) projects in the past five (5) years. Each reference shall include names and phone numbers of contacts.

C. If required in order to provide on overall system for the campus, include with the proposal the cost to convert the existing equipment to the system supplier's control system.

D. Product Data
   1. Provide the manufacturer's marked literature showing illustrations, technical data and description of equipment to be furnished.
   2. Submit all physical characteristics of the proposed equipment are to be submitted. These include the critical dimensions related to length, width and height, capacity, and clearances. Suppliers are advised to respond in as much technical detail as possible. Submissions shall contain a supplier developed plan view, and elevations.

E. System Simulation
   1. System Simulations shall be provided by the system supplier and approved by the owner/owner representative prior to beginning of detailed system BIM coordination with the contractor. The system supplier and contractor are responsible for any rework associated with design efforts without owner's review/approval of the System Simulation.
   2. Provide system design drawings that includes all distances utilized for the system simulation. A simulation will not be accepted without the design drawings and riser diagram updated to match the simulation inputs.
   3. The system supplier shall provide a system design simulation for the 6" system with the estimated peak hour traffic of seventy-two (72) transactions and ninety-five percent of transactions, sixty-eight (68) transactions, shall have a wait time less than 120 seconds. The simulation shall indicate the following information regarding the system performance:
      a. The average wait time for each station during the peak hour.
      b. The maximum wait time for each station during the peak hour.

c. The number of transactions that have wait times over 30, 60, 90 and 120 seconds.

4. The system supplier shall provide a system design simulation for the 6” system estimated peak day traffic of seven-hundred and thirty-six (736) transactions. The simulation shall indicate the following information regarding the system performance:
   a. The average wait time for each station during the peak day.
   b. The maximum wait time for each station during the peak day.
   c. The number of transactions that have wait times over 30, 60, 90 and 120 seconds.

F. Shop Drawings
1. Shop drawings are to include plan views and sections of all major components. Shop drawings shall show tube routings on architectural floor plans, tubing riser diagrams, electrical riser diagrams, right-of-way, methods of suspending and anchoring tubing and equipment, station details, equipment locations and detailed dimensions of all major components.
2. A set of coordination documents shall be provided to coordinate equipment access requirements, mechanical, electrical, structural and other details with other trades. Details should provide sufficient detail to coordinate the requirements of the system. The coordination drawings should be coordinated to provide sufficient access and space requirements for the system as installed. It is the responsibility of the System Supplier to coordinate the space and access requirements to properly maintain and access the equipment.

G. Installation Schedule
1. The system upgrade shall be installed to minimize downtime of other systems. Phasing plans and schedules shall be provided by the Contractor and approved by the Owner.
2. Submit any deviation to the phasing plan and schedule in writing to the Owner for approval.

H. Test Plan
1. Equipment Testing
   a. Provide a test plan that clearly defines the forms or documents that will be utilized to test the equipment as described in this document.

I. Service Agreement
1. Provide a service agreement proposal for the Owner to review. The service contract must include the items outlined in section 1.9.A.

1.6 PERFORMANCE TESTING

A. Provide a test plan that demonstrates to the Purchaser or Representative of the Purchaser that the system can handle the peak load as described in the peak hour matrix.
B. The test plan shall clearly identify the process, time, and number of hospital staff to perform the peak load test.
C. The test plan shall include forms and documents required to carry out the test plan by individual stations.

1.7 PRODUCT MANUALS

A. User Manuals
   1. Provide a read-only electronic version of the user operating manuals. The user operating manuals shall describe the operation of each type of station, carrier packing guidelines, and special use for the system including STAT transactions and secure transactions. Each manual shall be in easy-to-read format including pictures and diagrams demonstrating the system use.

B. Maintenance Manuals
   1. Provide a read-only electronic version on a CD of the complete system maintenance instructions for the system. The maintenance manuals shall include detailed information sufficient for the purchaser to execute a full maintenance program for each piece of equipment including:
      a. Exploded views of each piece of equipment and parts descriptions
      b. Wiring and electrical diagrams
      c. Mechanical and Electrical riser diagrams
      d. Starting and stopping procedures
      e. Specific maintenance and troubleshooting instructions
      f. Recommended service schedules for adjustment, lubrication and inspection.
      g. Parts list and spare parts inventory
      h. Close-Out Submittals
   2. Provide as required by general conditions of the specification.
   3. Provide record drawings. If the drawings are an expansion of an existing system, the shop drawings shall be complete including existing and new equipment and components. A partial record drawing package is not acceptable.
   4. The System Supplier shall provide record shop drawings in AutoCAD or equal for instruction and future reference by the Purchaser.
   5. Provide full system mechanical and electrical record riser diagrams.
   6. Comprehensive Equipment Inventory List
   7. The System Supplier shall develop an equipment inventory that includes model number, serial number and specific location (e.g. room number) for each piece of equipment.
   8. Provide a list of recommended preventive maintenance for each piece of equipment.

C. Close-Out Submittals
   1. Provide as required by general conditions of the specification.
   2. Provide record drawing for the system in its entirety. The shop drawings shall be complete including existing and new equipment and components. A partial record drawing package is not acceptable.
   3. The System Supplier shall provide a record shop drawing in AutoCAD or equal for instruction and future reference by the Purchaser.
   4. Provide a full system mechanical and electrical record riser diagrams.
   5. Comprehensive Equipment Inventory List
   6. The System Supplier shall develop an equipment inventory that includes model number, serial number and specific location (e.g. room number) for each piece of equipment.

7. Provide a list of recommended preventative maintenance for each piece of equipment.

1.8 WARRANTY

A. The System Supplier shall guarantee all components to be free from defects in material and workmanship for a period of twenty-four (24) months. The System Supplier shall provide a limited warranty on the system software for a period of twenty-four (24) months.

B. System Warranty
   1. Upon notice of failure of parts or workmanship of the system, the System Supplier shall promptly rectify the faulty parts or workmanship at no cost to the Purchaser.
   2. Perform all system or equipment troubleshooting during the warranty period will be performed by the System Supplier. Provide sufficient manpower to fully troubleshoot the system. The Purchaser may choose to have a facility technician accompany the System Supplier; however, at no time should the Purchaser be obligated to provide man power or support in this troubleshooting process.
   3. Defective parts shall be replaced with new parts of equal or greater value free of charge to the Purchaser during the warranty period. Refurbished or obsolete equipment or parts are not acceptable. The Purchaser's spare part inventory should not be utilized without express written approval from the Purchaser. All defective equipment or parts that are pulled from the Purchaser's inventory shall be replaced with new parts from the System Supplier during the warranty period at no cost to the Purchaser.
   4. All labor associated with defective system troubleshooting, parts replacement and warranty related items shall be provided to the Purchaser at no cost.
   5. The warranty period shall commence on the date of signed acceptance of the system. If the system is installed in phases, the warranty period shall commence at the completion of the last phase of installation.
   6. The System Supplier is responsible for the system maintenance between the time of installation and the signed acceptance of the system. If the System Supplier and Purchaser agree to a phased startup, the warranty period begins at the end of the last phase of startup.

C. Software Limited Warranty
   1. The System Supplier will provide the customer with a 24-hour factory Helpdesk telephone number to report problems and to troubleshoot software. This Helpdesk support shall have the ability to promptly troubleshoot the system remotely.
   2. The software package at the time of Purchaser's acceptance shall be the most up to date software version with the latest update that has been tried and tested for a period of no less than 3 months.
   3. If the software fails to perform according to specifications, the vendor will provide support to help the customer bring the software to operational mode, either through an emergency software fix or through some bypass procedures.
   4. If the latest software version and update fail to meet the level of service required due to excessive system downtime or malfunction of equipment as a result of the

software, the Purchaser may request the vendor to install an earlier software version or update at the System Supplier's cost.

1.9 MAINTENANCE

A. Service Agreement
   1. In addition to the normal warranty service, a service agreement shall be provided for the preventative maintenance on the equipment. The service agreement shall extend for a period of twenty-four (24) months.
   2. During the warranty period, the System Supplier is responsible for the proper maintenance of the system.
   3. The schedule of all service and maintenance agreements on the system shall be coordinated with the purchaser.
   4. After the first ninety (90) days, the System Supplier shall perform as-needed repair services within twenty-four (24) hours after notification by the Purchaser(s), Monday through Friday between the hours of 8:00 A.M. through 5:00 P.M., excluding Holidays, at no additional cost to the Purchaser. If such services commence prior to 8:00 A.M., Monday through Friday, or extend beyond 5:00 P.M., no additional service charges can be applied to the Purchaser.
   5. Service Agreement includes
      a. System Supplier shall provide, whenever available or required, software support, which includes, applicable hardware/software corrections/fixes/updates, and remote configuration (reprograms).
      b. Quarterly inspection, cleaning and maintenance of all equipment.
      c. Both expendable and non-expendable parts shall be replaced without additional cost to Purchaser.
      d. The System Supplier shall maintain a service maintenance log for the system. The maintenance log shall remain on-site. Maintenance log is to be signed by System Supplier's Technician and reviewed with the Purchaser quarterly.
         1) Include a record of maintenance in accordance with the System Supplier's recommendations and provide other information as required by the facility to meet all licensing, accrediting and regulatory agency requirements.
         2) Clearly identify the equipment serviced by model number and serial number.
         3) Include an itemization and description of services performed, including electrical checks and calibration reading.
         4) List any parts replaced.
      e. Include the service date(s) and time(s).
      f. Give the name of the Service Technician who performed the service.

B. Service Agreement Personnel
   1. System Supplier’s Service Technicians are responsible to lead and coordinate the requirements of the service agreement. System Supplier’s Service Technician shall be available Monday through Friday, 8:00 A.M. to 5:00 P.M., excluding holidays, to act as a central point of contact with Purchaser's personnel.

2. System Supplier's Representative shall institute and maintain appropriate supervision of all persons providing services. System Supplier shall work independently on designated assignments in accordance to the service agreement.
3. System Supplier service personnel shall be appropriately licensed, certified, credentialed, or trained to perform the preventive maintenance services.
4. System Supplier shall assume the sole responsibility for the timely completion of all activities assigned or to be performed hereunder.
5. System Supplier shall assign a sufficient number of employees to perform the required work.
6. Identification Badges and Dress Code
   a. System Supplier's staff shall be appropriately identified as required by the Purchaser.

1.10 WORK INCLUDED

A. The contractor shall furnish and install all motor starters and drives with properly sized thermal overload protection in each at the blower packages.

B. All new equipment will be connected by Ethernet to the system control center utilizing the hospitals network. The vendor is required to coordinate the requirements of the hospital network and the network drops.

C. For remote indicators and other areas where serial low voltage cables are required, the vendor shall provide all serial low voltage communication wiring. Furnish, install and terminate all low-voltage plenum-rated control wire and equipment terminals required.
   1. Low-voltage communication wiring is to be securely tie-wrapped to the tube. Tie wraps should be installed at a minimum of every five (5) feet.
   2. In areas where the cable does not follow the tube route, the control wire must be properly installed in electrical conduit, building cable trays, or J-Hooks..
   3. Where the cable penetrates a fire-rated wall or floor, the penetrations must meet the applicable code requirements for fire penetrations. At a minimum, the control wiring shall be installed in conduit that extends six-inches (6") on either side of the rated wall or floor and fire caulking applied to the ends of the conduit and the penetration through the wall or floor.
   4. The Contractor shall provide all junction boxes required for the installation of remote indicators.

D. The system electronics shall not interfere with telemetry equipment.

E. The tube routing and equipment placement shall be properly designed and coordinated through the shop drawings to avoid placement over patient care areas. In areas where installation over patient care areas is unavoidable, the Contractor shall install sound insulation on the tubes and architectural sound attenuation boxes around the equipment that are over patient areas. The sound insulation should extend a minimum of six feet (6'-0") on either side of the patient care area. The Contractor is to submit all sound attenuation measures and insulation cut sheets to the Owner for approval. Insulation shall be a minimum of one and one-half inch (1-1/2") thick layer of one and one-half (1-1/2") pcf density fiberglass insulation with a dust cover and taped joints over the tubing or equivalent.

F. Coordinate the temperature and humidity requirements at the computer control area.

1.11 WORK PROVIDED BY OTHERS

A. Architectural enclosures of the equipment and new stations.
B. Final painting of tubing or other unfinished equipment, if or when required.
C. Removal and replacement of ceilings, if or when required.
D. Furnishing and setting of sleeves and sleeve openings through walls and floors.
E. Cutting, core boring, patching or painting of walls, floor or ceilings required by the installation.
F. Patching/fireproofing of sleeves and openings in floors, walls and ceilings where required.
G. Furnish and install all access panels as required.
H. Furnish and install emergency electrical power as follows:
   1. 208/230/460 volt, 50/60 hertz, 3-phase power source and fused disconnect to support a 10 HP motor within five feet of the blower package.
   2. 120 volt, 50/60 hertz, 1-phase power source for each station, diverter and blower package.
   3. 120 volt, 50/60 hertz, 1-phase power source at the computer control area. This power source shall be uninterrupted and dedicated.
I. Data Connection
   1. An Active Ethernet network jack connected to the hospital network installed within six (6) feet of each new blower, station, and transfer unit/diverter.
J. Excavation, backfill, concrete/asphalt sawing, landscaping, repaving and finished surface for underground tube or cable installation, if or when required.
K. Provide elevator/hoist service, if required.
L. Clean off plaster, mortar and other debris on/in pneumatic tube equipment resulting from activities of other trades.
M. Repair or replace any damage to pneumatic tube equipment resulting from activities of other trades.
N. Temporary power to facilitate testing when required.
O. Fire protection and asbestos abatement.
   1. Identification of all areas with unabated asbestos.
   2. All inspections, testing, monitoring, abatement and containment for any hazardous material including asbestos, which is encountered anytime in the duration of the project.
P. Provide the necessary licenses and permits.

PART 2 - PRODUCTS

2.1 SYSTEM DESIGN REQUIREMENTS

A. The System shall be a six-inch (6") computer-controlled pneumatic tube system consisting of tubing, stations, transfer units, blower packages, computer control center and carriers.
   1. All new system components shall be installed on Emergency Power but installed as a non-critical system.
   2. The 6” system shall transport carriers at an average velocity of twenty (20) feet per second.
   3. New 6” stations shall be capable of dispatching carriers that weigh seven (7) pounds (payload and carrier).

4. The system shall be designed to have a group of stations (Zone) connected through transfer units (Diverters) to a minimum of one (1) blower and shall function independently.
5. The number of stations per zone shall be evaluated through the system design and simulation and must meet the requirements. Each zone shall have a maximum of ten (10) stations per zone.
6. The system zones shall be interconnected through inter-zone connections and by means of transfer units (Diverters). The system shall provide multiple inter-zone storage/ transfers between each of the zones.
7. The system shall be installed with carrier tracking features including inline sensors and control software.
8. The system shall include a card reader system for access to the equipment. The card reader for the system shall function with the hospitals badges and shall connect to the hospitals active directory.
9. The modular design of the System components shall permit changes in the number of stations and/or zones as Owner requirements change.
10. A 115 VAC duplex receptacle and device on/off switch shall be provided at each station, transfer unit, exchanger and blower package.
11. Each station shall include diagnostic capability at the unit.

2.2 SYSTEM OPERATION

A. System Control Center operation should include capacity of not less than nine hundred and ninety-six (996) stations without the need for modifications to the central control and existing station control.
B. The system software shall verify that all components of the system are operating properly before the carrier is dispatched through a closed loop control.
C. The system shall be computer-controlled with a graphic display of system information and diagnostic operation of system components.
D. The dispatching, routing, and storage of carriers shall be automated through the system control center to provide automatic unattended transmission of carriers between any two (2) stations.
E. The system control center shall make the selection of the shortest, most direct routing of all carriers to their destinations. Carriers that are being transported within a zone shall have the ability to turn around at the nearest common transfer unit.
F. The control center shall be programmable to provide individual priorities for each of the stations in the system on a send and receive function. These priorities are to be easily adjustable by the Owner. The system shall dynamically alter transaction priorities based upon transaction wait times.
G. Individual stations or zones shall be able to be shut down without affecting the remainder of System.
H. Systems with more than one zone shall allow multiple carriers to be in transit simultaneously. The system shall allow all station dispatchers to be loaded simultaneously, destinations to be selected and all transactions processed automatically until the system is clear.
I. Provide automatic empty carrier redistribution:
   1. The users shall have the ability to return excess carriers into the system by pushing an empty carrier redistribution button on the control panel. The system

will dispatch excess empty carriers to carrier-deficient stations, which shall be automatically identified and selected by the System.

2. The redistribution priorities include:
   a. Any stations that have zero (0) carriers present.
   b. Station having the greatest difference between carriers assigned and carriers present
   c. Should the deficiency ratio be exactly the same for several stations in the system, then the computer will route the empty carriers to stations that are nearest the sending station.

J. A transaction to a station that becomes unavailable after dispatch shall be rerouted to the origin station. A notification at the origin station shall inform the users of the returned carrier.

K. Carriers in process or pending when the system is shut off shall deliver to their destination station. Any new requests to send shall be rejected.

L. Carriers in process when a power failure occurs shall complete delivery to their destination after the power is restored. The control center shall be equipped with UPS to retain record of carriers in transit.

2.3 SYSTEM INTERCHANGE

A. Provide interzone connections between each of the zones for temporary storage and transfer of carriers between zones.

B. Provide simultaneous carrier storage and independent zone operation.

C. The system interchange shall be designed to provide multiple interzone connections to the system for each zone.

D. The system control center shall make the selection of the shortest, most direct routing of all carriers to their destinations. Carriers that travel through multiple zones shall be minimized through the system simulation.
   1. Systems that use shuttle zones or connection zones shall minimize the number of carriers that pass through multiple zones during transport.

E. All major system interchange equipment shall be redundant. For example, interzone connections, selective bypasses, etc.

2.4 EQUIPMENT

A. Transmission Tubing
   1. Transmission tubing shall be cold-rolled, electric-welded, flash-removed, degreased, flash and hot dip galvanized sixteen (16) gauge steel with a nominal six-inch (6") outside diameter. One end shall be belled and the other end chamfered to provide optimum joints.
   2. Bends shall be the same material as transmission tubing with belled and chamfered ends. They shall be formed to a nominal centerline radius of not less than forty-eight inches (48") and shall maintain a uniform cross section throughout the length. The cross section shall be free from wrinkles and distortions. No expanded bends or field modified bends shall be allowed in the system.
   3. All pipe utilized for the project shall be new. Straight pipe and bends cut in the field shall be cut square, deburred, and ends mandreled round.

4. A label shall be installed every 20’-0 on the new pipe indicating the following:
   a. “Six Inch (6) Pneumatic Tube”
   b. Label shall list where the tube is coming from/to (i.e. “Station XX to diverter XX”)
   c. The label shall be a minimum of 3”x 8”.
   d. The label shall be printed. Hand-written labels are not accepted.
5. Solid steel slip sleeves or split steel gasketed bolted sleeves shall be used for a field cut joint and at all equipment connections. Split sleeves shall be used at all connections of serviceable equipment. All sleeves shall be of the same gage as the tubing.
6. All joints shall be sealed with a suitable airtight compound and wrapped with a plastic tape. All joints shall be airtight.
7. Support hangers for tubing shall be 3/8" pre-threaded rod, galvanized and threaded into the building structure. Unistrut with tube clamps or tear-drop hangers fastened to the rod shall support the tubing. The tube shall be supported as follows:
   a. Minimum every ten (10) feet of straight tubing
   b. At each bend
   c. At equipment connections
8. Support for vertical tube runs shall be supported at every floor.
9. Provide sway bracing for both tangential and perpendicular forces to reduce tube movement from carrier passage through the system. Sway bracing shall be installed within 10'-0" of all stations, at each bend and at intervals not to exceed 40'-0". Additional sway bracing will be required if tube movement exceeds one half inch (1/2") from center with a fifteen (15) pound force applied to the center of the tube.
10. Pipe that is installed through a building expansion or seismic joint shall be installed to support the movement of the building expansion and contraction or seismic motion without damaging adjacent tubing. A pipe through the building expansion joint shall be installed with bolted couplings on either side of the joint such that the pipe and bolted couplings can be readily replaced.
11. The tube routing and equipment placement shall not be installed over patient care areas or hospital sound sensitive areas including; conference rooms and physician sleep rooms. In areas where installation over these areas is unavoidable, the system supplier shall install sound insulation on the tubes and architectural sound attenuation boxes around the equipment that are over patient areas. The sound insulation should extend a minimum of six feet (6'-0") on either side of the affected area. The Contractor is to submit all sound attenuation measures and insulation cut sheets to the Owner for approval. Insulation shall be a minimum of one and one-half inch (1-1/2") thick layer of one and one-half (1-1/2") pcf density fiberglass insulation with a dust cover and taped joints over the tubing or equivalent.
12. All pipe or bends installed on a roof and exposed to the elements shall have all joints brazed and covered with heat shrink sleeves. The tubing shall be pressure tested to ensure no moisture can enter through the joints. The PTS supplier shall submit heat shrink sleeve and pressure testing details to the Owner for approval before proceeding with the installation.

B. Transfer Units (Diverters)
   1. Provide Transfer units (Diverters) as the means to route carriers through the system.
   2. Transfer units shall be installed with split sleeves and sway braced against motion.
   3. Transfer units located above the ceiling shall have a minimum of twenty-four (24) inches to the finished floor on a minimum of one (1) of the sides of the unit for complete and clear access to service mechanical and electrical components. The transfer units shall be constructed of galvanized steel with side accessible panels.
   4. Transfer units are to be suspended from the ceiling using 3/8" galvanized threaded rods or supported from the floor with a uni-strut structure. Transfer units shall be sway braced in both tangential and perpendicular directions.
   5. The offset through the transfer unit shall be gradual using a curved tube section. The transfer unit types shall be as follows:
      a. One Line In; Four Lines Out
      b. One Line In; Six Lines Out
   6. The transfer units shall properly align with the transmission piping with minimal variance. Carriers that pass through the transfer units shall not hit the transfer unit or opposing transmission lines.
   7. All transfer units shall have non-contact carrier position sensors.
   8. Transfer units are to be controlled through a replaceable circuit board that is installed within the transfer unit.

C. Stations
   1. Stations shall consist of a self-supporting enclosure which houses the dispatch equipment, receive equipment and electrical controls enclosed in a sheet metal housing. The dispatch equipment, receive equipment and electrical controls are to be interchangeable.
   2. All mechanical and electrical components shall be front accessible and removable for repair or replacement. If keys are required to access the front of the station, provide a key for each station identified in the specification.
   3. The station enclosure should be sufficiently designed to minimize movement during carrier dispatch and receipt.
   4. Station shall be wall recessed, up-send, down-receive style, and provide an air cushion for soft delivery of the carriers.
   5. The pressure relief valve shall be located on the bend or straight pipe directly above the station.
      a. Ideally the pressure relief valve is to be located between six (6) and ten (10) linear feet from the station nipple. In no case should the pressure relief valve be located less than six (6) linear feet or more than fifteen (15) linear feet from the slide plate.
   6. The carrier receiving area shall be designed to reduce carrier arrival noise. The station padding in the station shall be replaceable.
   7. All visible metal surfaces of the station shall be factory painted. A trim frame shall be used for final mating to the wall. Bright metal finish parts shall be stainless steel, brushed aluminum or chrome plated.

8. The system shall utilize non-contact sensors at the station to detect the position of the carriers at the station.
9. The dispatcher shall hold one carrier at a time.
10. The receiver shall be independent of the dispatcher.
11. The dispatcher shall enable a carrier to be staged for dispatch while a carrier is incoming to a station.
12. The carrier receiving bin shall be integral with the station and shall have the ability to receive no less than four (4) carriers.
13. When station's receiver becomes full, that station's receive and dispatch functions shall be disabled. Carriers will not be dispatched to a station that is overloaded. A message on the station display and at the system control center shall indicate the full condition. The condition shall automatically reset upon carrier removal from receiver.
14. Each station shall have storage within the station housing for a minimum of three (3) carriers. Stations that do not have the storage as an integral part of the station will require an empty carrier storage bin. The empty carrier storage bin shall be recessed and located adjacent to the high capacity station.
15. Destinations that are unavailable shall be rejected at the origination station. Unavailable destinations include stations that are:
    a. Incorrectly entered (non-existing) stations
    b. Out-of service stations
    c. Receiving station bin exceeds capacity.
16. Each station shall have an audible alarm to announce the carrier arrival.
17. The system computer controls shall allow for "STAT" transactions. A code shall be used by the system operators to identify a transaction as being a "STAT" transport. The "STAT" transport shall take priority over all other system transactions.
18. Capability of sending secure items through the system using pin numbers or card swipe to control access to these items at the receiving station.
19. Capability to track the last ten transactions sent from a station on that station's control panel.
20. Station Dispatch panel
    a. Stations are to be equipped to support RFID or Bar Code scanning.
    b. A keypad for destination and special function selection.
    c. A minimum of twelve (12) programmable function keys shall be integrated into the station touchscreen panel for one-touch station address, specialized system requirements, diagnostics, and various maintenance and data retrieval options.
    d. The station dispatch panel shall have the capability to track the last ten transactions sent from a station on that station's control panel.
    e. All station controls shall be solid state plug-in units for fast replacement.
    f. Provide the ability to manually diagnose station mechanics from the station control panel.
    g. Provide the ability to clear station alarms from the station keypad.
    h. The control panel shall be a touchscreen display. The display panel shall display a message indicating:
        1) Station is signed on/off
        2) Send denied insert carrier, retry

3) Send cancelled by this user
4) Incoming carrier count, carrier origin, and transaction type
5) Invalid station number
6) Selection not in service or signed off
7) Carrier returned due to failure
8) Destination receiving bin full
9) The station receiving bin is full
10) Return empty carriers
11) Zone down
12) Carrier forwarded
13) Releasing secure carrier
14) Secure carrier arrival
15) Date and time, synchronized with the central computer
16) Destination address name
17) Help menu selections
18) User instructions
19) A directory of stations
20) Special functions
21) Emergency Shutdown

21. Other operator feedback information
    a. A ”Send" or "Send/Enter” key to activate the dispatch after destination selection or to enter data for special functions.
    b. A “Cancel/Clear” key to allow for transaction cancellation or clearing of the display during special function activation.
    c. A “Send Empty” key for surplus carrier redistribution.
    d. A ”Menu” key for selecting special functions.
22. Provide seventeen (17) new stations in the initial buildout shown in the list below. Two (2) additional stations are planned for future building expansion, and shall have their connecting tubes capped outside of the shelled/future area. The following is a list of stations:

ID	Station Location	New/Future	Floor Level	Station Quantity
1	Lab 1	New	1	1
2	Lab 2	New	1	1
3	Pharmacy 1	New	1	1
4	Pharmacy 2	New	1	1
5	Blood Bank	New	1	1
6	ED 1	New	1	1
7	ED 2	New	1	1
8	Preventative Med	New	2	1
9	Medical Supply	New	2	1
10	Surgical Services	New	2	1
11	Labor and Delivery	New	2	1

ID	Station Location	New/Future	Floor Level	Station Quantity
12	Primary Care 1	New	3	1
13	Primary Care 2	New	3	1
14	Acute Care 3-1	New	3	1
15	Acute Care 3-2	New	3	1
16	Dental	New	4	1
17	Specialty Care	New	4	1
18	Acute Care 4-1	Future	4	1
19	Acute Care 4-2	Future	4	1
		Station Totals		17 New 2 Future

D. Blowers
1. Blower units shall be modular, factory assembled, complete with integral vibration isolators, screen cleanout boxes and air shifting valves as required.
2. Blowers shall be located to allow complete and clear access to service mechanical and electrical components.
3. Blowers shall be of the regenerative type.
4. Furnish and install motor starters with properly sized thermal overload protection in each phase at the blower locations.
5. The blower package shall automatically turn off during periods of non-usage to conserve energy.
6. Provide sensors to verify the blower is running for both pressure and vacuum.
7. Zone blower packages shall be designed to be mounted on floors.
8. All visible metal surfaces shall be finished with a factory paint.
9. Air piping will be 4” diameter up to 100’ long. If longer than 100’, air piping shall be of the same tube specified for carrier lines complete with all necessary tees and elbows.
10. Zone blower packages are to be located in mechanical rooms. If the blower unit is installed in areas that exceed the noise requirements of the building or are required to be less than 65 dB(A) shall be sound deadened with sound insulation and intake and exhaust mufflers.

E. Control Center
1. Provide a new server-based control center. The server must be independent from other hospital servers. The server shall have a backup server to help operate the system in the event that the primary server fails. Upgrade the control center to the latest software release.
2. Install a primary control center in the facilities area and a secondary control center in the security office. The secondary control center will include an indicator to alert the security team if an alarm occurs 24 hours per day.
3. The server shall be installed on emergency power and include an uninterruptible power supply (UPS) for the new control center.
4. The manufacturer shall provide a computer capable of running the required software, as well as a word processor application, a spreadsheet application and a web browser application.

5. The control center software shall be capable of executing multiple concurrent transactions, while allowing for system monitoring, error handling and real-time transaction data retrieval.
6. The control center shall control all electro-mechanical equipment and manage system-wide network communications.
7. The control center shall accept station generated user commands and execute transactions accordingly.
8. The control center software shall employ an algorithm that dynamically builds transaction routes based on the resources available at that point in time, and then selects the most efficient route to complete a given delivery.
9. The control center software shall set, monitor and dynamically change transaction priorities based on system configuration, settings and real-time use.
10. The control center shall include a graphical user interface that allows for transaction monitoring, settings and option configuration, error handling, transaction data retrieval and manual operation of all equipment.
11. The database shall be a database capable of real-time documentation of every transaction request, including:
    a. Transaction status data
    b. Transaction time stamp data
    c. Transaction carrier identity
    d. Transaction content identity
    e. Transaction user identity
12. The control center shall include a standalone web application with a graphical user interface to enable the monitoring of transactions and the review and analysis of historical transaction data.
13. The control center shall support both serial and Ethernet communications to the stations, diverters and blowers.
14. The transaction data generated by the control center shall reside in the database and be fully accessible to the hospital.
15. The control center shall support remote access protocols to so that technicians located outside the hospital can access the system's engineering controls.
16. The control center shall support traditional interzone systems, as well as blower group systems.
17. The control center shall support empty carrier management, including storing empty carriers within specially designated tubing and automatically managing the acceptance and distribution of empty carriers to and from stations.
18. The control center shall have the ability to produce and send to all station displays user developed discrete messages.
19. The control center shall provide for on/off periods per day per station.
20. The control center shall process carriers by an incoming/outgoing priority scheme. Owner will work with vendor with relative priorities for each station during system start up.
21. The control center shall provide password protection for all levels of system control.
22. The control center shall provide a menu command to purge either the entire system or an individual zone
23. The control center shall provide an emergency stop feature.

24. The control center shall provide the following display windows for operator interaction:
    a. System Navigator – Displays the system as a directory tree. System commands and parameters are accessed through this window.
    b. Traffic – Allows for the viewing of all active transactions.
    c. Current Alarms – Allows maintenance operators to view problems within the system and provides details on the active alarms. Diagnostic screens allow for corrective action.
    d. Advisor History – Displays a list of advisories.
    e. Alarm History – Displays a list of alarms.
    f. Carrier Counts – Displays the number of carriers at each station, the number of incoming carriers, and the date the count was last updated.
    g. Journal – Allows maintenance operators to create messages in the system's notepad.
    h. Maintenance History – Displays cycles of each system device since its last preventive maintenance.
    i. Purge History – Displays results of purges of the entire system or by zone.
    j. Station Summary – Displays all information pertaining to stations including address, priorities, type, zone, COM line and name.
    k. User History – Lists who logged in or out of the system.
    l. Transaction History – Displays transaction numbers, sending and receiving station involved and time for each transaction.
25. By manipulating keyboard of graphic display it shall be possible to utilize the maintenance program.
26. Provide preventative and breakdown maintenance program.
    a. Access in zone that has zone control switch in "off" position. Other zones shall continue to operate normally when maintenance program is being used for one or more zones.
    b. Through keyboard manipulation, set or reset electromechanical or pneumatic component under computer control of a turned off zone including the stations. Manually cycle all component of the zone at required intervals and analyze operation.
27. The computer printer shall have the following capabilities:
    a. Provide hard copy record of individual alarms and transactions.
    b. In the event of an alarm, visually display or print out nature of alarm, probable cause, and location of malfunction. Store number and type of alarm in computer memory to be available upon request.
    c. Print time and date each alarm is cleared.
    d. Print displays on command from keyboard.
    e. Print time of power loss and power restoration for control center power failures.

F. Smoke / Fire Detection
1. Fire safety equipment shall be installed by others according to NFPA 101 and NFPA 72.
2. The pneumatic tube system provider shall provide a set of isolated electrical contacts for each blower that is connected to the system control center.

3. The pneumatic tube system provider shall coordinate with the general contractor on the connection of the fire safety system to the pneumatic tube system. The systems will be connected such that if smoke is detected in the main interchange near the blowers/air intake, the entire pneumatic tube system shall be placed into alarm and a notification at the control center shall indicate the reason the system is in alarm.

G. Carriers
1. Provide eighty-five (85) clear leak-resistant carriers that are sealed by a gasket that upon closure forms a leak-resistant barrier for liquid and vapor. Four carriers must be provided at minimum for every new 6” station. Vendors are responsible for labeling and indexing all carriers.
   a. Clear inside dimensions: 4-1/2” diameter by 15-5/8” length.
   b. Carriers shall be bi-directional clear molded plastic and side opening for full-access.
   c. Carrier latches shall be easy open positive closure latches.
   d. The carrier wear bands are to be of the replaceable type.
   e. Carriers shall be capable of carrying: specimens, medications, x-ray film, 1,000 ml IV bags with up to 100 ml's additives.
2. Provide eighty-five (85) carrier liners for cushioning small items. The type of liners (thin or full) is to be coordinated with the Purchaser sixty (60) days prior to completion of the project.

H. Testing Devices
1. Provide system diagnostic capabilities at each piece of equipment. The diagnostic capabilities shall enable the Owner's staff to fully trouble-shoot and evaluate the equipment including the system communication interface, control boards and connections, wiring and mechanical response.
2. Provide the Owner with any special maintenance or diagnostic tools required for the system.

I. Remote Personal Indicator (RPI)
1. Provide three remote personal indicators that are connected to the Primary Care Stations on level 3. Primary Care 1 Station will be connected to 1 RPI as shown in plan. Primary Care 2 Station will be connected to 2 RPI as shown in plan.
2. The remote personal indicator (RPI) is a wall-mounted visual and audible signal device with a reset switch, located away from the station. This unit shall have a chime that is adjustable based on the needs within the department.
3. The Remote Indicators shall each have a unique number from the Primary Care Stations.
4. Carriers received via the automatic carrier redistribution feature do not activate RPIs.

PART 3 - EXECUTION

3.1 EXAMINATION

A. It is the responsibility of the Contractor to field verify all dimensions. Report in writing to the Owner or Owner's representative any discrepancy or conditions that will prevent the correct installation of the system before performing the work.

B. All field measurements are to be properly coordinated with the fabrication schedule and construction process to avoid a delay in the work.

3.2 EQUIPMENT DELIVERY AND STORAGE

A. The Contractor shall coordinate the delivery schedule of the equipment with the Owner. The Contractor is responsible to receive, unload, and store all equipment associated with this section. The delivery of equipment should be scheduled to provide proper work flow to meet the project needs.

B. All equipment shipped, moved and stored shall be properly protected. All equipment damaged during shipping, handling and storage shall be replaced with new.

C. The System Supplier is responsible for the safe storage of equipment on-site. All equipment stored on-site shall be stored on platforms, pallets or other supports. The System Supplier is to coordinate with the Purchaser an on-site storage location for the equipment. The System Supplier is responsible for damaged equipment in this section due to improper storage of the equipment.

D. Enclosures and housings for equipment installed during the initial phases of construction shall be properly protected to avoid damage through the project. Stations shall have a protective covering to avoid collection of waste and debris. Protective coverings can be removed during the equipment fit out with mechanical and electrical components. The access panels on the transfer units are to remain in place unless specifically working on the equipment.

3.3 INSTALLATION

A. Provide the services of a service technician who is experienced in the installation, adjustment, and operation of the equipment specified. The representative shall supervise the installation, adjustment, and testing of the equipment.

B. The Contractor's installation team shall maintain orderly and clean working areas. The installation teams shall keep the working areas free from waste and debris. Equipment shall be neatly organized and safely stored each day. At the completion of the final phase of the project, all tools, construction equipment and machinery shall be removed.

C. If the System Supplier fails to remove waste, equipment, or debris at the completion of the work, the Purchaser may do so at the cost of the System Supplier.

D. The Purchaser can request a different installation team if the current installation team is not adequately installing the system in the specified manner or if the team fails to meet the standards identified by the Purchaser.

E. The System and components shall be assembled and installed in accordance with contract documents, applicable codes and regulations, and approved shop drawings.

F. Install all system components in compliance with the system manufacturers latest installation instructions.

G. The System Supplier shall properly coordinate installation with other trades including the mechanical and electrical trades so as to ensure the system will be a complete and properly functioning system.

H. The System Supplier shall submit detail drawings containing complete wiring and schematic diagrams and any other details required to demonstrate that the system has been coordinated and will properly function as a unit. Drawings shall show proposed layout and anchorage of equipment and appurtenances, and equipment relationship to

other parts of the work including clearance for maintenance and operation. Templates and installation requirements required to coordinate with other trades shall be provided.

I. The System Supplier shall coordinate the correct location and installation of all floor sleeves, concrete inserts, concrete pads, anchor bolts and other anchors that are imbedded in the concrete.

J. The System and components shall be anchored and fastened to building construction as required for a stable, secure installation. All exposed parts of the System and finish components shall be closely fit and joined to provide a neat uniform appearance.

K. The System Supplier shall coordinate the project schedule with the Purchaser. The phasing plan and schedule shall be reviewed with the Purchaser thirty (30) days prior to any equipment or system disruptions.

L. All existing equipment or system disruptions shall be coordinated with the Purchaser and requires a minimum of two (2) weeks advance notice upon the Purchasers approval.

M. The system components shall be cleaned and returned to a new unblemished state. Equipment with scratches, dings, dents are not acceptable. Equipment that is damaged during installation shall be either replaced with new or field refinished such that there is no evidence of field refinishing work.

N. Coordinate the use of the hospital elevators for equipment and personnel during construction.

O. Comply with all dust control and infection control measures required by the hospital for construction and ceiling tile removal.

3.4 SYSTEM STARTUP AND FINISHING

A. The Contractor is responsible to work with the Owner to adjust system settings and requirements to the Owner's preferences.

B. The System Supplier shall coordinate with the Purchaser system preferences and setup. The System Supplier shall review with the Purchaser and provide the following services at a minimum:

C. Assistance in developing the protocol policies for the Purchaser’s use of the system.

D. Review of information and standards regarding regulations of OSHA, NACCLS, and CDC for transport of hazardous materials in the system.

E. A decontamination/infection control procedure and a cleanout kit with procedures for cleaning liquid spills in the system.

F. Containment and immobilization of items transported in the system.

G. Station carrier arrival preferences including the use of the carrier arrival chime.

H. The System Supplier shall coordinate the quick key preferences for each of the stations. The System Supplier is responsible to fully setup each of the station features to the Purchasers preferences.

I. The System Supplier shall print and install station directories at each of the stations in the system.

J. The System Supplier shall meet with the Purchaser to setup station priorities and adjust the system accordingly.

K. The System Supplier shall set carrier counts per the Purchasers preferences and distribute carriers accordingly.

3.5 SYSTEM TESTING AND ACCEPTANCE

A. General Testing
   1. The pneumatic tube contractor will correct any workmanship or performance criteria not in conformance with these specifications.
   2. Testing shall be performed upon completion of the enabling project.
   3. The testing of the system shall be performed as follows:
      a. Factory pre-testing
      b. System Contractor testing
      c. Owner 's acceptance testing
      d. Performance testing
      e. Reliability testing
   4. All equipment required for the testing shall be provided by the Contractor including:
      a. A carrier that is filled to seven (7) lbs. shall be provided for testing.
      b. The Contractor shall provide test carriers for the Contractor testing and Owner acceptance testing. Carriers utilized for these tests shall be of the same size and type as the carriers provided as part of this section. Test carriers used for these tests shall not be provided to the Owner to fulfill the new carrier requirements for the system.
   5. Submit test reports in booklet form showing all field tests performed to adjust each component and all field tests performed to prove compliance with the specified performance criteria, upon completion of installation and testing of the installed system. Each test report shall include the test plan and the results.
   6. The performance test shall include an electronic snapshot of the traffic during the peak load test.

B. Factory Pre-testing
   1. All equipment is to be factory pre-tested before being shipped to the site. The Owner may request to witness factory pre-testing of the equipment.

C. System Contractor testing
   1. Perform all startup and testing requirements recommended by the manufacturer. Provide documentation of all testing performed.
   2. Perform preliminary tests, verifying all components are in fully operational condition for carrier dispatch and receive between all possible station combinations.
   3. Each new station in the system shall successfully send a minimum of twenty-five (25) carriers and receive a minimum of twenty-five (25) carriers. Providing that all possible station combinations have been fully tested, carriers can be sent back to the same station to fulfill this requirement. Provide a computer printout indicating the testing volume requirements.
   4. All tube in the system shall transport sufficient carriers through the system to collect the majority of the metal shards and dust particles in the tube. The wear bands on each carrier shall be cleaned after each use to minimize the reintroduction of metal shards and dust particles into the system. If the metal shards and dust particles are excessive, the Purchaser or Purchaser's representative may choose to have the system cleaned at the System Suppliers cost.

D. Owner Acceptance Testing
   1. In the presence of the Purchaser or Purchaser's representative, the System supplier shall perform operational tests, conduct tests of material, and review workmanship and function to establish that the work has been executed according to these specifications. The System suppliers test plan, record drawings and coordination documents shall be available on-site at the time of testing.
   2. In the presence of the Purchaser or Purchaser's representative the following tests shall be demonstrated:
      a. Demonstrate that a seven (7) lb. carrier can successfully be dispatched unassisted and received with soft delivery at each station. The Purchaser may choose to evaluate the passage of the seven (7) lb. carrier through transfer units and interchange equipment.
      b. Demonstrate that an empty carrier can successfully be dispatched unassisted and received with soft delivery at each station.
   3. All carriers will be evaluated for lacerations, scratches, and abrasions that are caused due to misalignment of equipment or improper installation of pipe.
   4. All test carriers shall be examined for cleanliness of the system.

E. Performance Testing
   1. Demonstrate that the system performance is sufficient to completely process each of the transactions from the peak hour matrix in a one-hour period. Each station shall send transactions to each of the receiving stations identified on the peak-hour matrix. The system shall have the capacity to completely process the seventy-two (72) transactions in a one (1) hour period. All stations are to send carriers simultaneously as described in the traffic matrix. The System Supplier may assign dispatch times for the carriers as part of the testing plan; however, execution of the dispatch times does not eliminate the need for the system to completely process the transactions during the peak-hour period.
   2. Test shall include a half hour pre-test meeting with System Supplier personnel and Purchaser personnel to review the testing procedures and protocols.
   3. The System Supplier is responsible to provide sufficient simulations and engineering to ensure that the system is capable of processing the peak-load carriers. If the system fails the peak-load testing, the System Supplier shall make the necessary adjustments to successfully carry out a second test. If the System Supplier cannot successfully carry out the peak-load test, the System Supplier will be responsible to bear the cost of additional testing.
   4. Submit test plan and procedures, not later than thirty (30) days prior to the start of testing. The test plan and test procedures shall explain in detail, step-by-step, actions and expected results to demonstrate compliance with the requirements of this specification including the necessary conditions of operation to demonstrate performance of the system.
   5. Test shall be conducted in accordance with the approved test procedures to determine that the system is functional, operational and installed in accordance with the specifications.
      a. It is estimated that the System Supplier shall provide a minimum of one (1) person to monitor the control center, one (1) person to help carry out the

test. The vendor shall coordinate with the Owner additional man-power to effectively carry out the test.

F. Reliability Testing
1. Reliability testing is an ongoing evaluation over the course of the first six (6) months of the system use to evaluate the reliability of the system.
2. The system shall meet the following reliability measures during the first six (6) months of system use.
   a. System downtime shall not exceed one percent (1%) of the total operating time. System downtime is defined as the amount of time that a station is ineligible to receive carriers due to a malfunction of the system. If multiple stations are down due to interchange or transfer unit malfunction, each station will be considered independently. The total hours of station operation compared against the total hours of station downtime will be the basis of the ratio for the system.
   b. A log of all system malfunctions shall be maintained by the Contractor during the service period. At the end of the six (6) month period, a report shall indicate that there shall be no more than one (1) malfunction per every thousand (1000) transactions. A malfunction is defined as equipment or system failure as a result of incorrect installation or maintenance.
3. The Contractor shall provide a printout at the end of the first month, third month and sixth month of official system use. The report shall indicate the system downtime and the number of malfunctions per number of transactions.

3.6 TRAINING

A. General Training
1. All training sessions are subject to be recorded by the Owner. These recorded training sessions will be coordinated with other video requirements.
2. Operational and Maintenance Manuals are to be available during the training sessions.

B. Operator training
1. The Contractor shall train key Owner's training staff on-site in the use and operation of the system for a minimum of eight (8) hours. The Contractor shall provide sufficient training sessions to accommodate the variable staff schedules.
2. The training shall include:
   a. A commercially prepared video describing the system and its capabilities and potential benefits.
   b. Review of common system alarms and their correction.
   c. Use and functions of the system.
   d. Package of training materials for the Owner’s trainers to use.

C. Maintenance training
1. Maintenance personnel as assigned by the Purchaser shall be trained on the job site in the proper maintenance and troubleshooting of the system.
2. The Purchaser shall assign at least two (2) persons to accompany Contractor start-up technicians during final system checkout procedures.

3. The service technician assigned to the service agreement shall continue training with the Purchaser's staff during the ninety (90) day period.

END OF SECTION