PROJECT MANUAL

SPECIFICATIONS

Issued for 100% Submittal – 8 Apr 2026

For

SUSTAIN/REPAIR BUILDING 301 AIRCRAFT GROUND EQUIPMENT

ZQEL 22-0006

For

910th AIRLIFT WING
3976 KING GRAVES ROAD
VIENNA, OHIO 44473-5931

PREP ARED BY

DEPARTMENT OF THE AIR FORCE
910th BASE CIVIL ENGINEERING OFFICE
3976 KING GRAVES ROAD, BLDG 510
VIENNA, OHIO 44473-5931

CONTROLLED UNCLASSIFIED INFORMATION

THIS PAGE IS INTENTIONALLY BLANK

TABLE OF CONTENTS

Division 00 – General Conditions

01 01 01	Project Title Sheet
01 01 10	Table of Contents
01 01 15	List of Drawing Sheets

Division 01 – General Requirements

01 00 00	General Requirements
01 30 01	Submittal Descriptions
01 33 00	Submittal Procedures
	AF Form 66
	AF Form 103
	AF Form 3000
	AF Form 3064
	AF Form 3065
01 35 43	Environmental Procedures
01 42 00	Sources for Reference Publications
01 60 00	Product Requirements
01 73 29	Cutting and Patching
1 74 19	Construction Waste Management

Division 02 – Existing Conditions

2 41 19	Selective Building Demolition

Division 03 Concrete - Not Used

Division 04 Masonry

04 05 13	Mortar

Division 05 Metals – Not Used

Division 06 – Wood, Plastics, and Composites – Not Used

Division 07 – Thermal and Moisture Control – Not Used

Division 08 – Openings

08 71 00	Door Hardware

Division 09 – Finishes

09 22 26	Metal Suspension
09 29 00	Gypsum Board
09 30 00	Hard Tile
09 51 00	Acoustical Ceilings
09 51 13	Acoustical Tile Ceilings
09 65 13	Resilient Base
09 91 00	Painting

Divisions 10 – Specialties

10 14 00 Signage

Division 11 – Furnishings

11 21 23 Roll-Down Blinds

Division 12 thru 22 – NOT USED

Divisions 23 Heating, Ventilation, and Air-Conditioning (HVAC)

23 05 29 Pipe Hangers and Supports for HVAC Piping
23 36 13 Grilles, Registers, Diffusers

Divisions 24 through 25 – Not Used

Division 26 –Electrical

26 05 00 Common Work Results for Electrical
26 05 29 Hangers and Supports for Electrical Systems
26 51 00 Lighting

Division 27 – Communications

27 05 00 Common Work Results for Communications

27 15 00 Communications Cabling

Divisions 28 through 30 – Not Used

END OF DOCUMENT

DOCUMENT 00015

LIST OF DRAWINGS

Sheet Nos.		Sheet Title	Date of Issue
1 of 12	G1	Title Sheet	2 Feb 2021
2 of 12	G2	Scope of Work Layout Plan	2 Feb 2021
3 of 12	G3	Construction General Notes	2 Feb 2021
4 of 12	A1	Room 111, 112 & 113 Demolition Plan	2 Feb 2021
5 of 12	A2	Room 111, 112 & 113 Floor Plan	2 Feb 2021
6 of 12	A3	Room 111, 112 & 113 Reflective Ceiling Plan	2 Feb 2021
7 of 12	A4	Room & Floor Plan, 101 & 102	2 Feb 2021
8 of 12	A5	Room 101 Interior Views	2 Feb 2021
9 of 12	A6	Room 102 Interior Views	2 Feb 2021
10 of 12	A7	West Elevation Wall View	2 Feb 2021
11 of 12	A8	East Elevation Wall View	2 Feb 2021
12 of 12	A9	Wall Cross Section Views	2 Feb 2021

END OF LIST OF DRAWINGS

THIS PAGE IS INTENTIONALLY BLANK

SECTION 01 00 00 - GENERAL REQUIREMENTS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. The Contractor shall furnish all supervision, labor, materials, tools, equipment, apparatus, and transportation required to complete the construction in conformity with the Contract Documents.

B. The Project is to Maintain/Repair/Construct Various Room Renovations around the entire base. Rooms will require renovations particular to each building as listed below:

C. The Work consists of – but is not limited to – the following

1. **Building 301: Aircraft Ground Equipment**
   Renovation of a portion of building 301, Room requiring work will be Rooms 101,102, 111, 112 & 113.

   Rooms 101 & 102 will have the walls, doors, frames, window trim and floor Painted.

   Rooms 111,112 & 113 will have the ceiling grid & panels, lighting removed and Replaced. Flooring will be removed and replaced. The walls will be painted And new cabinet hardware to be added.

1.3 SCHEDULE

A. The contractor is advised that the work required must be scheduled to occur between base UTA schedule time. UTA schedules occur every 30 calendar days, and contractors activities shall be coordinated between the CAC operations schedule and staff and the contractor, with approval of the Contracting Officer. Refer to article 1.7 of this Section for additional requirements

1.4 REFERENCES

A. United States Air Force (USAF or AF) Forms:

1. Base Civil Engineering Work Clearance Request Form (AF Form 103): Found at the end of this Section.

2. The Material Approval Submittal Transmittal Form (AF Form 3000): Found at

the end of Section 01 33 00 – Submittal Procedures.

1.5 DEFINITIONS

A. Any and all references in the Specifications and/or on the Drawings to – and/or requirements for – "notifications" shall be taken to mean written notification to the Contracting Officer.

B. Any and all references in the Specifications and/or on the Drawings to – and/or requirements for – "submittals" shall be taken to mean submittals in accordance with both of the following:

1. Section 01 30 01 – Submittal Descriptions.
2. Section 01 33 00 – Submittal Procedures.

C. Any and all references to – and/or requirements for materials and work to be in – compliance with the Manufacturer's recommendations shall be taken to mean – and/or includes the requirement that:

"Work shall be accomplished in accordance with the Manufacturer's recommendations. In the event of a conflict between the Manufacturer's recommendations and the Specifications, the Manufacturer's recommendations shall take precedence. However, if the Specifications require work and/or materials above/beyond the Manufacturer's recommendations without conflict with the manufacturer's recommendations, such additional work and/or materials shall be provided – in addition to that provided pursuant to the Manufacturer's recommendations."

D. Any and all references to – and/or requirement for – testing by "an approved independent commercial testing laboratory" shall be taken to mean an independent testing laboratory

that has been approved by the United States Army Corps of Engineers (USACE) within the last year.

1.6 DOCUMENTS

A. The Contractor shall be responsible for reviewing the complete set of Contract Documents for:

1. Procedures.
2. Space requirements.
3. Materials.
4. Installation sequence.
5. Similar items.

B. The Contractor shall coordinate efforts with all others working on the Project.

1.7 CONTRACTOR USE OF THE PREMISES

A. The Work shall not commence until the Contractor receives a completed AF Form 103 from Base Engineering.

B. Confine construction activities to areas defined for the Work in the Specifications and on the Drawings – or specifically assigned for that use by the Contracting Officer. Do not use any other areas on Government premises without written consent of the Contracting Officer.

C. Do not unreasonably encumber the Site with materials or equipment.

D. Assume full responsibility for protection and safekeeping of products stored at the Site.

E. The Government will occupy the premises during the construction period. Coordinate required shutdowns of building areas with the Government to facilitate construction operations and minimize conflict with Government usage.

F. The building occupants will remove personal and work-related materials from the work areas prior to the Contractor starting work in those areas.

G. Move, protect, store, and return furniture, equipment, and other items as necessary to complete painting, wall covering, tiling, carpeting, or any other work. Cover the existing furniture with durable drop cloths and develop a schedule to minimally impact the occupants.

1.8 CUTTING AND PATCHING

A. Perform cutting necessary for the installation of the Work. Perform patching required as a consequence thereof.

1.9 SITE ADMINISTRATION

A. The Prime Contractor shall assume responsibility for the general charge of the construction and the Site until the Project is turned over to the Government.

1.10 SHOP DRAWINGS

A. Where required by individual sections, submit four copies of the Shop Drawings to the Contracting Officer for approval. The Contractor's responsibility for errors and omission in submittals will not be relieved by the Contracting Officer's review of submittals. Do not begin work that requires submittals until those submittals have been returned with the Contracting Officer's signature indicating review and approval.

1.11 LAYOUT

A. Immediately locate all reference points, layout the Work, and be responsible for all measurements and other work to be executed by the Contractor under the Contract. Exercise precaution to confirm the figures shown on the Drawings before laying out the Work. Note: The Contractor shall be responsible for any errors resulting from a failure to do so.

B. Verify all dimensions of existing and new work. Be responsible for their accuracy. Submit

differences found to the Contracting Officer for consideration before proceeding with the Work. No extra compensation will be permitted because of differences between the actual dimensions and the measurements indicated on the Drawings.

1.12 TESTING

A. Wherever various sections of the Specifications indicate that tests are to be performed, they shall be performed at the expense of the Contractor.

1. Perform laboratory testing using an approved independent Testing Laboratory (ITL)
2. Sampling and handling shall be the responsibility of the Testing Engineer.

B. Submit certified test data results to the Contracting Officer using AF Form 3000.

C. Notify the Government 48 hours prior to testing, so that a representative of the Government may be present during testing.

1.13 TEMPORARY FACILITIES AND CONTROLS

A. Streets, Drives, and Walks:

1. Keep streets and drives clear of equipment, tools, and machinery.
2. If during the execution of this Contract it becomes necessary to obstruct any street, make necessary arrangements with the Contracting Officer's Representative – and the Security Police – at least 48 hours in advance.

a. Keep streets and walks clear of mud and debris caused by construction operations.
b. Provide all drive and sidewalk barriers required and necessary, complete with lights for night use.

B. Provide temporary weather tight closures of openings in exterior surfaces to prevent entry of unauthorized persons. Coordinate with Security Police. Erect and maintain temporary dustproof partitions as required to prevent spread of dust, fumes, and smoke to other parts of the building. At completion of the Work, remove partitions and repair damaged surfaces to match adjacent surfaces.

C. Provide adequate sanitary toilet facilities for all workers employed on the Project. Maintain toilet facilities used by construction employees in a clean and sanitary condition and furnish necessary supplies.

D. Only store materials within the area of the Contract Limits. Do not store materials in a manner creating a nuisance or a fire or traffic hazard. Store flammable and combustible materials separately. Inside storage will not be available to the Contractor.

E. The Contractor shall ensure that all materials and equipment are protected prior to installation and until final acceptance. Storage shall be dry, clean, and safe. Materials or equipment that become damaged, deteriorated, rusted, or defaced due to improper storage shall be fully repaired, refinished, or replaced as directed by the Contracting Officer. Materials or equipment lost through theft or mishandling shall be replaced by the Contractor without additional cost to the Government.

F. Temporary Fire Protection: Observe all provisions of the Government safety regulations relative to fire prevention throughout the construction period. Ensure that applicable permits are visible and kept current.

G. Provide temporary safety equipment in accordance with the requirements of the Government's safety regulations.

H. Utilities:

1. Notwithstanding the provisions of other clauses of the Contract, all reasonably required amounts of water, gas, electricity, and the like, essential to the performance of the Contract, will be made available at no cost to the Contractor from existing systems, outlets, and supplies.

2. Tying into Electrical Utilities: For this entire Project, tie-ins within Government-owned components will be at no cost to the Contractor.
3. Any arrangements with the utility company – or any fees involved in tying into the distribution system owned by the utility company – are the responsibility of the Contractor. The Government will not be held responsible for interruption of utility service and will not be liable for the Contractor's delays, damages, or increased costs occasioned by such an interruption of service.
4. Temporary connections or lines shall be installed, maintained, and removed by the Contractor at no additional expense to the Government and in a manner acceptable to the Contracting Officer.
5. No water may be obtained from the fire hydrants on the Base without permission from both the Contracting Officer and the Base Fire Department.

   a. Temporary water lines connected by the Contractor to hydrants on the Base shall be equipped with reduced pressure backflow preventers.

1.14 PROJECT CLOSE-OUT

A. When the Contractor determines that the Work is complete, submit to the Contracting Officer a request (in writing) for final inspection in accordance with the terms of the Contract.

1.15 CLEANING

A. Conduct cleaning and disposal operations to comply with Federal, State EPA, and local land, air, and water laws.

B. Be responsible for seeing that the Site is kept clean at all times and that a daily cleaning is conducted. Storage shall only take place in designated areas.

C. Unless noted otherwise, all materials removed as a result of the Contractor's operations under the Contract shall become the property of the Contractor and shall be properly disposed of, reused, or recycled – away from the Base – at the expense of the Contractor.

D. Be responsible for final cleaning. See that the building and the Site are in a clean condition

when they are turned over to the Government. At completion of the Work, the Contractor shall remove the Contractor's remaining tools, scaffolding, and surplus materials from the Site.

E. Prior to any demolition/excavation, submit a waste disposal plan for the recycling and disposal of construction waste materials and demolition debris resulting from the Work of this Contract, including:

1. A description of the waste materials and debris to be reused or recycled.
2. The proposed method of collection and transport.
3. The location of proposed disposal and recycling facilities.

4. The name, address, and telephone number for each facility and transporter.

   a. If, for any applicable materials listed in Paragraph H below, recycling facilities are not available within a 100-mile radius of the Base, state that in the plan.

F. Provide all containers required to collect solid wastes collected during the performance of the Contract. At no time shall the Contractor use dumpsters or other waste receptacle maintained by the Base for the disposal of any solid wastes. Small quantities of recyclable materials, such as cardboard, metals, and wood pallets, may be placed in the recycling containers maintained by the Base. Coordinate this exception with the Base Environmental Office.

1. The dumpsters maintained by the Base are periodically checked. If it is determined that the Contractor has placed construction and/or demolition debris (other than the recyclable materials listed above) – or any other waste – in a dumpster or other solid-waste collection unit maintained by the Base, the Contractor will immediately remove said waste and dispose of it – or recycle it – properly, away from the Base.
2. If any waste is dumped in an unauthorized area, immediately remove the material and restore the area to its pre-existing condition.

G. Track the amount of construction/demolition debris and other solid waste that is disposed of under this Contract. It is preferred that the waste be tracked by weight – but tracking the waste by volume (that is, cubic yards) will also be accepted. Submit the amount of waste disposed of – and all associated weight tickets – to the Contracting Officer monthly using AF Form 3000.

H. Transport as much of the recyclable construction waste materials and demolition debris as practicable to a valid recycling facility. The recyclable materials can include:

1. Cardboard.
2. Rubble (asphalt and concrete).
3. Recycled cementitious materials (in concrete mix).
4. Brick.
5. Metals.
6. Wood.
7. Plastic.
8. Insulation.
9. Roofing.
10. Glass.

11. Acoustical ceiling panels.
12. Carpet.
13. Polyvinyl chloride piping.
14. R-22 refrigerant.
15. Ballasts.
16. Other materials applicable to the Project that can be reused or recycled.

I. Submit the amount of materials recycled – and all associated weight tickets – to the Contracting Officer monthly using AF Form 3000.

1.16 RECORD DOCUMENTS

A. Maintain at the Site one copy of the Drawings with redline changes.

B. At completion of the Work, deliver Record Documents to the Contracting Officer.

1. Be responsible for the preparation and furnishing of marked-up Contract Drawings including all of the Work of this Contract. Record, using colored pencil, in a neat, workmanlike manner, all cases where actual field construction differs from the Work as indicated by the Contract Documents – as well as changes in location and in elevation. Dimension concealed work and utility locations.
2. These marked-up Contract Drawings will not be acceptable as Shop Drawings.
3. Maintain these marked-up Contract Drawings at the Site as an up-to-date set of Contract Drawings. At completion of the Work, turn this set of marked-up Contract Drawings over to the Contracting Officer for the updating of Record Drawings.

C. At completion of the Work, furnish four copies of a manual of information describing the products used for the Contract.

1. This manual shall serve as a reference to the products for potential maintenance and repair purposes.
2. This manual shall not supersede requirements for manuals or other information as may be stated in the submittal list and other sections of this Contract.

3. As applicable to the Contract:

a. This manual shall cover products such as:
   1) Concrete.
   2) Unit masonry.
   3) Interior woodwork.
   4) Steel studs.
   5) Insulation.
   6) Roofing.
   7) Metal wall panels.
   8) Sealants.
   9) Door and door frames.
   10) Windows
   11) Entrance Framing System
   12) Glass and Glazing

13) Gypsum board.
14) Door hardware.
15) Ceramic tile.
16) Folding Accordion partition
17) Paint.

Note: Do not turn containers of paint over to the Government.

18) Toilet accessories
19) Plumbing fixtures.
20) HVAC equipment.
21) Lighting components.
22) Fire detection equipment
23) Similar products.

b. This manual shall present product information such as:
1) Catalog cut sheets.
2) Manufacturer's names.
3) Brand names.
4) Model/serial/part numbers or product types.
5) Color names/codes and the like.
6) Room number and/or location where the product was used.

4. Furnish each copy of this manual in a three-ring binder from which material can readily be removed and replaced. Clearly label the exterior spine and front cover of each binder indicating:

a. The Contract number.
b. The Project number.
c. The Project title.
d. The submittal number.
e. The contents of the binder.

1.17 PHOTOGRAPHY PERMIT

A. Prior to taking any photographs or video recordings – either for internal record or as required by the terms of the Contract – prepare a request for a photography permit, in letter format, and submit it to the Contracting Officer using AF Form 3000. The request shall indicate:

1. The Contract number.
2. The term of the Contract.
3. The locations or the Site(s) to be photographed.
4. Proposed dates and times to be accomplished.
5. Reason for photography complete with justification.
6. Whether the Contractor intends to take photographs and/or video recordings.

B. Provide a copy of any and all photographs and/or video recordings to the Government within ten calendar days of being taken, using AF Form 3000.

1. Still images shall be digital and submitted in compact disc (CD) format.
2. Video recordings shall be provided in either of the following formats:
   a. Digital Versatile Disc (DVD).
   b. Video Home System (VHS).
3. Clearly label the CD, DVD, or the videocassette and the videocassette case indicating:
   a. The Contract number.
   b. The Project number.
   c. The Project title.
   d. The date taken.

PART 2 – PRODUCTS – Not Used

PART 3 – EXECUTION – Not Used

END OF SECTION 01 00 00

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 01 30 01 - SUBMITTAL DESCRIPTIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUBMITTAL CLASSIFICATION

A. Related Documents: Other requirements pertaining to submittals are included in:

1. The CONTRACT CLAUSES.
2. SECTION 01 33 00 – SUBMITTAL PROCEDURES.

B. Submittals required by the CONTRACT CLAUSES and other non-technical parts of the Contract are not included in this Section.

C. The submittals described below are those required and further described in other sections of the specifications.

1. Submittal Description No. 1 (SD-01) – Data: Submittals that provide calculations, descriptions, or documentation regarding the Work.
2. Submittal Description No. 2 (SD-02) – Not Used.
3. Submittal Description No. 3 (SD-03) – Not Used.
4. Submittal Description No. 4 (SD-04) – Drawings: Submittals that graphically show:
   a. Relationship of various components of the Work.
   b. Schematic diagrams of systems.
   c. Details of fabrication.
   d. Layouts of particular elements.
   e. Connections.
   f. Other relational aspects of the work.
5. Submittal Description No. 5 (SD-05) – Not Used.
6. Submittal Description No. 6 (SD-06) – Instructions: Preprinted materials describing installation of a product, system, or material, including special notices and material safety data sheets, if any, concerning impedances, hazards, and safety precautions.
7. Submittal Description No. 7 (SD-07) – Schedules: Tabular lists showing location, features, or other pertinent information regarding products, materials, equipment, or components to be used in the Work.
8. Submittal Description No. 8 (SD-08) – Statements: Documents, required of the Contractor, or through the Contractor from a Supplier, Installer, Manufacturer, or other lower tier Contractor, the purposes of which is to confirm the quality or orderly progression of a portion of the Work by:

a. Documenting procedures.
b. Acceptability of methods or personnel.
c. Qualifications.
d. Other verifications of quality.

9. Submittal Description No. 9 (SD-09) – Reports: Reports of inspections or tests, including analysis and interpretation of test results. Each report shall be properly identified, signed, and dated. Test methods used shall be identified and test results shall be recorded.
10. Submittal Description No. 10 (SD-10) – Not Used.
11. Submittal Description No. 11 (SD-11) – Not Used.
12. Submittal Description No. 12 (SD-12) – Not Used.
13. Submittal Description No. 13 (SD-13) – Certificates: Statements signed by an official authorized to certify on behalf of the Manufacturer of a product, system, or material, attesting that the product, system, or material meets specified requirements. The statement shall:

    a. Be dated after the award of this Contract.
    b. State the Contractor's name and address.
    c. Name the Project and its location.
    d. List the specific requirements that are being certified.

14. Submittal Description No. 14 (SD-14) – Samples: Samples, including both fabricated and unfabricated physical examples of materials, products, and units of the Work – as complete units or as portions of units of the Work.
15. Submittal Description No. 15 (SD-015) – Not Used.
16. Submittal Description No. 16 (SD-16) – Not Used.
17. Submittal Description No. 17 (SD-17) – Not Used.
18. Submittal Description No. 18 (SD-18) – Records: Documentation required to record compliance with technical or administrative requirements.
19. Submittal Description No. 19 (SD-19) – Operation and Maintenance Manuals: Data that forms a part of an operation and maintenance manual.

PART 2 – PRODUCTS – Not Used

PART 3 – EXECUTION – Not Used

END OF SECTION 01 30 01

SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section, including – but not limited to – the following.

1. SECTION 01 00 00 – GENERAL REQUIREMENTS: Other required submittals:

   a. The Waste Disposal Plan for the recycling and disposal of waste GEORGIA SENials resulting from the Work under this Contract.
   b. A monthly accounting of the amount of waste disposed of – and all associated weight tickets.
   c. A monthly accounting of the amount of material recycled – and all associated weight tickets.
   d. Marked-up Contract Drawings.
   e. The Manual of Information.
   f. A Request-for-Photography Permit.
   g. Copies of any and all photographs and/or video recordings.

2. SECTION 01 35 43 – ENVIRONMENTAL PROCEDURES: The required detailed proposal for implementing specified requirements for environmental pollution control, including a Sediment and Erosion Control Plan.

1.2 REFERENCES

A. United States Air Force (USAF or AF) Forms: The following documents can be found at the end of this Section.

1. Schedule of Material Submittals (AF Form 66) aka "Submittal Register."
2. The Material Approval Submittal Transmittal Form (AF Form 3000).
3. The Contract Progress Schedule (AF Form 3064).

1.3 DEFINITIONS

A. Submittals requiring "Government approval":

1. "Government approval" is required for:

   a. Extensions of design.
   b. Critical materials.
   c. Deviations.
   d. Equipment whose compatibility with the entire system is required to be checked.
   e. Other items as designated by the Contracting Officer.

2. Within the terms of the Contract, submittals requiring "Government approval" are considered to be “Shop Drawings.”

B. Approved Submittals:

1. The approval of submittals by the Contracting Officer shall not be construed as a complete check, but will indicate only that the general method of construction, materials, detailing and other information are satisfactory. Approval will not relieve the Contractor of the responsibility for any error that might exist. The Contractor remains responsible for the dimensions and the design of adequate connections, details, and satisfactory construction of the Work.

2. After submittals have been approved by the Contracting Officer, no resubmittal for the purpose of substituting materials or equipment will be given consideration unless accompanied by an explanation as to why a substitution is necessary.

C. Disapproved Submittals: Make all corrections required by the Contracting Officer and furnish a corrected submittal within five calendar days in the form and number of copies as specified for the initial submittal.

1. If the Contractor considers any correction indicated on the submittals to constitute a change to the Contract, give prompt notice to the Contracting Officer as required by the terms of the Contract.

PART 2 – PRODUCTS – Not Used

PART 3 – EXECUTION

3.1 GENERAL

A. Submit four copies of all items listed on the Submittal Register or specified in the other sections of the Specifications.

B. The Contracting Officer may request submittals in addition to those listed when deemed necessary to adequately describe the work covered in the respective sections.

C. Units of weights and measures used on all submittals shall be the same used on the Contract Drawings.

D. Each submittal shall be complete and in sufficient detail to allow ready determination of compliance with the requirements of the Contract.

E. Prior to submittal, all items shall be checked and approved by the Contractor.

F. Proposed deviations from the contract requirements shall be clearly identified.

G. Submittals shall include items as:

1. The Contractor's, manufacturer's, or fabricator's drawings.
2. Descriptive literature including – but not limited to:
   a. Catalog cuts.
   b. Diagrams.
   c. Operating charts or curves.
3. Test reports.
4. Test cylinders.
5. Samples
6. Operations and maintenance manuals (including parts list).
7. Certifications.
8. Warranties.
9. Other similar required submittals.

H. Submittals requiring Government approval shall be scheduled and made prior to the acquisition of the material or equipment covered thereby.

3.2 SUBMITTAL REGISTER

A. At the end of this Section is a Submittal Register showing – at a minimum – which submittals are required by the Specifications.

3.3 SCHEDULING

A. Submittals covering component items forming a system or items that are interrelated shall be scheduled to be coordinated and submitted concurrently.

B. Certifications that are specified to be submitted with related Shop Drawings shall be so scheduled.

C. Allow adequate time for review and approval. No delays, damages or time extensions will be allowed for time lost due to late submittals.

3.4 SUBMITTAL FORM

A. Use AF Form 3000 for submitting Government-approved submittals in accordance with the instructions on the reverse side of the form. Copies of this form will be furnished to the Contractor.

B. Properly complete this form by filling out all the heading blank spaces and identifying each item submitted. Exercise special care to ensure proper listing of the specification paragraph and/or sheet number of the Contract Drawings pertinent to the data submitted for each item.

3.5 SUBMITTAL PROCEDURE

A. Submittals shall be made as follows:

1 Schedule:

a. Prepare and submit to the Contracting Officer for approval, three copies of the Submittal Register found at the end of this Section.
b. The proposed schedule shall reflect the Contractor's practicable schedule of planned dates of submittal of AF Form 3000.
c. The Submittal Register shall be submitted concurrently with the Contractor's submittal of the required AF Form 3064.
d. The Contracting Officer will review and return submittals received, approved or disapproved, within ten calendar days after receipt.
e. Warranties and operating instructions are required at the completion of the Work, after final inspection.

2 Deviations: For submittals that include proposed deviations requested by the Contractor, set forth in writing the reason for any deviations and annotate such deviations on the submittal. The Government reserves the right to rescind inadvertent approval of submittals containing un-noted deviations.

3.6 NOT USED

3.7 GOVERNMENT - APPROVED SUBMITTALS

A. Upon completion of review of submittals, the submittals will be identified as having received approval by being signed and dated. Three copies of the submittal will be retained by the Contracting Officer and one copy of the submittal will be returned to the Contractor to be retained at the Site.

END OF SECTION 01 33 00

SCHEDULE OF MATERIAL SUBMITTALS	PROJECT NUMBER ZQEL 16- 0012	PROJECT TITLE Sustain/Repair Building 301	SOLICITATION/CONTRACT NUMBER

TO BE COMPLETED BY CONTRACTOR | **-TO BE COMPLETED BY CONTRACT ADMINISTRATOR**

LINE NUMBER	ITEM OR DESCRIPTION OF ITEM, CONTRACT REFERENCE, TYPE OF SUBMITTAL	NUMBER OF COPIES REQUIRED										PLANNED SUBMISSION DATE	DATE RECEIVED IN CONTRACTING	DATE TO CIVIL ENGINEERING	RETURN SUSPENSE DATE	SUBMITTAL NUMBERS	DATE CONTRACTOR NOTIFIED		CONTRACTOR RESUBMITTAL	FINAL APPROVAL	REMARKS
		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER' S RECCOMMENDATIONS	MANUFACTURER' S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS								APPROVED	DIS-APPROVED			
1	DIVISION 01 – Gen'l Rqmts Waste Disposal Plan 01000, 11.E QA/QC Procedure																				
2	Monthly Report of Construction Debris – Disposed of 01000, 11.G QA/QC Report																				
3	Monthly Report of Construction Debris – Recycled 01000, 11.I QA/QC Report																				
4	Marked-Up Contract Drawings 01000. 12.B.3 Closeout Submittal																				
5	Manual(s) of Information 01000, 12.C Closeout Submittal																				
6	Environmental Protection Plan 01570, 1.05.A Informational Submittal																				
7	Sediment and Erosion Plan 01570, 3.01.A.1.b Informational Submittal																				
8	Request to Use Laser Devices 01570, 3.06.C Action Submittal																				
9	Substitution Request (if req'd) 01732, 1.03.B Action Submittal																				

SCHEDULE OF MATERIAL SUBMITTALS	PROJECT NUMBER ZQEL 16-0012	PROJECT TITLE Sustain/Repair Building 301	SOLICITATION/CONTRACT NUMBER

TO BE COMPLETED BY CONTRACTOR	TO BE COMPLETED BY CONTRACT ADMINISTRATOR

LINE NUMBER	ITEM OR DESCRIPTION OF ITEM, CONTRACT REFERENCE, TYPE OF SUBMITTAL	NUMBER OF COPIES REQUIRED										PLANNED SUBMISSION DATE	DATE RECEIVED IN CONTRACTING	DATE TO CIVIL ENGINEERING	RETURN SUSPENSE DATE	SUBMITTAL NUMBERS	DATE CONTRACTOR NOTIFIED		CONTRACTOR RESUBMITTAL	FINAL APPROVAL	REMARKS
		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER' S RECCOMMENDATIONS	MANUFACTURER' S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS								APPROVED	DIS-APPROVED			
10	Request for Cutting & Alteration 01732, 1.03.C.1 Informational Submittal																				
11	Notice of Times and Dates 01732, 1.03.C.2 Informational Submittals																				
12	Demolition Procedures and Operational Sequence 01736, 1.04.A Informational Submittals																				
13	DIV'N 02 – Site Demolition Selective Demolition 024119 1.3 Informational Submittal																				
14	DIVISION 08 – Openings Hollow-Metal Product Data & Shop Drawings 08 11 13-, 1.2 A,B,C Action Submittal																				
15	Door Hardware Product Data & Schedule 08710, 1.3.A,B Action Submittals																				
16	Metal Suspension Systems Product Data 092216, 2.4 A,B,C Action Submittal																				
17	Tiling Product Data 09300, 1.50. A, B, Action Submittal																				
18	Tiling Certificates 09300, 1.50.C.1 Informational Submittals																				

SCHEDULE OF MATERIAL SUBMITTALS	PROJECT NUMBER ZQEL 16-0012	PROJECT TITLE Sustain/Repair Building 301	SOLICITATION/CONTRACT NUMBER

TO BE COMPLETED BY CONTRACTOR	TO BE COMPLETED BY CONTRACT ADMINISTRATOR

LINE NUMBER	ITEM OR DESCRIPTION OF ITEM, CONTRACT REFERENCE, TYPE OF SUBMITTAL	NUMBER OF COPIES REQUIRED										PLANNED SUBMISSION DATE	DATE RECEIVED IN CONTRACTING	DATE TO CIVIL ENGINEERING	RETURN SUSPENSE DATE	SUBMITTAL NUMBERS	DATE CONTRACTOR NOTIFIED		CONTRACTOR RESUBMITTAL	FINAL APPROVAL	REMARKS
		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER' S RECCOMMENDATIONS	MANUFACTURER' S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS								APPROVED	DIS-APPROVED			
19	Acoustical Panel Ceilings Samples for Verification 095123, 1.3.A.B,C Action Submittal																				
20	Resilient Base Manufacturers Instructions 096513, 1.3 A Informational Submittal																				
21	Tile Carpeting Product Data 096813, 1.40.A Action Submittal																				
22	Painting and Coating Product Data and Schedule 099100, 1.3.A, B, C Action Submittal																				
23	DIVISION 10 - Signage 101400, 1.30.A,B,C Shop Drawings, Product Data, & Samples																				
24	DIVISION 12 – Roller Shades 122123, 1.50.A,B,C,D,E.F Shop Drawings, Product Data, & Samples																				
25	DIVISION 23 – HVAC 2301001, 1.07.A,B,C Shop Drawings																				
26	Pipe Hangers And Supports Section 15178, 1.04.A Shop Drawings & Product Data Submittals																				
27	DIVISION 26 – Electrical Interior & Exterior Ltg. Fixtures 16511, 1.04.A Product Data																				

SCHEDULE OF MATERIAL SUBMITTALS	PROJECT NUMBER ZQEL 16-0012	PROJECT TITLE Sustain/Repair Building 301	SOLICITATION/CONTRACT NUMBER

TO BE COMPLETED BY CONTRACTOR	TO BE COMPLETED BY CONTRACT ADMINISTRATOR

LINE NUMBER	ITEM OR DESCRIPTION OF ITEM, CONTRACT REFERENCE, TYPE OF SUBMITTAL	NUMBER OF COPIES REQUIRED										PLANNED SUBMISSION DATE	DATE RECEIVED IN CONTRACTING	DATE TO CIVIL ENGINEERING	RETURN SUSPENSE DATE	SUBMITTAL NUMBERS	DATE CONTRACTOR NOTIFIED		CONTRACTOR RESUBMITTAL	FINAL APPROVAL	REMARKS
		CERTIFICATION OF COMPLIANCE	SHOP DRAWINGS	SAMPLES	COLOR SELECTION	MANUFACTURER' S RECCOMMENDATIONS	MANUFACTURER' S WARRANTY	CATALOG DATA	OPERATING INSTRUCTIONS								APPROVED	DIS-APPROVED			
28	Interior & Exterior Ltg. Fixtures 16511, 1.04.B Operation and Maintenance																				
29	Interior & Exterior Ltg. Fixtures 16511, 1.04.C Warranties																				
30	DIVISION 27 Communications 270500, 1.2.A Product Data																				
31																					
32																					
33																					
34																					
35																					
36																					

BASE CIVIL ENGINEERING WORK CLEARANCE REQUEST

(See Instruction s on Reve rse)

DATE PREPARED

1. Clearance is requested to proceed with work at _____

on work Order No. _____ • Contract No. _____ • involving excavation or utili ty disturbance per

attached sketch. This area D has D has not been staked or clearly marked.

2. TYPEOF FACILITY/WORKINVOLVED

	A. PAVEMENTS		D. FIRE DETECTION & PROTECTION SYSTEMS				G. AIRCRAFT OR VEHICULAR TRAFFIC FLOW
	B. DRAINAGE SYSTEMS		E. UTILITY	OVERHEAD	UNDERG ROUND		H. SECURITY
	C. RAILROAD TRACKS		F. COMM	OVERHEAD	UNDERGRf\1 IND		I. OTHER

3. DATE CLEARANCE REQUIRED	4. DATE OF CLEARANCE	
5. SIGNATURE OF REQUESTING OFFICIAL	6. TELEPHONE NO.	7. ORGANIZATION

	ORGANIZATION	REMARKS *(Use Reverse for additional comments)*	REVIEWER'S NAMEAND INITIALS
8. BASE CIVIL ENGINEERING	A. ELECTRICAL DISTRIBUTION		
	B. STEAM DISTRIBUTION		
	C. WATER DISTRIBUTION		
	D. POL DISTRIBUTION		
	E. SEWER DISTRIBUTION		
	F. ENVIRONMENTAL		
	G . PAVEMENTS/ GROUNDS		
	H. FIRE PROTECTION		
	I. ZONE _____		
	J. OTHER *(Specify)*		
9. SECURITY POLICE			
10. SAFETY			
11. COMMUNICATIONS			
12. BASEOPERATIONS			
13. CABLETV			
8 14. COMMERCIAL UTILITY COMPANY TELEPHONE GAS n ELECTRIC			

15. OTHER *(Specify)* _____

16. REQUESTED CLEARANCE D APPROVED D DISAPPROVED

17. TYPED NAME AND SIGNATURE OF APPROVING OFFICER *(Chief of Operation s Flight or Chief of Engineering Flight)*

17a. DATE SIGNED

INSTRUCTTONS

The BCE work clearance request is used for any work (contract or in-house) that may disrup t aircraft or vehicular traffic flow, base utility services, protection provided by fire and intrusion alarm system, or routine activities of the installation. This form is used to coordinate the required work with key base activities and keep customer inconvenience to a minimum. It is also used to identify potentially hazardous work conditions in an attempt to prevent accidents. The work clearance request is processed just prior to the start of work. If delays are encountered and the conditions at the job site change (or may have changed) this work clearance request must be reprocessed.

18. REMARKS. *(This section must describe specific precautionary measure to be taken before and during work accomplishment. Specific comments concerning the approved method of excavation, hand or powered equipment, should be included.)*

MATERIAL APPROVAL SUBMIT TAL

(See Instructions on Reverse)

Form Approved
0MB No 9000-0062
Expires May 31, 2005

PUOIIC ... Ing DUIUC:"11 for InIS ... Ion OI IIIIvIIIoIIOn IS ... gathering and maintaining the data needed, and completing and reviewing the collection o information. Send comments regarding this burden estimate or any other aspect of this collection of 1nfonmallon Including suggestions for reducing this burden lo Ihe Department of Defense, Washington Headquarters Services, Directorate for Infonmallon Operations and Reports, 1215Jefferson Davis Higiwa Suite 1204, Arlington VA 22202-4302, and lo Ihe Office of Management and Budget, Paperwork Reduction Project 0MB No 9000-0062, Washington DC 20503. Please D NO RETURN your form lo either of these addresses. Send your completed form to: SAF/AQCP, 1060 Air Force Pentagon. Washington DC

TO: *(Contracting Officer)*	**FROM:** *(Contractor)*	DATE *(YYYYMMDD)*
CONTRACT NUMBER	SUBMISSION NUMBER	SUBMIIT AL D NEW D RESUBMITI AL
PREVIOUS SUBMISSION NUMBER	PROJ E CT NUMB ER	

TO BE COMPLETED BY CONTRACTOR			FOR GOVERNMENT USE ONLY			
ITEM NO.	SPECIFICATION SECTION/ PARA NO./DRAWINGNO.	DESCRIPTION OF MATERIAL *(Include Type, Model Number, Catalog Number, Mfg., etc.)*	AP-PROVED	DISAP-PROVED	SEE REVERSE	INITIAL
			D	D	D	
			D	D	D	
			D	D	D	
			D	D	D	
			D	D	D	
			D	D	D	
			D	D	D	
			0	0	0	
			0	D	0	
			0	D	0	
			0	0	0	

BY COMPLETING THIS FORM, THE UNDERSIGNED CONTRACTOR CERTIFIES THAT THE MATERIAL COMPLIESWITH ALL SPECIFICATIONS OF SUBJECT CONTRACT.

DATE *(YYYYMMDD)*	TYPE OR PRINT NAME AND TITLE	SIGNA T UR E

FOR GOVERNMENT USE ONLY

TO: *(Base Civil Engineering Officer)*

For Evaluation and Action

DATE *(YYYYMMDD)*	TYPE OR PRINT NAME AND GRADE	SIGNATURE

TO: *(AF Contracting Office)*

RECOMMEND | | APPROVAL 1 1 | DISAPPROVAL AS INDICATED ABOVE AND SUBJECT TO ANY APPLICABLE COMMENTS ON THE REVERSE

DATE(YYYYMMDD)	TYPE OR PRINT NAME AND GRADE	SIGNATURE

TO : *(Contrac tor)*

D APPROVED

DISAPROVED AS INDICATED ABOVE AND SUBJECT TO ANY APPLICABLE COMMENTS ON THE REVERSE SIDE. REQUEST RESUBMIIT AL ON DISAPPROVED ITEMS WITHIN DAYS OF DATE SHOWN BELOW

DATE *(YYYYMMDD)*	TYPE OR PRINT NAME AND GRADE	SIGNATURE

COMMENTS

(Number to correspond with applicable Item Number on reverse)

INSTRUCTIONS TO CONTRACTORS

1. The term ·material" is defined as articles, supplies, raw materials, equipment, parts, components, and end items that are to be incorporated into the work required by the contract.

2. This form is to be used by contractors for submitting Shop Drawings, Equipment Data, Manufacturer's Literature and Certificates and samples of Materials to the Government for approval in accordance with the provisions of this contract. Unless otherwise specified, it is to be preparedin 4 copies, signed, and provided to the contracting officer with appropriate attachments.

3. Item(s) to be approved will be clearly tabbed or identified. Data pertaining lo item(s) to be approved will be clearly identified or tabbed, particularly where documents are voluminous, in order to properly evaluate the materials or articles to be incorporated in the work. Each attachment will be numbered to correspond with the item number shown on the face of this form.

4. Requests submitted shall be numbered consecutively, by contract, in the space entitled "Submission No.·. This number, in addition to the Contract No., will be used to identify each Material Approval Submitta.l Resubmissions will be indicated in the appropriate block and the insertion of previous submission number and data in addition to a new submissio n number. A single submission should be used for all work of a section of the specifications, but in NO instance should the submission include work for more than one (1) contract. Submiltals requiring priority handling will be submitted by separate submittal using the form and so marked across the face of the form.

5. This Material Approval Submittal is not valid unless ii is signed by the contracting officer. This approval is required as called for by the contracting officer under the terms of this contract.

CONTRACT PROGRESS SCHEDULE

*(See Contractor's Instructions on **Reverse**)*

Form Approved
0MB NO. 0704-0188

Publie reporting burden tor this collection of information Is estimated to average 15 minutes per response, rncluding the lime for reviewing mstruchons. searching existing data sources. gathering and mamtammg the data needed. and completing and reviewmg the collect,on of information. Send comments regarding thrs burden estimate or any other aspect of this collec11on 04 information. Including suggestions for reducing this burden to Department of Defense. Washington Headquarters Services, Directorate for Information, Operations and Reports. 1215 Jefferson Oav,s Highway, Sutte 1204. Arlington VA 22202-4302. and to the Office of Management and Budget Paperwork Reduction Project 0704-0188. Washington DC 20503. Please DO NOT RETURN your form/questionnaire to either of these addresses. Send your completed form/quest1onnaIre lo: SAF/AQCP, 1060 Air Force Pentagon. Washington DC 20330-1060

1. CONTRACT NO.		8. PROJECT TITLE		10. APPROVAL RECOMMENDED BY:	
2. STARTING DATE				DATE SIGNED	INSTALLATIONS ENGINEER'S SIGNATURE
3. COMPLETION DATE		9. SUBMITTED BY:			
4. PURCHASE REQUEST NO.		DATE SIGNED	CONTRACTOR'S NAME *(Last, First, Middle Initial)* ADDRESS *(Street, City, State, Zip Code)*	CONTRACTOR'S SIGNATURE	11. APPROVED BY:
5. PROJECT NO.					DATE SIGNED / CONTRACTING OFFICER'S SIGNATURE
6. ACTUAL STARTING DATE					
7. ACTUAL COMPLETION DATE					

LINE NO A	WORK ELEMENTS B	% C	WEEKS D	E	F	G	H	I	J	K	L	M	N	0	P	a

INSTRUCTIONS TO CONTRACTORS

1. Prepare three copies of AF Form 3064, in accordance with these instructions, and submit to the contracting officer at the time stated in the contract or as established by the contracting officer.

2. Blocks 1, 2, and 3. Enter the contract number, starting date, and completion date as shown on the contract.

3. Block 8. Enter the title of the project as shown on the contract.

4. Block 9. Enter name and address of your firm. The three copies submitted to the contracting officer must be dated and signed by the contractor or an authorized representative of the firm.

5. Lines 1 through 12. Major elements of work *(whether unit price or lump sum contract)* such as excavation, concrete work, carpentry, engineering, installation of communication electronic facilities, etc., will be shown in Column B in logical sequence and in sufficient detail to identify the element. If the contract calls for more than 11 work elements, additional copies of the AF Form 3064 may be used as a continuation for the work elements.

6. The percentage of each listed work element to the complete job will be shown opposite each element in Column C. As an example, if 3 work elements are shown: excavation, concrete work, and backfill, and it is estimated that excavation is 50% of the total job, concrete 30%, and backfill 20%, these percentages will be shown opposite each element. The total must equal 100%.

7. Columns D through Q will be used to show planned periodic progress, as required by the contracting officer, during the period of the contract. Only the top half of the space under these columns will be used by contractors. Using the example cited above and assuming that the contract period for performance is 8 weeks, and it is planned to accomplish 10% of the excavation work the 1st week and 20% each week until excavation is complete, 10 would be shown in the upper half of Line 1 under Column D, 20 under Column E, and 20 under Column F for a total of 50%. If it is planned to accomplish the concrete work during the 4th, 5th, and 6th weeks in equal amounts, 10 would be entered under Columns G, H, and I on Line 2. Assuming the backfill will be accomplished during the 7th and 8th weeks, 10 would be entered under Columns J and K on Line 3. If the contract extends beyond 14 weeks, additional copies of AF Form 3064 may be used as a continuation of performance record.

8. Total amount of work planned at intervals as shown in Columns D through Q will be totaled and entered in the top half of the space under the appropriate column of Line 12. Again, using the example cited above, the totals under Columns D through K would read 10, 20, 20, 10, 10, 10, 10, 10 for a total of 100%. These totals will be used to plot an overlay graph using Lines 4 through 11, beginning with Column D and extending to the right the number of columns *(weeks)* authorized by the contract for performance time.

9. In the event the contract is modified by the contracting officer under terms of the contract, changing the progress of work as originally scheduled, adding or deleting work or changing the original completion date, a revised progress schedule will be prepared and submitted to the contracting officer for approval. In preparing the revised schedule, the amount of work completed will be considered, together with the changed new completion date set forth in the contract modification. Considering these factors, the work under the contract will be rescheduled over the new total performance time in the same manner that the original schedule was prepared. The new completion date will be entered in Block 3. "First Revised Schedule," "Second Revised Schedule," etc., will be entered to the left of the form title. Time of submission of the revised schedule will be determined by the contracting officer.

10. At such intervals as may be established by the contracting officer, the contractor will submit to the contracting officer AF Form 3065, "Contract Progress Report," indicating the percentage of work accomplished for each work element during the established reporting period. Accurate reports are of the utmost importance to the contractor and to the Government, since the percentage of completion, or progress, thus reported is used in administration of the contract and may be used in connection with approval of partial payments under the contract. Care should be taken to plan the work in such manner that it can be accomplished as stated in this schedule. If, for any reason, it becomes known that any part of the progress under this contract will be delayed, this fact should be reported to the contracting officer immediately.

CONTRACT PROGRESS REPORT

0MB NO. 0704..()188

Public reporting burden for this coflectk>n ol Informat1on Is estimated to average 15 minutes per response, including the time for rev,ewmg Instruct10ns, searching exislmg data sources, gathering and mamtam1ng the data needed. and completing and reviewing the collection of Information. Send comments regarding this burden estimate or any other aspect of this collection of Information. Including suggest1ons for reducing this burden to the Department of Defense. Washington Headquarters Services, Directorate for Information Operations and Reports (0MB No. 0000·0058). 1215 Jefferson Dav,s Highway. Suite 1204. Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subJect to any penalty for falling to comply with a collect,on of mformat1on If it does not display a currently valid 0MB control number.

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS. RETURN COMPLETED FORM TO: SI>F/AOCO, 1060 Air Force Pentagon, Washington DC 20330-1060.

CONTRACTOR	ADDRESS
REPORT NO. PERIOD COVERED FROM: TO: PROJECT NO.	CONTRACT NO. COMPLETION DATE

LINE NO.	WORK ELEMENT	% OF TOTAL JOB	% COMPLETED THIS PERIOD	% COMPLETED CUMULATIVE
	TOTAL			

REMARKS

At the Contracting Officer's discretion and according to the payments clause of the contract, the information provided on this form may be used for computing progress payments.

PROGRESS OR COMPLETION CERTIFICATE

I hereby certify that the contractor I1as satisfactorily completed the indicated percentage of the contract per contract specifications.

SUBMITTED BY OR FOR

☐ CONTRACTOR ☐ BASE CIVIL ENGINEER

TYPE OR PRINT NAME AND TITLE	SIGNATURE	DATE

REVIEWED BY OR FOR CONTRACTING OFFICER

TYPE OR PRINT NAME AND TITLE	SIGNATURE	DATE

SECTION 01 35 43 - ENVIRONMENTAL PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Contractor Liabilities for Environmental Protection:

1. Government installations must comply with environmental protection laws including – but not limited to the following:

a. The Clean Water Act
b. The Clean Air Act
c. The Resource Conservation and Recovery Act.
d. The Federal Facilities Compliance Act.

2. The United States Environmental Protection Agency (USEPA) has granted inspection and enforcement authority to the State of Ohio Environmental Protection Agency (Ohio EPA).

a. Inspection by either agency might include questioning of the construction personnel who are working with or have contact with hazardous materials and waste.
b. Complete – and provide documentation of – environmental training required by federal, state, and local regulations.

1.3 REFERENCES

A. The publications listed below form a part of the requirements of this Section to the extent referenced. The publications are referenced in the text using the basic designation only.

1. United States Air Force (USAF or AF) Forms: The following documents can be found at the end of SECTION 01 33 00 – SUBMITTAL PROCEDURES.

a. Material Approval Submittal (AF Form 3000).
b. Contractors Progress Reports (AF Form 3065).

2. Code of Federal Regulations (CFR):

a. 40 CFR 261: Identification and Listing of Hazardous Waste (1999).
b. 40 CFR 262: Generators of Hazardous Waste (1999).
c. 40 CFR 263: Transporters of Hazardous Waste (1999).
d. 40 CFR 264: Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (1999).

e. 40 CFR 265: Interim Status Standard for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities (1999).
f. 40 CFR 300: National Oil and Hazardous Substances Pollution Contingency Plan (1999).
g. 40 CFR 355: Emergency Planning and Notification (2003)
   1) Appendix A: The List of Extremely Hazardous Substances and Their Threshold Planning Quantities.
h. 49 CFR 171: General Information, Regulations, and Definitions (1999).
i. 49 CFR 172: Hazardous Materials, Tables, and Hazardous Materials Communications Regulations (1999).
j. 49 CFR 178: Shipping Container Specification (1999).

3. Corps of Engineers (COE): Safety and Health Requirements Manual (COE EM-385-1-1 (1996)).
4. Executive Orders: Greening the Government Through Leadership in Environmental Management, 21 April 2000 (13148).
5. NFPA International: Safeguarding Construction, Alteration, and Demolition operations (NFPA 241 (2000)).
6. United States Department of Defense (USDoD) Military Standard: Requirements for the Control of Electromagnetic Interference Characteristics of Subsystems and Equipment, Revision E (MIL-STD-461E, 20 August 1999).

1.4 DEFINITIONS

A. Sediment = Soil and other debris that have eroded and have been transported by runoff water or wind.

B. Solid Waste = Rubbish, debris, garbage, and other discarded solid materials (except hazardous waste as defined in paragraph entitled "Hazardous Waste") resulting from industrial, commercial, and agricultural operations and from community activities.

C. Sanitary Wastes = Wastes characterized as domestic sanitary sewage.

D. Rubbish = Combustible and noncombustible wastes such as paper, boxes, glass, crockery, metal, lumber, cans, and bones.

E. Debris = Combustible and noncombustible wastes such as ashes and waste materials resulting from construction or maintenance and repair work, leaves, and tree trimmings.

F. Chemical Wastes = This includes salts, acids, alkalis, herbicides, pesticides, and organic chemicals.

G. Garbage = Refuse and scraps resulting from preparation, cooking, dispensing, and consumption of food.

H. Hazardous Waste = Hazardous substances as defined in 40 CFR 261 or as defined by applicable state and local regulations.

I. Hazardous Materials = Hazardous materials as defined in 49 CFR 171 and listed in 49 CFR 172.

J. Landscape Features = Trees, plants, shrubs, and ground cover.

K. Lead Acid Battery Electrolyte = The electrolyte substance (liquid medium) within a battery cell.

L. Oily Waste = Petroleum products and bituminous materials.

M. Class I Ozone-Depleting Substance (ODS) = Class I ODS is defined in Section 602(a) of The Clean Air Act and includes the following chemicals:

1. Chlorofluorocarbon-11 (CFC-11).
2. Chlorofluorocarbon-12 (CFC-12).
3. Chlorofluorocarbon-13 (CFC-13).
4. Chlorofluorocarbon-111 (CFC-111).
5. Chlorofluorocarbon-112 (CFC-112).
6. Chlorofluorocarbon-113 (CFC-113).
7. Chlorofluorocarbon-114 (CFC-114).
8. Chlorofluorocarbon-115 (CFC-115).
9. Chlorofluorocarbon-211 (CFC-211).
10. Chlorofluorocarbon-212 (CFC-212).
11. Chlorofluorocarbon-1, 213 (CFC-213).
12. Chlorofluorocarbon-214 (CFC-214).
13. Chlorofluorocarbon-215 (CFC-215).
14. Chlorofluorocarbon-216 (CFC-216).
15. Chlorofluorocarbon-217 (CFC-217).
16. Halon-1211.
17. Halon-1301.
18. Halon-2402.
19. Carbon tetrachloride.
20. Methyl chloroform.

N. Industrial Hygienist = A hygienist certified by the American Board of Industrial Hygiene.

1.5 SUBMITTALS

A. Statements (SD-08): Within ten calendar days after Notice-to-Proceed – and prior to commencement of the Work at the Site – submit in writing (in accordance with SECTION 01 30 01 – SUBMITTAL PROCEDURES) a detailed proposal for an Environmental Protection Program to implement requirements for the environmental pollution controls specified herein, including a Sediment and Erosion Control Plan.

1.6 Quality Assurance

A. Regulatory Requirements:

1. Hazardous Waste, Spills, and Asbestos:

a. Hazardous Waste/Spill Response:

1) Unless otherwise specified in this Contract, no hazardous waste as defined in 40 CFR 261 will be generated by the Contractor; however, should the Contractor cause a hazardous material release, the Contractor shall immediately take action to stop the release and clean up the material.

A. Notify the Base Fire Department immediately if a large spill occurs.

B. The Contractor shall verbally notify the Contracting Office as soon as the leak has been stopped and cleaned up – followed by a written notification/report of the incident to the Contracting Officer within one day.

C. The Contractor shall be responsible for having adequate spill response equipment and material at the Site to clean up any hazardous material release created by the Contractor.

D. The spill residue, which includes the hazardous material, absorbent used in the clean up action, and contaminated soil, if any, will be placed in an appropriate container.

E. Replace any excavated contaminated soil with suitable fill material and return the area to its original condition, all at the Contractor's expense.

F. It shall be the Contractor's responsibility to analyze the spill residue for hazardous waste characteristics – and to dispose of accordingly.

G. Clean-up actions, hazardous waste analysis, and disposal shall be at the Contractor's expense and shall be accomplished per all applicable USEPA and OSHA requirements.

2) The Contractor will be monitored for compliance with USEPA hazardous waste requirements. Any violations of said requirements will be made known to the Ohio EPA and/or the USEPA. The Contractor shall be responsible for any fines or penalties assessed by either agency.

b. Spill Containment:

1) The Contractor shall provide secondary containment for all hazardous material containers that have a capacity greater than 30 gallons. This shall include fuels, lubricants, chemical additives, and any other material that requires a Material Safety Data Sheet (MSDS).

2) The secondary containment units may be dikes, containment pallets, overpacks, or similar equipment that will contain a release from the primary container. Secondary containment units shall be compatible with the hazardous material. The Contractor shall

ensure that rainwater does not accumulate in the secondary containment units.

2 Environmental Protection:

a. Provide and maintain, during the life of the Contract, environmental protection as defined. Plan for – and provide – environmental protective measures to:

1) Control pollution that develops during normal construction practice.
2) Correct conditions that develop during the construction of permanent or temporary environmental features associated with the Project.

b. Comply with federal, state, and local regulations pertaining to the environment, including- but not limited to – those regulating water, air, and noise pollution.

c. Class I ODS Prohibition: Class I ODS as defined and identified herein shall not be used in the performance of this Contract – nor be provided as part of the equipment. This prohibition will be considered to prevail over any other provision, specification, drawing, or referenced document.

3. Safety Program:

a. Entry: Entry into a confined or enclosed space by personnel for any purpose, including hot work, shall be prohibited until the qualified person has conducted appropriate tests to ensure the confined or enclosed space is safe for the Work intended. The following definitions apply to this Subsubparagraph only:

1) Confined Spaces (first of two parts) = Refers to spaces that by design have one or more of the following characteristics:
A. Have limited openings for entry and exit.
B. Have unfavorable natural ventilation that could contain or produce dangerous air contaminants.
C. Are not intended for continuous employee occupancy.

2) Confined Spaces (second of two parts) = Include – but are not limited to – the following:

3) Qualified Person = A person designated by the Contractor, in writing, as capable (by education or specialized training) of anticipating, recognizing, and evaluating employee exposure to hazardous substances or other unsafe conditions in a confined space. This person shall be capable of specifying necessary control and protective action to ensure worker safety. Where work involves facilities that handle combustible and hazardous materials, this qualified person shall be an NFPA -certified marine chemist.

4) Entry Permit: The Contractor shall submit for review and approval a Daily Confined Space Entry Permit at any location deemed necessary by the Contracting Officer. Complete the permit at least

24 hours prior to entering a designated confined space. The permit shall be posted in a conspicuous place close to the confined space entrance with a copy furnished to the Contracting Officer.

5) Letter of Certification: Submit to the Contracting Officer a letter of certification for the qualified person. The letter shall state the qualified person's name and qualifications and delineate the qualified person's authority to direct work stoppage in the event of hazardous conditions.

b. Unforeseen Hazardous Material:

1) If material that is not indicated on the Drawings is encountered that might be dangerous to human health upon disturbance during construction operations, stop that portion of the Work and notify the Contracting Officer immediately.

2) The intent is to identify materials such as:
   a. Polychlorinated biphenyl (PCB).
   b. Lead paint.
   c. Friable and non-friable asbestos.

3) Within 14 calendar days, the Government will determine if the material is hazardous. If the material is not hazardous or poses no danger, the Government will direct the Contractor to proceed without change. If the material is hazardous and handling of the material is necessary to accomplish the Work, the Government will issue a modification per the terms of the Contract.

c. Hazardous Noise: Provide hazardous noise signs, as directed, wherever equipment and work procedures produce sound-pressure levels greater than 85 dBA steady state or 140 dBA impulse, regardless of the duration of the exposure. When personnel are subject to sound-pressure levels exceeding the limits specified in COE EM-385-1-1, Table 5-3, they shall be provided with hearing protection.

PART 2 – PRODUCTS

2.1 GENERAL

A. Green Purchasing:

1. Youngstown ARS is obligated to comply with the affirmative procurement requirements of:

   a. Section 6007 of the Resource Conservation and Recovery Act (RCRA).
   b. Executive Order 13148.
   c. The policies of the United States Department of Defense (USDoD) “Green Procurement Program (GPP).”

2. In order to comply, Youngstown ARS requires its Contactors to use, provide, and/or install environmentally preferable products and services in accordance with federally mandated preference programs.
3. Green purchasing includes the acquisition of:
   a. Recycled content products.
   b. Environmentally preferable products and services.
   c. Bio-based products.
   d. Energy- and water-efficient products.
   e. Alternate fuel vehicles.
   f. Products using renewable energy.
   g. Alternatives to hazardous or toxic chemicals.
4. The elements of GPP are described on the Office of the Federal Environmental Executive website (http://www.ofee.gov/gp/gp.htm).
5. The Contractor shall comply with the following agency listings and guidelines/recommendations:

Agency	Listing/Guidelines Website
United States Environmental Protection Agency (USEPA) Comprehensive Procurement Guidelines (CPG)	http://www.epa.gov/cpg
United States Department of Agriculture (USDA) Bio - based Products Guidelines	http://www.biobased.oce.usda.gov
United States Department of Energy (USDOE) Federal Energy Management Program (FEMP) Energy Efficiency Recommendations	http://www.eere.energy.gov/femp/technologies/eep_eerecommendations.cfm
Green Seal Product Standards	http://www.greenseal.org/certproducts.htm

If it is determined that a guideline/recommended product does not meet the specified performance requirements (or other known Government performance requirements), the Contractor shall submit for approval a proposed alternative with the lowest environmental impact that would meet the performance requirements.

6. The Contractor shall provide EPA-designated products containing recovered material unless the item cannot be acquired:

   a. Competitively within a reasonable time frame.
   b. Meeting the appropriate performance standards.
   c. At a reasonable price.

7. Items identified in the USEPA's CPG shall be viewed as the minimum that can be considered when evaluating recycled/reused materials. Other materials and products not listed, but commonly used in industry outside of the Government, shall also be considered.
8. Material and product submittals for all recycled-content items shall list the recycled and recovered materials used and the percentage content listed.

B. Hazardous Materials (HazMat) Management:

1. HazMat Management Program (HMMP): The Contractor shall participate in the HMMP to the extent described in this Contract. Participation shall include:

   a. Designation of a single individual who has experience and knowledge of hazardous materials as the point of contact for HazMat issues.
   b. Provision of MSDSs for all HazMat used or stored on the Base.
   c. Limited storage of HazMat on the Base.
   d. Identification of all HazMat stored or used on the Base through the provisions of contract submittal documentation.
   e. Tracking all HazMat stored or used on the Base.
   f. Implementation of best management practices to prevent spills and other releases to the environment.
   g. Proper storage and management of HazMat while in use or in storage to meet NFPA, OSHA, and RCRA requirements
   h. Participation in an accurate exit inventory of HazMat used on the Base.

2. HAZMART is the central tracking function for HazMat used on the Base. It is located at Building 205.
3. Review of HazMat for Use on the Base:

   a. The Contractor shall submit the current Material Safety Data Sheet (MSDS) for each HazMat to be used for the performance of the Work under this Contract to the Contracting Officer using AF Form 3000 – for review – prior to bringing any HAZMAT onto the Base.

      1) HazMat will be reviewed by personnel in Bioenvironmental Engineering, Safety, and Environmental Engineering.
      2) HazMat reviews are for material tracking purposes only. The Contractor remains responsible for compliance with applicable health and safety requirements for use of HazMat.

   b. Substantiating documentation for the use of any HazMat required to complete work shall be submitted with the MSDS if the HazMat contains any of the following:

      1) USEPA Industrial Toxics Program Chemicals, also known as EPA 17 toxic chemicals.

2) Carcinogens as defined by OSHA.
3) Ozone-depleting chemicals (ODC).
4) Compounds with high volatile organic contents (VOCs).
5) CERCLA 102(a) Extremely Hazardous Substances (EHS) – see Appendix A of 40 CFR 355.
6) Hazardous air pollutants (HAP) – see Section 112 (b)(1) of the Clean Air Act and its amendments.

c. For each HazMat stored or used on the Base, the Contractor shall maintain a current MSDS at the Site where the HazMat is being stored or used, and shall make the MSDSs available for inspection upon request from the Contracting Officer or authorized representative.

4. Tracking Usage of HazMat: The Contractor shall maintain a daily Usage Log for each HazMat.

a. Submit a copy of the updated Usage Log to the Contracting Officer, biweekly – concurrently with AF Form 3065.
b. The Usage Log shall indicate the:
1) Name of the material.
2) Date used.
3) Quantity used in units of measurement consistent with units marked on container.
4) Cumulative quantity used by material for the time period of the log.
5) User of the material.
c. The Usage Log shall include a provision for identification of a HazMat tracking number that will be designated by the Government.
d. Maintain the Usage Logs sequentially for tracking of HazMat.
e. When a HazMat from an individual container is totally used during the Contract period, annotate the Usage Log using a designation for the empty container and noting the date the container was empty. Ensure that all empty containers are removed from the Base and disposed of – or recycled – properly.
f. The Usage Log shall have:
1) The Contractor's name.
2) The Contract number
3) The Project number and title.
4) A sequence/date designation on the sheets.
g. Each sheet of the Usage Log shall be signed and dated by the Contractor.
h. Make the Usage Log available for review upon request by the Contracting Officer or authorized representative.
i. Indicate on the Usage Log the quantities and dates of spillage (if any) for each container – on a daily basis.
j. Upon completion of the Project/Work – and concurrently with submission of the AF 3065 that reflects 100 percent completion –submit a final version of the Usage Log to the Contracting Officer. Include certification

that the final version of the Usage Log is complete and accurate. Such certification shall include:

1) Signature of the firm's authorized representative.
2) Date.
3) Typed/printed name, title, and firm name.

5. HazMat Storage Area:

a. Store all HazMat in their designated HazMat storage area. The Contractor will be subject to visits by the Contracting Officer or the Contracting Officer's representative for assessment of their HazMat storage Site/area for compliance with the requirements specified herein for HAZMAT MANAGEMENT during the Contract period.
b. Ensure that all BEST MANAGEMENT PRACTICES (immediately below) are in place while HazMat is used or stored on the Base.
c. Provide secondary containment for all HazMat being stored and used on the Base when the primary container exceeds 30 gallons. Secondary containment shall be chemically inert to the HazMat being stored and impervious to absorption of that HazMat. The containment volume shall not be less than 10 percent of the total quantity being stored or the equal quantity of the largest container being stored – whichever is greater in volume. Provide separate secondary containment for incompatible HazMat.

6. Best Management Practices:

a. Ensure that the segregation of incompatible materials is accomplished at all times in the Contractor's field office, storage, staging, and work areas.
b. Keep all containers closed when not in use. At the end of the workday, or when finished using any material, return the container to a proper storage area.
c. Follow all Manufacturers' recommendations for storage/use of HazMat.
d. Have current MSDS documents available at all times where employees can access them in case of an emergency at the Site.

7. Spill Control and Cleanup:

a. Be responsible for the cleanup and disposal of all spilled materials whether or not they are hazardous materials, including all materials used to contain and absorb the spill.
b. Spills of hazardous materials shall be managed in accordance with HazMat Emergency Response requirements.
c. Dispose of wastes generated from spill cleanup per the provisions of solid waste and hazardous waste disposal requirements.

8. Hazardous Materials Transport:

a. When quantities of HazMat transported onto the installation meet certain United States Department of Transportation (USDOT) thresholds, use only drivers and vehicles that are permitted by the State of Ohio to

transport hazardous materials onto or off of the Base per the USDOT regulations. Under these conditions:
1) Properly manifest hazardous materials coming onto the Base.
2) Mark vehicles per USDOT specifications for the materials being transported.

c. Remove all unused materials from the Base upon completion of the Work – or when the materials are no longer needed – whichever comes first.

PART 3 – EXECUTION

3.1 GENERAL

A. Perform all of the Work in a manner that minimizes the pollution of air, water, or land. Control – within reasonable limits–noise and the disposal of solid waste materials, as well as other pollutants.

1. Develop a Sediment and Erosion Control Plan.

a. Maintain and control stormwater runoff to ensure that during the construction time period:
1) Erosion does not occur.
2) Sediment is not discharged into the stormwater collection system.

b. Submit the Sediment and Erosion Control Plan for approval by the Contracting Officer prior to commencing of construction.

3.2 PROTECTION OF LAND AREAS

A. The land areas outside the limits of the permanent work performed under this Contract shall be preserved in their present condition.

1. Exception: Work on storage areas and access routes specifically assigned for the use of the Contractor under this Contract

B. Confine construction activities to areas defined for the Work on the Drawings or specifically assigned for the use of the Contractor. Storage and related areas – and access routes required temporarily by the Contractor in the performance of the work – will be assigned by the Contracting Officer. No other areas on Government premises shall be used by the Contractor without written consent of the Contracting Officer.

C. Protection of Natural Resources: Preserve the natural resources within the project boundaries and outside the limits of permanent work. Restore to an equivalent or improved condition upon completion of work. Confine construction activities to within the limits of the work indicated or specified.

1. Land Resources:

a. Do not remove, cut, deface, injure, or destroy trees or shrubs without the Contracting Officer's permission.
1) Exception: Areas to be cleared.

b. Do not fasten or attach ropes, cables, or guys to existing nearby trees for anchorages unless recommended by the arborist or nurseryman and approved by the Contracting Officer. Where such use of attached ropes, cables, or guys is authorized, the Contractor shall be responsible for any resultant damage.

2. Protection:

a. Protect existing trees that are indicated to remain and that may be injured, bruised, defaced, or otherwise damaged by construction operations.

b. Remove displaced rocks from uncleared areas.

c. By approved excavation, remove trees with 30 percent or more of their root systems destroyed.

3. Replacement: Remove trees and other landscape features scarred or damaged by equipment operations, and replace with equivalent, undamaged trees and landscape features. Obtain the Contracting Officer's approval before replacement.

3.3 PROTECTION OF WATER RESOURCES

A. Control the disposal of fuels, oils, bitumens, calcium chloride, acids, or harmful materials, both on and off the Government premises.

B. Comply with applicable federal, state, county and municipal laws concerning pollution of rivers and streams while performing the Work under this Contract.

C. Special measures shall be taken to prevent chemicals, fuels, oils, greases, bituminous materials, herbicides and insecticides from entering public waters.

D. Water used at the Site for material processing, concrete curing, foundation and concrete cleanup, and other waste waters shall not be allowed to reenter a stream if an increase in the turbidity of the stream could result therefrom.

E. Oily Wastes: Prevent oily or other hazardous substances from entering the ground, drainage areas, or local bodies of water. Surround all temporary fuel oil or petroleum storage tanks with a temporary earth berm of sufficient size and strength to contain the contents of the tanks in the event of leakage or spillage.

3.4 TEMPORARY CONSTRUCTION

A. Remove traces of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other signs of construction. Grade temporary roads, parking areas, and similar temporarily used areas to conform to surrounding contours.

3.5 NOISE

A. Make the maximum use of low-noise emission products, as certified by the USEPA. Blasting or use of explosives will be grounds for rejection of the installation.

3.6 RESTRICTIONS ON EQUIPMENT

A. Electromagnetic Interference Suppression

1. Electric motors shall comply with MIL-STD-461 relative to radiated and conducted electromagnetic interference.

   a. A test for electromagnetic interference will not be required for motors that are identical physically and electrically to those that have previously met the requirements of MIL-STD-461.
   b. An electromagnetic interference suppression test will not be required for electric motors without commutation or sliprings having no more than one starting contact and operated at 3,600 revolutions per minute or less.

2. Construction equipment used by the Contractor shall comply with the following:

   a. For devices capable of producing radiated or conducted interference: MIL-STD-461.

3. Tests for Electromagnetic Interference Suppression:

   a. Conduct tests on electric motors and the Contractor's construction equipment per MIL-STD-461.
   b. The test location shall be reasonably free from radiated and conducted interference.
   c. Furnish:

      1) The testing equipment, instruments, and personnel for making the tests.
      2) A test location.
      3) Other necessary facilities.

B. Radio Transmitter Restrictions: Conform to the restrictions and procedures for the use of radio transmitting equipment, as directed. Do not use transmitters without prior approval.

C. Laser/Radioactive Device(s): Comply with the requirements of the Occupational Safety and Health Administration (OSHA). Comply with other restrictions and procedures for the use of laser/radioactive devices, as directed by the Contracting Officer.

1. Use AF Form 3000 to notify the Base Safety Office of – and to obtain approval from the Contracting Officer for – the use of each such device prior to bringing it onto the Base. Indicate when and where the laser/radioactive device will be used so that:

a. An evaluation of the potential hazards to base personnel can be assessed.
b. Precautionary actions can be taken to protect the population at the Base.

3.7 BURNING

A. Air pollution restrictions applicable to this Project are as follows:

1. Materials shall not be burned on the Government premises.
2. If the Contractor elects to dispose of waste materials off of the Government premises, by burning, he shall make his own arrangements for such burning area and shall conform to all local regulations.

B. Compliance: COE EM-385-1-1, NFPA 2, T1, and activity fire regulations. Obtain approval from the activity Fire Chief prior to commencement of hot work operations.

3.8 EROSION CONTROL

A. Surface drainage from cuts and fills within the construction limits (whether or not completed) – and from borrow and waste disposal areas – shall be graded to control erosion within acceptable limits. Provide and maintain temporary control measures until permanent drainage facilities are completed and operative. Hold the area of bare soil exposed at any one time by construction operations to a minimum. Outline additional erosion control measures in the Sediment and Erosion Control Plan.

B. Burn-Off: Burn-off of the ground cover will be grounds for rejection of the installation.

C. Borrow Pit Areas: Manage and control borrow pit areas that are not at the Base to prevent sediment from entering nearby streams or lakes.

1. Restore areas – including those outside the borrow pit – disturbed by borrow and haul operations. Restoration shall include the following:

a. Grading.
b. Replacement of topsoil.
c. Establishment of a permanent vegetative cover.

2. Uniformly grade side slopes of borrow pit to not more than a slope of one part vertical to two parts horizontal. Uniformly grade the bottom of the borrow pits to provide a flat bottom and drain by outfall ditches or other suitable means.

3. Stockpile topsoil remove during the borrow pit operation, and use as part of restoring the borrow pit area.

D. Protection of Erodible Soils: Immediately finish the earthwork brought to a final grade, as indicated or as specified. Immediately protect the side slopes and back slopes upon completion of rough grading. Plan and conduct earthwork to minimize the duration of exposure of unprotected soils. Use the following methods to temporarily protect erodible soils by preventing erosion and controlling sedimentation:

1. Mechanically retard and control the rate of runoff from the Site. This shall include construction of diversion ditches, benches, berms, and use of silt fences and straw bales to retard and divert runoff to protected drainage courses.
2. Vegetation and Mulch: Provide temporary protection on sides and back slopes as soon as rough grading is completed or sufficient soil is exposed to require erosion protection.

   a. Protect slopes by:

      1) Accelerated growth of permanent vegetation.
      2) Temporary vegetation.
      3) Mulching.
      4) Netting.

   b. Stabilize slopes by:

      1) Hydro-seeding.
      2) Anchoring mulch in place.
      3) Covering with anchored netting.
      4) Sodding.
      5) Such combination of these and other methods necessary for effective erosion control.

   c. Seeding: Provide new seeding where ground is disturbed. Include topsoil or nutriment during the seeding operation necessary to reestablish a suitable stand of grass.

3.9 DUST CONTROL

A. Maintain all excavations, stockpiles, access roads, waste areas, and all other work free from excess dust to such reasonable degree as to avoid causing a hazard or nuisance to the Users or to others.

B. Keep dust down at all times, including nonworking periods. Using dust suppressants, sprinkle or treat the soil at:

1. The Site.
2. Haul roads.
3. Other areas disturbed by operations.

C. Dry power-brooming will be grounds for rejection of the installation. Instead, use:

1. Vacuuming.
2. Wet-mopping.
3. Wet-sweeping.
4. Wet power-brooming.

D. Air-blowing used for anything other than cleaning non-particulate debris such as steel reinforcing bars will be grounds for rejection of the installation.

E. Cutting bituminous concrete, Portland cement concrete, and concrete masonry units by other means than wet-cutting will be grounds for rejection of the installation.

F. Do not shake bags of cement, concrete mortar, or plaster unnecessarily.

G. The proposed dust control method shall be approved by the Contracting Officer.

3.10 FIELD QUALITY CONTROL

A. Upon receipt of a notice in writing of any noncompliance with the foregoing provisions, take immediate corrective action. If the Contractor fails or refuses to comply promptly, the Contracting Officer may issue an order stopping all or part of the Work until satisfactory corrective action has been taken. No part of the time lost due to any such stop work order shall be made the subject of a claim for extension of time or for excess costs of damages by the Contractor.

1. Exception: If it is later determined that the Contractor was in compliance.

3.11 POST-CONSTRUCTION CLEANING OR OBLITERATION

A. Unless other wise instructed in writing by the Contracting Officer, obliterate all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess or waste materials, and other vestiges of construction prior to final acceptance of the Work. Grade and fill the disturbed areas and seed the entire area.

3.12 CULTURAL RESOURCES

A. It is not likely that cultural resources such as historic or archeological items (for example, Native-American artifacts or human remains) will be found on the Base; however, should a potential cultural resource be discovered during demolition or excavation, the Contractor shall immediately stop work in that area and notify the Contracting Officer.

3.13 CONTAMINATION

A. Should the Contractor discover and/or encounter contaminated soil and/or hazardous materials during demolition or excavation, immediately stop work in that area and notify the Contracting Officer.

3.14 CONTROL AND DISPOSAL OF SOLID WASTES

A. General: Remove and dispose of rubbish and debris away from Government premises.

1. Pick up solid wastes and place in covered containers that are regularly emptied.
2. Do not prepare or cook food at the Site.
3. Prevent contamination of the Site or other areas when handling and disposing of wastes.
4. At project completion, leave the areas clean.

3.15 SEWAGE, ODOR, AND PEST-CONTROL

A. Dispose of sewage through connection to a municipal, sanitary sewage system. Where such system is not available, propose one of the following alternatives:

1. Use chemical toilets – or comparably effective units – and periodically empty wastes into a municipal sanitary sewage system.
2. Construct and maintain an approved type of adequate sanitary convenience for the use of persons employed on the Work.

B. Include provisions for pest-control and elimination of odors.

3.16 GARBAGE DISPOSAL

A. Place garbage in approved containers, and move to a pickup point or disposal area, where directed.

3.17 CONTROL AND DISPOSAL OF HAZARDOUS WASTE

A. Hazardous Waste Generation: Handle generated hazardous waste per 40 CFR 262.

B. Hazardous Waste Disposal: Dispose of hazardous waste per federal, state, and local regulations, especially 40 CFR 263, 40 CFR 264, and 40 CFR 265.

C. Hazardous Waste Storage: Store hazardous waste in containers per 49 CFR 178. Identify hazardous waste per 40 CFR 261 and 40 CFR 262.

D. Spills of Oil and Hazardous Materials: Take precautions to prevent spills of oil and hazardous material. In the event of a spill, immediately notify the Contracting Officer. Spill response shall be per 40 CFR 300 – and applicable state regulations.

E. Petroleum Products: Protect against spills and evaporation during fueling and lubrication of equipment and motor vehicles. Properly dispose of:

1. Lubricants to be discarded.
2. Excess oil.

3.18 ABRASIVE BLASTING

A. Do not use silica sand in abrasive blasting.

B. Enclose abrasive blasting operations using tarpaulin drop cloths and windscreens to confine and collect dust, abrasive, agent, paint chips, and other debris per the requirements specified herein.

C. Disposal Requirements: Collect dust, sand, paint, and other debris resulting from abrasive blasting operations and store in 55-gallon drums with watertight lids. Take a representative sample of this material, and test for EP toxicity with respect to lead, chromium, and cadmium content. Perform the sampling and testing per 40 CFR 261.

END OF SECTION 01 35 43

SECTION 01 42 00 - SOURCES FOR REFERENCE PUBLICATIONS

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 REFERENCES

A. Various publications are referenced in other sections of the Specifications to establish requirements for the Work. These references are identified in each section by document title, number, and date. The document number used in the citation is the number assigned by the standards-producing organization, (for example, ASTM B-564 for "Standard Specification for Nickel Alloy Forgings"). However, when the standards-producing organization has not assigned a number to a document, an identifying number has been assigned for reference purposes.

B. Ordering Information: The addresses of the standards-producing organizations whose documents are referenced in other sections of these Specifications are listed below, and if the source of the publications is different from the address of the sponsoring organization, that information is also provided. Documents listed in the Specifications with numbers that were not assigned by the standards-producing organization should be ordered from the source by title rather than by number.

1. ACI INTERNATIONAL
   PO Box 9094
   Farmington Hills MI 48333-9094
   Voice: 248.848.3700
   Facsimile: 248.848.3701
   URL: http://www.aci-int.org

2. AIR CONDITIONING AND REFRIGERATION INSTITUTE (ARI)
   Attention: Publications Department
   4301 North Fairfax Drive, Suite 425
   Arlington VA 22203-1653
   Voice: 703.524.8800
   Facsimile: 703.528.3816
   URL: http://www.ari.org
   E-mail Address: ari@ari.org

3. AIR MOVEMENT AND CONTROL ASSOCIATION INTERNATIONAL INCORPORATED (AMCA)
30 West University Drive
Arlington Heights IL 60004-1893
Voice: 847.394.0150
Facsimile: 847.253.0088
URL: http://www.amca.org

4. AMERICAN ARCHITECTURAL MANUFACTURERS ASSOCIATION (AAMA)
1827 Walden Office Square, Suite 550
Schaumburg IL 60173-4268
Voice: 847.303.5664
Facsimile: 847.303.5774
URL: http://www.aamanet.org

5. AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS (AASHTO)
444 North Capital Street, NW, Suite 249
Washington DC 20001-1539
Voice: 800.231.3475 or 202.624.5800
Facsimile: 800.525.5562 or 202.624.5806
URL: http://www.aashto.org

6. AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS (AATCC)
PO Box 12215
Research Triangle Park NC 27709-2215
Voice: 919.549.8141
Facsimile: 919.549.8933
URL: http://www.aatcc.org

7. AMERICAN FOREST & PAPER ASSOCIATION (AF&PA)
AMERICAN WOOD COUNCIL (AWC)
1111 19th Street, NW, Suite 800
Washington DC 20036
Voice: 800.878.8878
URL: http://www.afandpa.org

8. AMERICAN GAS ASSOCIATION (AGA)
400 North Capitol Street NW, Suite 450
Washington DC 20001-1535
Voice: 202.824.7000
Facsimile: 202.824.7115
URL: http://www.aga.org

9. AMERICAN IRON AND STEEL INSTITUTE (AISI)
1101 17th Street, NW, Suite 1300
Washington DC 20036-4710
Voice: 202.452.7100
URL: http://www.steel.org

10. AMERICAN LUMBER STANDARD COMMITTEE (ALSC), INCORPORATED
Board of Review
PO Box 210
Germantown MD 20875-0210
Voice: 301.972.1700
Facsimile: 301.540.8004
URL: http://www.alsc.org

11. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
1819 L Street, NW, Sixth Floor
Washington DC 20036-3864
Voice: 202.293.8020
Facsimile: 202.293.9287
URL: http://www.ansi.org/

Note: Documents that begin with the letter "S" can be ordered from:

Standards and Publications Fulfillment Center
Acoustical Society of America
PO Box 1020
Sewickley PA 15143-9998
Voice: 412.741.1979
Facsimile: 412.741.0609
URL: http://asa.aip.org
General E-mail Address: asa@aip.org
Publications E-mail Address: asapubs@abdintl.com

12. AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE)
1801 Alexander Bell Drive
Reston VA 20191-5467
Voice: 800.548.2723
URL: http://www.asce.org

13. AMERICAN SOCIETY OF HEATING, REFRIGERATING AND AIR-CONDITIONING ENGINEERS (ASHRAE)
1791 Tullie Circle, NE
Atlanta GA 30329-2305
Voice: 800.527.4723 or 404.636.8400
Facsimile: 404.321.5478
URL: http://www.ashrae.org

14. AMERICAN WATER WORKS ASSOCIATION (AWWA)
6666 West Quincy Avenue
Denver CO 80235-3098
Voice: 800.926.7337 or 303.794.7711
Facsimile: 303.794.7310
URL: http://www.awwa.org

15. AMERICAN WELDING SOCIETY (AWS)
550 Northwest LeJeune Road
Miami FL 33126-5649
Voice: 800.443.9353 or 305.443.9353
Facsimile: 305.443.7559
URL: http://www.amweld.org

16. ARCHITECTURAL WOODWORK INSTITUTE (AWI)
46179 Westlake Drive, Suite 120
Potomac Falls VA 20165-6874
Voice: 571.323.3636
Facsimile: 571.323.3630
URL: http://www.awinet.org

17. ASME INTERNATIONAL
(formerly, AMERICAN SOCIETY OF MECHANICAL ENGINEERS)
Three Park Avenue
New York NY 10016-5990
Voice: 212.591.7722
Facsimile: 212.591.7674
URL: http://www.asme.org

18. ASTM INTERNATIONAL
(formerly, AMERICAN SOCIETY FOR TESTING AND MATERIALS)
100 Barr Harbor Drive
West Conshohocken PA 19428-2959
Voice: 610.832.9585
Facsimile: 610.832.9555
URL: http://www.astm.org

19. BRICK INDUSTRY ASSOCIATION (BIA)
(formerly, BRICK INSTITUTE OF AMERICA)
1850 Centennial Park Drive, Suite 310
Reston VA 20191-1524
Voice: 703.620.0010
Facsimile: 703.620.3928
URL: http://www.bia.org

20. BUILDERS HARDWARE MANUFACTURERS ASSOCIATION (BHMA)
355 Lexington Avenue, 17th Floor
New York NY 10017-6603
Voice: 212.297.2122
Facsimile: 212.370.9047
URL: http://www.buildershardware.com

21. CARPET AND RUG INSTITUTE (CRI)
Shipping Address: 310 Holiday Avenue
Dalton GA 30720-3760
Mailing Address: PO Box 2048
Dalton GA 30722-2048
Voice: 800.882.3176 or 706.278.0232
Facsimile: 706.278.8835
URL: http://www.carpet-rug.com

22. CAST IRON SOIL PIPE INSTITUTE (CISPI)
5959 Shallowford Road, Suite 419
Chattanooga TN 37421-2228
Voice: 423.892.0137
Facsimile: 423.892.0817
URL: http://www.cispi.org

23. CEILINGS AND INTERIOR SYSTEMS CONTRACTORS ASSOCIATION (CISCA)
1500 Lincoln Highway, Suite 202
St. Charles IL 60174
Voice: 630.584.1919
Facsimile: 630.584.2003
URL: http://www.cisca.org

24. DOOR AND HARDWARE INSTITUTE (DHI)
14150 Newbrook Drive, Suite 200
Chantilly VA 20151-2223
Voice: 703.222.2010
Facsimile: 703.222.2410
URL: http://www.dhi.org
E-mail Address: techdept@dhi.org

25. ENGINEERED WOOD ASSOCIATION (APA)
7011 South 19th
Tacoma WA 98466
Voice: 253.565.6600
Facsimile: 253.565.7265
URL: http://apawood.org

26. FM GLOBAL (formerly, FACTORY MUTUAL ENGINEERING and FACTORY MUTUAL RESEARCH CORPORATION)
Shipping Address: 1301 Atwood Avenue
Johnston RI 02919-4900
Mailing Address: PO Box 7500
Johnston RI 02919-0750
Voice: 877.364.6726 or 781.255.6681
Facsimile: 781.255.0181
URL: http://www.fmglobal.com

27 GAS APPLIANCE MANUFACTURERS ASSOCIATION (GAMA)
2107 Wilson Boulevard, Suite 600
Arlington VA 22201-3042
Voice: 703.525.7060
Facsimile: 703.525.6790
URL: http://www.gamanet.org
E-mail Address: info@gamanet.org

Order publications from:

GAMA Certification Services Office
(formerly Hydronics Institute)
35 Russo Place
Berkeley Heights NJ 07922-1606
Voice: 908.464.8200, Extension 10
Facsimile: 908.464.7818
E-mail Address: publications@gamanet.org

28. GLASS ASSOCIATION OF NORTH AMERICA (GANA)
2945 Southwest Wanamaker Drive, Suite A
Topeka KS 66614-5321
Voice: 785.271.0208
Facsimile: 785.271.0166
URL: http://www.glasswebsite.com/GANA

29. GYPSUM ASSOCIATION (GA)
810 First Street NE, Suite 510
Washington DC 20002-8027
Voice: 202.289.5440
Facsimile: 202.289.3707
URL: http://www.gypsum.org

30. INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS (IEEE)
Shipping Address: 445 Hoes Lane
Piscataway NJ 08854-4141
Mailing Address: PO Box 1331
Piscataway NJ 08855-1331
Voice: 800.701.4333 or 732.981.0060
Facsimile: 732.981.9667
URL: http://www.ieee.org
E-mail Address: customer.services@ieee.org

31. INSULATING GLASS CERITIFACTION COUNCIL (IGCC)
Mailing Address: PO Box 9
Henderson Harbor NY 13651
Voice: 315.646.2234
Facsimile:315.646.2297
URL: http://www.igcc.org
E-mail Address: staff@amscert.com

32. INTERNATIONAL CERTIFIED FLOORCOVERING INSTALLER ASSOCIATION (CFI)
2400 East Truman Road
Kansas City MO 64127- 2038
Voice: 816.231.4646
Facsimile: 816.231.4343
URL: http://www.cfi-installers.org
E-mail Address: cfiguy@earthlink.net

33. INTERNATIONAL CODE COUNCIL (ICC)
5203 Leesburg Pike, Suite 600
Falls Church VA 22041-3405
Voice: 703.931.4533
Facsimile: 703.379.1546
URL: http://www.intlcode.org

34. [THE] MASONRY SOCIETY (TMS)
3970 Broadway, Suite 201-D
Boulder CO 80304-1135
Voice: 303.939.9700
Facsimile: 303.541.9215
URL: http://www.masonrysociety.org
E-mail Address: info@masonrysociety.org

35. MIDWEST INSULATION CONTRACTORS ASSOCIATION (MICA)
2017 South 139th Circle
Omaha NE 68144-2149
Voice: 402.342.3463
Facsimile: 402.330.9702
URL: http://www.micainsulation.org
E-mail Address: info@micainsulation.org

36. NACE INTERNATIONAL
(formerly, NATIONAL ASSOCIATION OF CORROSION ENGINEERS)
1440 South Creek Drive
Houston TX 77084-4906
Voice: 800.797.6223
Facsimile: 281.228.6300
URL: http://www.nace.org
E-mail Address: firstservice@nace.org

37. NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM)
Architectural Metal Products (AMP) Division or
Hollow Metal Manufacturers Association (HMMA) Division
8 South Michigan Avenue, Suite 1000
Chicago IL 60603-3452
Voice: 312.332.0405
Facsimile: 312.332.0706
URL: http://www.naamm.org

38. NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA)
1300 North 17th Street, Suite 1847
Rosslyn VA 22209-3801
Voice: 703.841.3200
Facsimile: 703.841.3300
URL: http://www.nema.org/
E-mail Address: jas_peak@nema.org

39. NATIONAL ROOFING CONTRACTORS ASSOCIATION (NRCA)
10255 West Higgins Road, Suite 600
Rosemont IL 60018
Voice: 847.299.9070
Facsimile: 847.299.1183
URL: http://www.nrca.net

40. NFPA INTERNATIONAL
(formerly, NATIONAL FIRE PROTECTION ASSOCIATION)
Shipping Address: 1 Batterymarch Park
Quincy MA 02269-7422
Mailing Address: PO Box 9101
Quincy MA 02269-9101
Voice: 617.770.3000
Facsimile: 617.770.0700
URL: http://www.nfpa.org

41. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)
United States Department of Labor (USDOL)
200 Constitution Avenue, NW
Washington DC 20210

Order publications from:

PO Box 37535
Washington DC 20013-7535
Voice: 202.693.1888
Facsimile: 202.693.2498
URL: http://www.osha.gov

42. OHIO DEPARTMENT OF COMMERCE (ODOC)
Division of Industrial Compliance
Board of Building Standards
Shipping Address: 6606 Tussing Road
Reynoldsburg OH 43068-4004
Mailing Address: PO Box 4009
Reynoldsburg OH 43068-9009
Voice: 614.644.2223
Facsimile: 614.644.2618
URL: http://www.com.state.oh.us/dic/
E-mail Address: ic@com.state.oh.us

43. OHIO DEPARTMENT OF TRANSPORTATION (ODOT)
Office of Construction Administration
1980 West Broad Street
Columbus OH 43223
Voice: 614.387.2173
Facsimile: 614.644.7175
URL: http://www.dot.state.oh.us/construction/OCA/default.htm

44. OHIO ENVIRONMENTAL PROTECTION AGENCY (Ohio EPA)
Division of Air Pollution Control (DAPC)
122 South Front Street
Columbus OH 43215-3425
Voice: 614.644.2270
Facsimile: 614.644.3681
URL: http://www.epa.state.oh.us/dapc/files/files.html

45. PORTLAND CEMENT ASSOCIATION (PCA)
5420 Old Orchard Road, Building A
Skokie IL 60077-1083
Voice: 847.966.6200
Facsimile:847.966.8389
URL: http://www.cement.org
E-mail Address: info@cement.org

46. SAFETY GLAZING CERTIFICATION COUNCIL (SGCC)
P.O. Box 730
Sackets Harbor NY 13685-0730
Voice: 315.646.2234
Facsimile: 315.646.2297
URL: http://www.sgcc.org
E-mail Address: staff@amscert.com

47. SHEET METAL AND AIR CONDITIONING CONTRACTORS' NATIONAL ASSOCIATION (SMACNA)
4201 Lafayette Center Drive
Chantilly VA 20151-1209
Voice: 703.803.2980
Facsimile: 703.803.3732
URL: http://www.smacna.org
E-mail Address: info@smacna.org

48. SOCIETY FOR PROTECTIVE COATINGS (SSPC)
(formerly, STEEL STRUCTRUES PAINTING COUNCIL)
40 24th Street, Sixth Floor
Pittsburgh PA 15222-4656
Voice: 877.281.7772
Facsimile: 412.281.9992
URL: http://www.sspc.org

49. STEEL DOOR INSTITUTE (SDoI)
30200 Detroit Road
Cleveland OH 44145-1967
Voice: 440.899.0010
Facsimile: 440.892.1404
URL: http://www.steeldoor.org

50. TILE COUNCIL OF AMERICA (TCA)
100 Clemson Research Boulevard
Anderson SC 29625-6548
Voice: 864.646.8453
Facsimile: 864.646.2821
URL: http://www.tileusa.com
E-mail Address: literature@tileusa.com

51. TURFGRASS PRODUCERS INTERNATIONAL (TPI)
(formerly, AMERICAN SOD PRODUCERS ASSOCIATION (ASPA))
2 East Main Street
East Dundee IL 60118
Voice: 800.405.8873
Facsimile: 847.649.5678
URL: http://www.turfgrasssod.org
E-mail Address: info@turfgrasssod.org

52. UNDERWRITERS LABORATORIES (UL) INCORPORATED
333 Pfingsten Road
Northbrook IL 60062-2096
Voice: 847.272.8800
Facsimile: 847.272.8129
URL: http://www.ul.com/
E-mail Address: northbrook@us.ul.com

53. UNITED STATES ARMY CORPS OF ENGINEERS (USACE or COE)

Order CRD-C documents from:
United States Army Engineer Waterways Experiment Station
Attention: Technical Report Distribution Section, Services Branch, TIC
3909 Halls Ferry Road
Vicksburg MS 39180-6199
Voice: 601.634.2664
Facsimile: 601.634.2388
URL: http://www.wes.army.mil/SL/MTC/handbook/handbook.htm

Order other documents from:
USACE Publications Depot
Attention: CEIM-SP-D
2803 52nd Avenue
Hyattsville MD 20781-1102
Voice: 301.394.0081
Facsimile: 301.394.0084
URL: http://www.usace.army.mil/publications
or http://www.hnd.usace.army.mil/techinfo/index.htm

54. UNITED STATES CONSUMER PRODUCT SAFETY COMMISSION (CPSC)
4330 East-West Highway
Bethesda MD 20814-4408
Voice: 800.638.2772
Facsimile: 301.504.0124 and 301.504.0025
URL: http://www.cpsc.gov

55. UNITED STATES DEPARTMENT OF AGRICULTURE (USDA)

Order AMS publications from:
Agricultural Marketing Service (AMS)
Seed Regulatory and Testing Branch
USDA, AMS, LS Division
Room 209, Building 306, BARC-East
Beltsville MD 20705-2325
Voice: 301.504.9430
Facsimile: 301.504.8098
URL: http://www.ams.usda.gov/nop/
E-mail Address: jeri.irwin@usda.gov

Order other publications from:
United States Department of Agriculture
14th and Independence Avenues, SW, Room 4028-S
Washington DC 20250
Voice: 202.720.2791
Facsimile: 202.720.2166
URL: http://www.usda.gov

56. UNITED STATES DEPARTMENT OF COMMERCE (USDOC or DOC)
Technology Administration
National Institute of Science and Technology
100 Bureau Drive, Stop 2320
Gaithersburg MD 20899-2320
Voice: 301.975.6776
Facsimile:
URL: http://www.nist.gov
E-mail Address: srmorder@nist.gov

57. UNITED STATES DEPARTMENT OF DEFENSE (USDoD or DoD)

Order Military Specifications, Standards, and related publications from:
Department of Defense Single Stock Point (DODSSP) for
Defense Automation and Production Service (DAPS)
Building 4-D
700 Robbins Avenue
Philadelphia PA 19111-5094
Voice: 215.697.2179
Facsimile: 215.697.1462
URL: http://dodssp.daps.dla.mil

Order other USDoD documents from:
National Technical Information Service (NTIS)
United States Department of Commerce
5285 Port Royal Road
Springfield VA 22151-2103
Voice: 800.553.6847
Facsimile: 703.605.6900
URL: http://www.ntis.gov
E-mail Address: orders@ntis.fedworld.gov

58. UNITED STATES DEPARTMENT OF JUSTICE (USDOJ)
Civil Rights Division
Disability Rights Section – NYAV
950 Pennsylvania Avenue, NW
Washington DC 20530-0001
Voice: 800.514.0301
Facsimile: 202.307.1198
URL: http://www.usdoj.gov

59. UNITED STATES DEPARTMENT OF TRANSPORTATION (USDOT)
Federal Highway Administration (FHWA)
Office of Transportation Operations (HOTO)
Room 3408
400 Seventh Street, SW
Washington DC 20590
Voice: 202.366.1993
Facsimile: 202.366.3225
URL: http://www.mutcd.fhwa.dot.gov/ser-pubs.htm

Order FHWA documents from:
Government Printing Office (GPO)
Superintendent of Documents
PO Box 371954
Pittsburgh PA 15250-7954
Voice: 202.512.1803
URL: http://bookstore.gpo.gov

60. UNITED STATES ENVIRONMENTAL PROTECTION AGENCY (USEPA)
Ariel Rios Building
1200 Pennsylvania Avenue, NW
Washington DC 20460
Voice: 202.272.0167
URL: http://www.epa.gov

61. UNITED STATES GENERAL SERVICES ADMINISTRATION (GSA)
1800 F Street, NW
Washington DC 20405-0002
Voice: 202.501.0705

Order publications from:
Federal Supply Service Bureau
General Services Administration
1941 Jefferson Davis Highway
Arlington VA 22202
Voice: 703.605.5400
URL: http://www.fss.gsa.gov/pub/fed-specs.cfm

62. UNITED STATES NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)
700 Pennsylvania Avenue, NW
Washington DC 20408-0002
Voice: 866.325.7208
URL: http://www.nara.gov

Order documents from
(and access portions of the Code of Federal Regulations (CFR) from):
Superintendent of Documents
United States Government Printing Office
732 North Capitol Street, NW
Washington DC 20401-0003
Mailstop: SDE
Voice: 866.512.1800 or 202.512.1800
Facsimile: 202.512.2250
URL: http://www.gpo.gov
or http://www.gpoaccess.gov/cfr/retrieve.html
E-mail Address: gpoaccess@gpo.gov

63. Window Covering Manufacturers Association Incorporated (WCMA)
355 Lexington Avenue, 17th Floor
New York NY 10017-6603
Voice: 212.297.2122
URL: http://www.wcmanet.org

END OF SECTION 01 42 00

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. These requirements supplement the General Conditions. Refer to General Conditions for additional requirements.

1.2 PRODUCTS

A. Products include materials, equipment and systems.

B. Products incorporated into the work:

1. Comply with specifications and referenced standards as minimum requirements.
2. Comply with size, make, type, and quality specified, or as specifically accepted in writing by the Contracting Officer
3. Manufactured and fabricated products:
   a. Design, fabricate and assemble in accordance with the best engineering and shop practices.
   b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
   c. Two or more items of the same kind shall be identical, by the same manufacturer.
   d. Products shall be suitable for service conditions.
   e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing by the Contracting Officer.
4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.
5. New and unused, except as otherwise indicated.

1.3 TRANSPORTATION AND HANDLING

A. Arrange deliveries of products in accordance with construction schedules, coordinate to avoid conflict with work and conditions at the site.

1. Transport products by methods to avoid product damage.
2. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
3. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and accepted submittals, and that products are properly protected and undamaged.

B. Provide equipment and personnel to handle products by methods to prevent soiling or damage.

C. Each contractor shall provide suitable weathertight storage sheds of sufficient size to hold materials required on the site at one time, for storage of materials which might be damaged by the weather. Outdoor storage of materials shall be confined to the areas within the construction fence.

1.4 STORAGE AND PROTECTION

A. Store products in accordance with manufacturer's instructions with seals and labels intact and legible.
   1. Store products subject to damage by the elements in weather tight enclosures.
   2. Maintain temperature and humidity within the ranges required by manufacturer's instructions.

B. Exterior Storage
   1. Store fabricated products above the ground, on blocking or skids, to prevent soiling or staining. Cover products which are subject to deterioration with impervious coverings. Provide adequate ventilation to avoid condensation.
   2. Store loose granular materials in a well drained area on solid surfaces to prevent mixing with foreign materials.

C. Arrange storage in a manner to provide access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage.

D. Protection After Installation: Provide coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed.

PART 2 – PRODUCTS (Not Used)

PART 3 – EXECUTION (Not Used)

END OF SECTION 01 60 00

SECTION 01 73 29 - CUTTING AND PATCHING

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, – including, but not limited to – the following.

1. SECTION 01 00 00 – GENERAL REQUIREMENTS.
2. SECTION 01 33 00 – SUBMITTAL PROCEDURES: Substitutions.

1.2 SUMMARY

A. This Section includes the responsibility for cutting, fitting, and patching.

1. Make the several parts of a material, system, or finish fit together properly.
2. Uncover portions of the Work to provide for installation of ill-timed work.
3. Remove and replace defective work.
4. Remove and replace work not conforming to requirements of the Contract Documents.
5. Remove samples of installed work as specified for testing.
6. Provide routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

B. Related Sections:

1. SECTION 02 41 19.13 – SELECTIVE BUILDING DEMOLITION.
2. Individual sections in Divisions 03 through 33: PRODUCT and EXECUTION requirements specific to the Work of each of those respective sections.

1.3 SUBMITTALS

A. Submit a written request to the Contracting Officer well in advance of executing any cutting or alteration that affects:

1. Work of the Government or separate contractors.
2. Structural value or integrity of any element of the Project.
3. Integrity or effectiveness of weather-exposed or moisture-resistant elements or systems.
4. Efficiency, operational life, maintenance, or safety of operational elements.
5. Visual qualities of elements exposed to view.

B. Include in the request:

1. Identification of the Project.
2. Description of affected work.
3. The necessity for cutting, alteration or excavation.
4. The anticipated effect on:
   a. The Government's operations.
   b. The integrity of the structure.
   c. The weather-tightness of the Project.
   d. The work of separate contractors.
5. Include in the description of proposed work the:
   a. Scope of cutting, patching, alteration, or excavation.
   b. Trades who will execute the Work.
   c. Products proposed to be used.
   d. Extent of refinishing to be done.
6. Alternatives to cutting and patching.
7. Cost proposal, when applicable.
8. Written permission of any separate contractor whose work will be affected.

C. Should conditions of the Work or the schedule indicate a change of products from the original installation, submit a request for substitutions as specified in the section referenced above.

D. Submit a written notice to the Contracting Officer designating the date and the time the Work will be uncovered.

PART 2 – PRODUCTS

2.1 MATERIALS

A. Comply with specifications and standards for each specific product involved. See PRODUCT and EXECUTION requirements in their respective individual sections.

PART 3 – EXECUTION

3.1 EXAMINATION

A. Inspect existing conditions of the Project, including elements subject to damage or to movement during cutting and patching.

B. After uncovering work, inspect conditions affecting installation of products, or performance of the Work.

C. Report unsatisfactory or questionable conditions to the Contracting Officer in writing; do not proceed with the Work until the Contracting Officer has provided further instructions.

3.2 PREPARATION

A. Provide adequate temporary support as necessary to assure the structural value or integrity of affected portions of the Work.

B. Provide devices and methods to protect other portions of the Project from damage.

C. Provide protection from the elements for portions of the Project that might be exposed by cutting and patching work. Maintain excavations free from water.

3.3 PERFORMANCE

A. Execute cutting and demolition by methods that will:

1. Prevent damage to other work.
2. Provide proper surfaces to receive installation of repairs.

B. Execute excavating and backfilling by methods that will prevent:

1. Settlement.
2. Damage to other work.

C. Employ the original Installer or Fabricator to perform cutting and patching for:

1. Weather-exposed or moisture-resistant elements.
2. Finished surfaces exposed to view.

D. Execute fitting and adjustment of products to provide a finished installation to comply with specified:

1. Products.
2. Functions.
3. Tolerances.
4. Finishes.

E. Restore work that has been cut or removed. Install new products to provide completed Work per the requirements of the Contract Documents.

F. Fit work airtight to:

1. Pipes.
2. Sleeves.
3. Ducts.
4. Conduit.
5. Other penetrations through surfaces.

G. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes.

1. For continuous surfaces: Refinish to nearest intersection.
2. For an assembly: Refinish entire unit.

END OF SECTION 01 73 29

SECTION 01 74 19 - CONSTRUCTION WASTE MANAGEMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section includes:
1. Special requirements for waste management during demolition and construction operations.
   a. Protect the environment, both on-site and off-site, during demolition and construction operations.
   b. Prevent environmental pollution and damage.
   c. Maximize source reduction, reuse and recycling of solid waste.

1.2 DEFINITIONS

A. Definitions pertaining to sustainable development: As defined in ASTM E2114.

1.3 QUALITY ASSURANCE

A. Maximize use of source reduction and recycling procedures outlined in ASTM D5834.

B. Diversion Goals: A minimum 75 percent by weight of total project solid waste to be diverted from landfill.

C. Report monthly the waste diversion cumulative totals.

1.4 PRECONSTRUCTION MEETING

A. After award of Contract and prior to the commencement of the Work, General Contractor shall schedule and conduct meeting with the Contracting Officer and Architect to discuss the proposed Waste Management Plan and to develop mutual understanding relative to details of environmental protection.

1.5 SUBMITTALS

A. Solid Waste Management Plan: Not later than 10 days before the Pre-construction meeting, prepare and submit a Solid Waste Management Plan including, but not limited to, the following:
1. List of the recycling facilities, reuse facilities, municipal solid waste landfills and other disposal area(s) to be used. Include:
   a. Name, location, and phone number.
   b. Copy of permit or license for each facility.

2. Identify materials that cannot be recycled or reused. Provide explanation or justification.
3. Revise and resubmit Plan as required by Contracting Officer.
   a. Approval of Contractor's Plan will not relieve the Contractor of responsibility for compliance with applicable environmental regulations.

B. Progress Documentation: Document solid waste disposal and diversion. Include the quantity by weight of waste generated; waste diverted through sale, reuse, or recycling; and waste disposed by landfill or incineration.

1. Document quantities and destinations. Identify landfills, recycling centers, waste processors, and other organizations that process or receive the solid waste.
2. Submit report showing waste management process in place, diverted materials photos with captions, project name, contractor name, and date in pdf format.
3. With each Application for Payment, submit updated Documentation for solid waste disposal and diversion.
4. With each Application for Payment, submit log of manifests, weight tickets, receipts, and invoices specifically identifying the Project and waste material; produce said receipts on request.

C. Record Submittals: With Record Submittals as specified in Section 01 78 39 submit the following:

1. Summary of solid waste disposal and diversion.

PART 2 PRODUCTS – not used

PART 3 EXECUTION

3.1 SOLID WASTE MANAGEMENT

A. Develop and implement a waste management program in accordance with ASTME1609 and as specified herein.

B. Collection: Implement a recycling/reclamation program that includes at a minimum wood, metals, glass, and cardboard.

1. Identify sorting requirements and post appropriate signage
2. Review requirements at regular contractor project meetings and in all safety orientation meetings.

C. Recycling/Reuse: Maximize recycling and reuse of materials.

1. Recycling/Reuse on project site: Coordinate with Contracting Officer to include materials from demolition of structures outside of new construction contract

3.2 SITE IMPLEMENTATION

A. All Contractors working onsite must comply with Construction Waste Management Plan (CWMP).

B. CWMP to be posted and readily available for inspection in job trailer.

C. Requirements of CWMP to be reviewed during regular construction meetings.

END OF SECTION 01 74 19

THIS PAGE IS INTENTIONALLY BLANK

SECTION 02 41 19 - SELECTIVE STRUCTURE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of building
2. Demolition and removal of selected site elements.

B. See Division 01 Section "Construction Waste Management and Disposal" for disposal of demolished materials.

C. See Division 31 Section "Site Clearing" for site clearing and removal of above- and below-grade improvements.

1.2 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate detailed sequence of selective demolition and removal work, with starting and ending dates for each activity, interruption of utility services, use of elevator and stairs, and locations of temporary partitions and means of egress.

B. Pre-demolition Photographs: Show existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by selective demolition operations. Comply with Division 01 Section "Photographic Documentation." Submit before Work begins.

C. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1. Comply with submittal requirements in Division 01 Section "Construction Waste Management and Disposal."

1.4 QUALITY ASSURANCE

A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.

B. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

C. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

D. Standards: Comply with ANSI A10.6 and NFPA 241.

E. Pre-demolition Conference: Conduct conference at Project site.

1.5 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

E. Hazardous Materials: It is unknown whether hazardous materials will be encountered in the Work.

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

F. Hazardous Materials: Hazardous materials are present in construction to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.

1. Hazardous material remediation is specified elsewhere in the Contract Documents.

2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.

G. Storage or sale of removed items or materials on-site is not permitted.

H. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.6 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Engage a professional engineer to survey condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective demolition operations.

F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs

1. Comply with requirements specified in other Division "Photographic Documentation."

G. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Arrange to shut off indicated utilities with utility companies.
2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris- removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Division 01 Section "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

3.4 SELECTIVE DEMOLITION

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.

3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
5. Dispose of demolished items and materials promptly. Comply with requirements in Division 01 Section "Construction Waste Management and Disposal."

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Comply with requirements specified in Division 01 Section "Construction Waste Management and Disposal."

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 02 41 19

THIS PAGE IS INTENTIONALLY BLANK

SECTION 04 05 13 MORTAR

PART 1 GENERAL

1.1 DESCRIPTION

A. The General Prime Contractor shall provide to job site mortar as shown on the drawings or specified herein as required to complete all masonry work.

B. Refer to other Sections of Division 4 for related work.

1.2 SUBMITTALS

A. Submit manufacturer's specifications and instructions for each manufactured product.

B. The intent of the project is to match as closely as possible the aesthetic characteristics of the existing mortar. Provide mortar sample to match existing in sample panel for approval.

1.3 PRODUCT DELIVERY, STORAGE AND PROTECTION

A. Deliver cement and lime materials in original unopened containers.

B. Store materials in a dry place with elevated floors and cover with canvas or Polyethylene. No materials shall be used where bag or container shows watermarks.

PART 2 PRODUCTS

2.1 MATERIALS

A. Portland cement: ASTM C150, Type I, non-staining, without air entrainment.

B. Lime: ASTM C207, Type S.

C. Sand: ASTM C 144, except not over 10% to pass No. 100 sieve.

D. Water: Drinkable, from a public source.

E. Colors: Mortar shall be natural.

2.2 MIXES

A. Do not change source or brands of mortar during the course of the work. See structural Drawing notations for additional information.

B. Type S mortar: all work, ASTM C270 proportions by volume with a minimum average compressive strength at 28 days of 1800 psi, either:

1. One-half part Portland cement, one part masonry cement, not less than two and one-fourth and not more than three times the sum of the volumes of cement and lime used of damp, loose sand, or:
2. One part Portland cement, one-fourth to one parts hydrated lime, not less than two and one-fourth and not more than three times the volumes of cement and lime used of damp loose sand.
3. <u>Match existing Mortar as closely as possible. Approve a sample panel prior to start of work.</u>

C. Type N mortar: Above Grade Non-Load Bearing, condition with a minimum average compressive strength at 28 days of 750 psi.

PART 3 EXECUTION

3.1 PREPARATION

A. Mortar mix may be varied with Contracting Officer's permission depending on atmospheric and ambient conditions. Use only accurate measuring devices.

B. Mix all cementitious materials and sand in a mechanical batch mixer for a minimum of 5 minutes. Adjust the consistence of the mortar to the satisfaction of the mason but add only as much water as is compatible with convenience in using the mortar. If the mortar begins to stiffen from evaporation or from absorption of a part of the mixing water, re - temper the mortar immediately by adding water and remix the mortar. Use all mortar within 2-1-1/2 hours of the initial mixing. Do not use mortar after it has begun to set.

3.2 INSTALLATION

A. Use Type S mortar (1800 psi) for all structural masonry work, and all bearing walls.

B. Antifreeze: not permitted

3.3 PROTECTION

A. Cover top of masonry walls and all masonry materials covered to prevent water damage.

END OF SECTION

SECTION 08 71 00 - DOOR HARDWARE

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. Mechanical door hardware for the following:
   a. Swinging doors.

B. Related Sections:

1. Division 08 Section "Hollow Metal Doors and Frames" for door silencers provided as part of hollow-metal frames.

1.3 ACTION SUBMITTALS

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

B. Other Action Submittals:

1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
   a. Submittal Sequence: Submit door hardware schedule concurrent with submissions of Product Data. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
   b. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule." Double space entries, and number and date each page. Use same door numbers as in the Contract Documents.
   c. Content: Include the following information:
      1) Identification number, location, hand, size, and material of each door and frame.
      2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.

3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
4) Fastenings and other pertinent information.
5) Explanation of abbreviations, symbols, and codes contained in schedule.
6) Mounting locations for door hardware.
7) List of related door devices specified in other Sections for each door and frame.

2. Keying Schedule: Prepared by or under the supervision of Installer, detailing the Government's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Supplier of products and an employer of workers trained and approved by product manufacturers and an Architectural Hardware Consultant who is available during the course of the Work to consult with Contractor, Architect, and Owner about door hardware and keying.

1. Scheduling Responsibility: Preparation of door hardware and keying schedules.

B. Architectural Hardware Consultant Qualifications: A person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and who is currently certified by DHI as follows:

C. Source Limitations: Obtain each type of door hardware from a single manufacturer.

D. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

E. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
2. Comply with the following maximum opening-force requirements:
   a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
4. Adjust door closer sweep periods so that, from an open position of 70 degrees, the door will take at least 3 seconds to move to a point 3 inches (75 mm) from the latch, measured to the leading edge of the door.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up for door hardware delivered to Project site.

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 or package.

1.6 COORDINATION

A. Installation Templates: Distribute for 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.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. Provide door hardware for each door as scheduled on Drawings to comply with requirements in this Section.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products, products equivalent in function and comparable in quality to named products and products complying with BHMA designations referenced.

2.2 HINGES

A. Hinges: BHMA A156.1. Provide template-produced hinges for hinges installed on hollow-metal doors and hollow-metal frames.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Baldwin Hardware Corporation.
   b. Bommer Industries, Inc.
   c. Hager Companies.
   d. IVES Hardware; an Ingersoll-Rand company.
   e. McKinney Products Company; an ASSA ABLOY Group company.
   f. Stanley Commercial Hardware; Div. of The Stanley Works.

2.3 MECHANICAL LOCKS AND LATCHES

A. Lock Functions: As indicated in door hardware schedule.

B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:

1. Bored Locks: Minimum 1/2-inch (13-mm) latchbolt throw.

C. Lock Backset: 2-3/4 inches (70 mm), unless otherwise indicated.

D. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

E. Bored Locks: BHMA A156.2; Grade 1; Series 4000.

1. Entrance Function: Series 4000, Grade 1 with lever style to match existing (similar and equivalent in quality, function, and durability (as determined by the Contracting Officer) to 93K-7AB-15D-S3 by Best).
   a. Do not discard the tailpiece that comes in each lockset box. They will be required with the permanent core in each lockset.

2.4 LOCK CYLINDERS AND KEYING

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

B. Security: Locksets for this Project shall include both construction ("CC") cores and permanent seven-pin cores from Best Lock Corporation dba Best Access Systems, part of the Access Controls Group of The Stanley Works, 19579 Progress Drive, Strongsville OH 44136-3203 (Voice: 800.758.2378).

1. Master Keying (BHMA A-156.28): Key the lock cores to a master key system as directed by the Contracting Officer by Best Corporation.
2. Best shall furnish the Contractor with "CC" cores along with control and operating keys. Use the "CC" cores during the construction phase.
3. Upon acceptance by the Government of beneficial occupancy of the facility, the Contractor shall assume sole responsibility for removal and return of the "CC" cores and control and operating keys to Best.
4. Best shall ship the permanent seven-pin combinated cores and their keys to the Base Realty Specialist. The Base Locksmith will install the permanent cores.

2.5 OPERATING TRIM

A. Operating Trim: BHMA A156.6; stainless steel, unless otherwise indicated.

1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated below or comparable product by one of the following:
   a. Hager Companies.
   b. Hiawatha, Inc.
   c. IVES Hardware; an Ingersoll-Rand company.
   d. Rockwood Manufacturing Company.
   e. Trimco.
2. Pull Handles (ANSI J-401): Provide stainless-steel cast or forged pull handles from the Hardware Manufacturer's standard designs (similar and equivalent in quality, function, and durability (as determined by the Contracting Officer) to 137 by Rockwood).
   a. 5 ½ -inch center-to-center.

b. 6-inch overall height.
c. 2-inch projection.
d. 1 ½ -inch knuckle clearance.
e. Mount 1 ¼-inch wide by 5/8-inch high bases with through-bolts.
f. Backup pull handle with plates equivalent to push plates specified below (ANSI J-405).

3. Push Plates (ANSI J-301): Provide 4-inch wide by 16-inch high by 0.050-inch thick stainless-steel (brushed) door push plates with four beveled edges and Phillips oval-headed stainless-steel sheet metal screws plated to match finish (similar and equivalent in quality, function, and durability (as determined by the Contracting Officer) to 70-C by Rockwood).

2.6 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Basis-of-Design Product: Subject to compliance with requirements, provide LCN 4041 Super Smothee or comparable product by one of the following:
   a. Arrow USA; an ASSA ABLOY Group company.
   b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
   c. DORMA Architectural Hardware; Member of The DORMA Group North America.
   d. Dor-O-Matic; an Ingersoll-Rand company.
   e. Norton Door Controls; an ASSA ABLOY Group company.
   f. Rixson Specialty Door Controls; an ASSA ABLOY Group company.
   g. SARGENT Manufacturing Company; an ASSA ABLOY Group company.
   h. Yale Security Inc.; an ASSA ABLOY Group company.

2.7 MECHANICAL STOPS AND HOLDERS

A. Wall Stops: BHMA A156.16; polished cast brass, bronze, or aluminum base metal.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Rockwood 400 Series or comparable product by one of the following:
   a. Architectural Builders Hardware Mfg., Inc.
   b. Baldwin Hardware Corporation.
   c. Hager Companies.
   d. Hiawatha, Inc.
   e. IVES Hardware; an Ingersoll-Rand company.
   f. Rockwood Manufacturing Company.
   g. Stanley Commercial Hardware; Div. of The Stanley Works.
   h. Trimco.

2.8 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops and Holders: BHMA A156.8.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Glynn Johnson 90-H Series with Angle Jamb J or comparable product by one of the following:
   a. Architectural Builders Hardware Mfg., Inc.
   b. Rockwood Manufacturing Company.
   c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.9 METAL PROTECTIVE TRIM UNITS

A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. Baldwin Hardware Corporation.
   b. Hiawatha, Inc.
   c. IVES Hardware; an Ingersoll-Rand company.
   d. Rockwood Manufacturing Company.
   e. Trimco.
2. Stainless steel (brushed): 0.050-inch thick, with beveled edges on top and sides, and countersunk holes for stainless-steel tamperproof and self-drilling screws:
   a. Kickplates (ANSI J-102): Width of door leaf less 2 inches by 16-inches high.

2.10 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rated labels and as otherwise approved by Architect.

1. Manufacturer's identification is permitted on rim of lock cylinders only.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for

installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.

2. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
3. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
4. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.11 FINISHES

A. Provide finishes complying with BHMA A156.18.

1. Finish: Brushed chrome (US 26D).
   a. Exception: Brushed stainless steel (US 32D) will be accepted on stainless steel items (hinges, exit devices, kickplates, etc.).

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

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other 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 doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance.

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

3.2 PREPARATION

A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

3.3 INSTALLATION

A. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

B. Install each door hardware item to comply with manufacturer's 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 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

C. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

D. Lock Cylinders: Install construction cores to secure building and areas during construction period.

E. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

3.4 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.

1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by door hardware installation.

B. Clean operating items as necessary to restore proper function and finish.

C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DEMONSTRATION

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

B. Arrange for a meeting at the site with the Government's designated maintenance personnel to train them in the adjusting of door hardware to satisfy the requirements of the ADAAC.

END OF SECTION 08 71 00

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 09 30 00 - TILING

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. This Section includes the following:

1. Paver tile.
2. Glazed wall tile.
3. Crack-suppression membrane for thin-set tile installations.
4. Metal edge strips installed as part of tile installations.

B. Related Sections include the following:

1. Division 03 Section "Cast-in-Place Concrete" for monolithic slab finishes specified for tile substrates.
2. Division 07 Section "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.

1.3 DEFINITIONS

A. Module Size: Actual tile size (minor facial dimension as measured per ASTM C 499) plus joint width indicated.

B. Facial Dimension: Actual tile size (minor facial dimension as measured per ASTM C 499).

C. Facial Dimension: Nominal tile size as defined in ANSI A137.1.

1.4 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:

1. Level Surfaces: Minimum 0.6.
2. Step Treads: Minimum 0.6.
3. Ramp Surfaces: Minimum 0.8.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each type of ceramic tile and grout.

C. Qualification Data: For Installer.

1.6 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.

1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:

1. Joint sealants.
2. Metal edge strips.

1.7 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 requirement in ANSI A137.1 for labeling sealed 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 avoided.

D. Store liquid latexes and emulsion adhesives in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT 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.

1.9 EXTRA MATERIALS

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. 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.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article.

C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials complying with the following requirements:

1. As indicated by manufacturer's designations.

D. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, 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.

2.2 TILE PRODUCTS

A. Basis-of-Design Products: Subject to compliance with requirements, provide products shown on Finish Schedule drawings or equal. Equal products must be equal to basis-of-design products as determined by Contract Officer in physical characteristics, material composition, color, finish and pattern.

B. Manufacturers/Products: Refer to Color Schedule Drawings for tile products.

2.3 CRACK-SUPPRESSION MEMBRANES FOR THIN-SET TILE INSTALLATIONS

A. General: Manufacturer's standard product that complies with ANSI A118.10.

B. Unreinforced, Fluid-Applied Product: Liquid-latex rubber in a consistency suitable for trowel application and intended for use as waterproofing.

1. Products:
   a. Custom Building Products; Regard Waterproofing and Anti-Fracture Membrane.

2.4 SETTING AND GROUTING MATERIALS

A. Manufacturers:

1. Custom Building Products or equal.

B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4, consisting of the following:

1. Porcelain tile fortified thin set mortar. Prepackaged dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive.

C. Organic Adhesive: Omnigrip ANSI A136.1, Type I.

D. Prism Grout: ANSI A118.6, color as indicated.

2.5 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: As shown on Color Schedule Drawings.

C. 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.

D. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.

1. Products:
   a. Custom Building Products; Tile Lab, Surfaceguard Penetrating Grout Sealer or equal.

2.6 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. 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.

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 installed tile.

1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.
2. 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 before installing tile.
3. 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 and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.

B. Provide concrete substrates for tile floors installed with thin-set mortar that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.

1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
2. Remove protrusions, bumps, and ridges by sanding or grinding.

C. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, 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.

3.3 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.

C. 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.

D. 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.

E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

F. Lay out tile wainscots to next full tile beyond dimensions indicated.

G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Locate joints in tile surfaces directly above joints in concrete substrates.
2. Prepare joints and apply sealants to comply with requirements in Division 07 Section "Joint Sealants."

H. Grout tile to comply with requirements of the following tile installation standards:

1. For ceramic tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.

3.4 CRACK-SUPPRESSION MEMBRANE INSTALLATION

A. Install crack-suppression membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.

B. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.5 SHOWER KIT INSTALLATION

A. Install shower kit with all accessories and components according to manufacturers instruction.

3.6 FLOOR TILE INSTALLATION

A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards.

1. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
   a. Tile floors in wet areas.
   b. Tile floors composed of tiles 8 by 8 inches (200 by 200 mm) or larger.
   c. Tile floors composed of rib-backed tiles.

B. Joint Widths: Install tile on floors with the following joint widths:

1. Paver Tile: 1/8”.

C. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

D. Grout Sealer: Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.7 WALL TILE INSTALLATION

A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.

B. Install metal lath and scratch coat for walls to comply with ANSI A108.1A, Section 4.1.

C. Joint Widths: Install tile on walls with the following joint widths:

1. Glazed Wall Tile: 1/16 inch (1.6 mm).

3.8 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove latex-portland cement grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. 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. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.

B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.9 FLOOR TILE INSTALLATION SCHEDULE

A. Tile Installation CT.1 & CT.2: Interior floor installation on waterproof crack-suppression membrane over concrete; thin-set mortar; TCA F122 and ANSI A108.5.

1. Tile Type: Unglazed ceramic mosaic Unglazed paver tile.
2. Thin-Set Mortar: Latex-portland cement mortar.
3. Grout: Polymer-grout.

3.10 WALL TILE INSTALLATION SCHEDULE

A. Tile Installation: Interior wall installation over gypsum board on metal studs; organic adhesive; TCA W242 and ANSI A108.4.

1. Tile Type: Glazed wall tile.
2. Grout: Polymer-modified grout.

END OF SECTION 09 30 00

SECTION 09 50 00 – ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.2 SUMMARY

A. Section Includes

1. Acoustical ceiling panels
2. Exposed grid suspension system
3. Wire hangers, fasteners, main runners, cross tees, and wall angle moldings
4. Perimeter Trim

B. Related Selections

1. Section 092000 - Gypsum Board
2. Sections 23 - HVAC Air Distribution
3. Sections 26 - Electrical

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM A 1008 Standard Specification for Steel, Sheet, Cold Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability
2. ASTM A 641 Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire
3. ASTM A 653 Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process
4. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Re- verberation Room Method
5. ASTM C 635 Standard Specification for Metal Suspension Systems for Acousti- cal Tile and Lay-in Panel Ceilings
6. ASTM C 636 Recommended Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels
7. ASTM D 3273 Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber
8. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Build- ing Materials
9. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Material

10. ASTM E 580 Installation of Metal Suspension Systems in Areas Requiring Mod- erate Seismic Restraint

11. ASTM E 1111 Standard Test Method for Measuring the Interzone Attenuation of Ceilings Systems

12. ASTM E 1414 Standard Test Method for Airborne Sound Attenuation Between Rooms Sharing a Common Ceiling Plenum
13. ASTM E 1264 Classification for Acoustical CeilingProducts

B. International Building Code

C. ASHRAE Standard 62.1-2004, Ventilation for Acceptable Indoor Air Quality

D. NFPA 70 National Electrical Code

E. ASCE 7 American Society of Civil Engineers, Minimum Design Loads for Buildings and Other Structures

F. International Code Council-Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components

G. International Code Council-Evaluation Services Report - Seismic Engineer Report

1. ESR 1308 - Armstrong Suspension Systems

H. International Association of Plumbing and Mechanical Officials - Seismic Engineer Re- port

1. 0244 - Armstrong Single Span Suspension System

1.4 SYSTEM DESCRIPTION

A. Continuous/Wall-to-Wall

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.

B. Samples: Minimum 6 inch x 6 inch samples of specified acoustical panel; 8 inch long samples of exposed wall molding and suspension system, including main runner and 4 foot cross tees.

C. Shop Drawings: Layout and details of acoustical ceilings show locations of items that are to be coordinated with, or supported by the ceilings.

D. Certifications: Manufacturer's certifications that products comply with specified re- quirements, including laboratory reports showing compliance with specified tests

and standards. For acoustical performance, each carton of material must carry an ap- proved independent laboratory classification of NRC, CAC, and AC.

E. If the material supplied by the acoustical subcontractor does not have an Underwriter's Laboratory classification of acoustical performance on every carton, subcontractor shall be required to send material from every production run appearing on the job to an in- dependent or NVLAP approved laboratory for testing, at the Architect/Engineer's dis- cretion. All products not conforming to manufacturer's current published values must

be removed, disposed of and replaced with complying product at the expense of the Contractor performing the work.

1.6 QUALITY ASSURANCE

A. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

1. Fire Performance Characteristics: Identify acoustical ceiling components with ap- propriate markings of applicable testing and inspecting organization.
2. Surface Burning Characteristics: As follows, tested per ASTM E 84 and comply- ing with ASTM E 1264 Classification.
3. Fire Resistance: As follows tested per ASTM E119 and listed in the appropriate floor or roof design in the Underwriters Laboratories Fire Resistance Directory.

B. Coordination of Work: Coordinate acoustical ceiling work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, andsprinklers.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from mois- ture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

1.8 PROJECT CONDITIONS

A. Do not install interior ceilings until space is enclosed and weatherproof; wet work in place is completed and nominally dry; work above ceilings is complete; and ambient conditions of temperature and humidity are continuously maintained at values near those intended for final occupancy. Building areas to receive ceilings shall be free of construction dust and debris.

B. For humidity resistant ceiling systems, building areas to receive ceilings shall be free of construction dust and debris. Performance and hot dipped galvanized steel, aluminum or stainless steel suspension systems can be installed up to 120°F (49°C) and in spaces before the building is enclosed, where HVAC systems are cycled or not oper- ating. Cannot be used in exterior applications where standing water is present or where moisture will come in direct contact with the ceiling.

1.9 ALTERNATE CONSTRUCTION WASTE DISPOSAL

A. Ceiling material being reclaimed must be kept dry and free from debris.

B. Contact the manufacturer a consultant will verify the condition of the material and that it meets the requirements for recycling. The manufacturer's consultant will provide assis- tance to facilitate the recycling of the ceiling.

1.10 WARRANTY

A. Acoustical Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to the following:

1. Acoustical Panels: Sagging and warping
2. Grid System: Rusting and manufacturer's defects

B. Warranty Period:

1. Acoustical panels: Ten (10) years from date of final completion per Section 017823.
2. Grid: Ten (10) years from date of final completion per Section 017823.

C. The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concur- rent with other warranties made by the Contractor under the requirements of the Con- tract Documents.

1.11 MAINTENANCE

A. Extra Materials: Deliver extra materials to Architect/Engineer. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.

1. Acoustical Ceiling Units: Furnish quality of full-size units equal to 5.0 percent of amount installed.
2. Exposed Suspension System Components: Furnish quantity of each exposed suspension component equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Ceiling Panels:

1. Acceptable Manufacturers:

a. Armstrong World Industries, Inc.
b. USG Corp.
c. CertainTeed Corp.

B. Suspension Systems:

1. Acceptable Manufacturers:

a. Armstrong World Industries, Inc.
b. USG Corp.
c. CertainTeed Corp.

2.2 ACOUSTICAL CEILING UNITS

A. Acoustical Panels Type AP, ACT-1:

1. Surface Texture: Fine .
2. Composition: Mineral Fiber.
3. Color: White.
4. Size: 24IN x 24IN.
5. Edge Profile: Beveled Tegular 9/16IN for interface with 9/16" Exposed Tee grid.
6. Noise Reduction Coefficient (NRC), ASTM C 423: 0.80.
7. Ceiling Attenuation Class (CAC), ASTM C 1414: 35.
8. Sabin: N/A.
9. Articulation Class (AC): ASTM E 1111; 170 .
10. Flame Spread: ASTM E 1264; Class A (UL).
11. Light Reflectance White Panel, ASTM E 1477: 87%.
12. Dimensional Stability: high humidity applications.
13. Basis of Design: Ultima High-NRC, 1912HRC as manufactured by Armstrong World Industries.

2.3 METAL SUSPENSION SYSTEMS, GRD-1

A. Tee System, GRD-2

1. Basis of Design: Suprafine XL 9/16" Exposed Tee color Blizzard White as manu- factured by Armstrong World Industries.
2. Tee Width: 9/16”.
3. Color: White Powder-Coat to match panel.

B. Tee System, GRD-3

1. Tee System Basis of Design: SONATA 9/16" Dimensional Tee color Blizzard White as manufactured by Armstrong World Industries.
2. Edge Basis of Design: SONATA Shadow Molding color Blizzard White as manu- factured by Armstrong World Industries.
3. Tee Width: 9/16” with center extrusion.
4. Color: White Powder-Coat to match panel.

C. Components: Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction with exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.

a. Structural Classification: ASTM C 635 Heavy Duty

D. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

E. Wire for Hangers and Ties: ASTM A 641, Class 1 zinc coating, soft annealed, with a yield stress load of at least time three design load, but not less than 12 gauge.

F. Edge Moldings and Trim:

1. 12ft Wall

Molding PART 3 -

EXECUTION

3.1 EXAMINATION

A. Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out, unless expressly permitted by manufacturer's printed recommendations.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Avoid use of less than half width units at bor- ders, and comply with reflected ceiling plans. Coordinate panel layout with mechanical and electrical fixtures.

3.3 INSTALLATION

A. Follow manufacturer installation instructions.

B. Install suspension system and panels in accordance with the manufacturer's

instruc- tions, and in compliance with ASTM C 636 and with the authorities having jurisdiction.

C. Suspend main beam from overhead construction with hanger wires spaced 4-0 on cen- ter along the length of the main runner. Install hanger wires plumb and straight.

D. Install wall moldings at intersection of suspended ceiling and vertical surfaces. Miter corners where wall moldings intersect or install corner caps.

E. For reveal edge panels: Cut and reveal or rabbet edges of ceiling panels at border ar- eas and vertical surfaces.

F. Install acoustical panels in coordination with suspended system, with edges resting on flanges of main runner and cross tees. Cut and fit panels neatly against abutting sur- faces. Support edges by wall moldings.

3.4 ADJUSTING AND CLEANING

A. Replace damaged and broken panels.

B. Clean exposed surfaces of acoustical ceilings, including trim, edge moldings, and sus- pension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage. Remove any ceiling products that cannot be successfully cleaned and or repaired. Replace with attic stock or new product to eliminate evidence of damage.

C. Before disposing of ceilings, contact the manufacturer to review with a consultant the condition and location of building where the ceilings will be removed. The consultant will verify the condition of the material and that it meets the manufacturer’s require- ments for recycling if so desired.

END OF SECTION

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

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. Resilient base.
2. Resilient molding accessories.
3. Resilient stair accessories.

B. Related Sections:

1. Division 09 Section "Resilient Sheet Flooring" for resilient sheet floor coverings.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: 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.

1.5 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 (10 deg C) or more than 90 deg F (32 deg C).

1.6 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F (35 deg C), in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. 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.

1.7 EXTRA MATERIALS

A. Furnish extra materials 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 (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

A. Resilient Base: Refer to Finish Schedule Drawings Basis-of-Design for resilient base products.

B. Basis-of-Design Product: Subject to compliance with requirements, provide products shown on Finish Schedule drawings or equal. Equal products must be equal to basis-of-design products as determined by Contracting Officer in physical characteristics, material composition, color, finish and pattern.

C. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TP (rubber, thermoplastic).
2. Manufacturing Method: Group I (solid, homogeneous).
3. Style: Cove (base with toe).

D. Minimum Thickness: 0.125 inch (3.2 mm).

E. Height: 4-inches.

F. Lengths: Coils in manufacturer's standard length.

1. Cove Base: 120 feet.

G. Outside Corners:

1. Cove Base: Preformed.

H. Inside Corners:

1. Cove Base: Job formed.

I. Colors and Patterns: As shown on Finish Schedule Drawings.

2.2 RESILIENT STAIR ACCESSORIES

A. Resilient Stair Accessories: Refer to Finish Schedule Drawings Basis-of-Design for resilient stair accessories products.

B. Basis-of-Design Product: Subject to compliance with requirements, provide products shown on Finish Schedule drawings or equal. Equal products must be equal to basis-of-design products as determined by Contracting Officer in physical characteristics, material composition, color, finish and pattern.

C. Resilient Stair Treads Standard: ASTM F 2169.

1. Material Requirement: Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic).
   a. Class 2, Pattern: Raised-disc design.

D. Nosing Style: Square, adjustable to cover angles between 60 and 90 degrees.

E. Nosing Height: 1-1/2 inches (38 mm).

F. Thickness: ¼ inch (6 mm) and tapered to back edge.

G. Size: Lengths and depths to fit each stair tread in one piece.

H. Risers: Smooth, flat, coved-toe, 7 inches (178 mm) high by length matching treads, produced by same manufacturer as treads and recommended by manufacturer for installation with treads.

1. Thickness: 0.125 inch (3.2 mm).

2.3 RESILIENT MOLDING ACCESSORY

A. Description: As shown on Finish Schedule Drawings.

B. Material: Rubber.

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 manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

C. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.

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.

B. 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.

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

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 and remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until they are same temperature as the space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

D. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

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 practicable 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. Preformed Corners: Install preformed corners before installing straight pieces.

G. Job-Formed Corners:

1. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Stair Accessories:

1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
2. Tightly adhere to substrates throughout length of each piece.
3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

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 until Substantial Completion.

END OF SECTION 09 65 13

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 09 91 00 - PAINTING

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 surface preparation and the application of paint systems on substrates:

1. Interior steel other than that scheduled for painting under Section 09 96 00 "High-Performance Coatings".
2. Interior gypsum board.

B. Related Sections:

1. Section 09 96 00 - "High-Performance Coatings".

C. Related Requirements:

1. Division 08 Sections for shop priming of metal substrates with primers specified in this Section.

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. 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 (200 mm) square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

C. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.
3. VOC content.

1.5 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 (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to products listed in other Part 2 articles for the paint category indicated.

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

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 manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Products shall comply with VOC limits of authorities having jurisdiction.

1. Nonflat Paints and Coatings: 150 g/L.
2. Primers, Sealers, and Undercoaters: 200 g/L.

D. Low-Emitting Materials: Interior paints and coatings shall 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."

E. Colors: As indicated in Finish Schedule Drawings.

2.3 PRIMERS/SEALERS

A. Primer Sealer, Interior, Institutional Low Odor/VOC: MPI #149.

2.4 METAL PRIMERS

A. Primer, Alkyd, Quick Dry, for Metal: MPI #76.

2.5 WATER-BASED PAINTS

A. Latex, Interior, Institutional Low Odor/VOC, (Gloss Level 2): MPI #144.

B. Latex, Interior, Institutional Low Odor/VOC, Semi-Gloss (Gloss Level 5): MPI #147.

C. Latex, Exterior Semi-Gloss (Gloss Level 5): MPI #11.

2.6 SOLVENT-BASED PAINTS

A. Alkyd, Exterior, Semi-Gloss (Gloss Level 5): MPI #94.

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. Masonry (CM): 12 percent.

2. 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 Manual" applicable to substrates 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. Existing Painted Steel Substrates: Remove paint, rust, loose mill scale, and shop primer, if any. Clean using the following method:
1. SSPC-SP 11, "Power Tool Cleaning to Bare Metal."

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

3.3 APPLICATION

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.

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.
   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 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.

3.5 INTERIOR PAINTING SCHEDULE

A. CMU Substrates:

1. Institutional Low-Odor/VOC Latex System:
   a. First Coat (over existing paint): Latex, interior, institutional low odor/VOC, matching topcoat.
   b. Topcoat: Latex, interior, institutional low odor/VOC, semi-gloss (Gloss Level 5), MPI #147.

B. Steel Substrates:

1. Alkyd System:
   a. Prime Coat: Touch-up shop primer or metal primer for existing steel.
   b. Intermediate Coat: Alkyd exterior semi-gloss match topcoat..
   c. Topcoat: Alkyd exterior semi-gloss (Gloss Level 5) MPI #94.

C. Gypsum Board and Skim-Coated Substrates:

1. Institutional Low-Odor/VOC Latex System:
   a. Prime Coat: Primer sealer, interior, institutional low odor/VOC, MPI #149.
   b. Intermediate Coat: Latex, interior, institutional low odor/VOC, matching topcoat.
   c. Topcoat: Latex, interior, institutional low odor/VOC, (Gloss Level 2), MPI #144.

END OF SECTION 09 91 23

SECTION 10 14 00 – SIGNAGE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Panel Signs

1.2 DEFINITIONS

A. ADA-ABA Accessibility Guidelines: U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines."

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details for signs.

1. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
2. Provide message list, typestyles, graphic elements, including tactile characters and Braille, and layout for each sign.

C. Samples: For each sign type and for each color and texture required.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Polycarbonate Sheet: Of thickness indicated, manufactured by extrusion process, coated on both surfaces with abrasion-resistant coating:

1. Impact Resistance: 16 ft-lbf/in. per ASTM D 256, Method A.
2. Tensile Strength: 9000 lbf/sq. in. per ASTM D 638.
3. Flexural Modulus of Elasticity: 340,000 lbf/sq. in. per ASTM D 790.
4. Heat Deflection: 265 deg F at 264 lbf/sq. in. per ASTM D 648.
5. Abrasion Resistance: 1.5 percent maximum haze increase for 100 revolutions of a Taber abraser with a load of 500 g per ASTM D 1044.Min. thickness: 3/8” overall

B. Tactile and Braille Sign: Manufacturer's standard process for producing text and symbols complying with ADA-ABA Accessibility Guidelines and with ICC/ANSI A117.1. Text shall be accompanied by Grade 2 Braille. Produce precisely formed characters with square-cut edges free from burrs and cut marks; Braille dots with domed or rounded shape.

1. Panel Material: Opaque acrylic sheet.
2. Raised-Copy Thickness: Not less than 1/32 inch.

C. Engraved Copy: Machine engrave letters, numbers, symbols, and other graphic devices into panel sign on face indicated to produce precisely formed copy, incised to uniform depth.

1. Engraved Plastic Laminate: Engrave through exposed face ply of plastic-laminate sheet to expose contrasting core ply.

D. Subsurface Engraved Acrylic Sheet: Reverse-engrave back face of clear acrylic sheet. Fill resulting copy with enamel. Apply opaque background color coating over enamel-filled copy.

E. Colored Coatings for Acrylic Sheet: For copy colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and are UV and water resistant for five years for application intended.
1. Color: Reviewed by the Contracting Officer and as selected from manufacturer's full range when not scheduled.

2.2 SIGNAGE

A. Interior Panel Signs: Provide smooth sign panel surfaces constructed to remain flat under installed conditions within a tolerance of plus or minus 1/16 inch measured diagonally from corner to corner, complying with the following requirements:

1. Aluminum Sheet: See drawings.
2. Edge Condition: See drawings.
3. Corner Condition: See drawings.
4. Mounting: See drawings.

a. Wall mounted with concealed anchors
b. Manufacturer's standard anchors for substrates encountered.

5. Color and Graphics: See drawings.

2.3 FABRICATION

A. General: Provide manufacturer's standard signs of configurations indicated.

2.4. ACRYLIC SHEET FINISHES

Colored Coatings for Acrylic Sheet: For copy colors, provide colored coatings, including inks, dyes, and paints, that are recommended by acrylic manufacturers for optimum adherence to acrylic surface and that are UV and water resistant for five years for application intended.

2.5 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ACE Sign Systems, Inc.
2. Advance Corporation; Braille-Tac Division.
3. Allen Industries Architectural Signage
4. Allenite Signs; Allen Marking Products, Inc.
5. APCO Graphics, Inc.
6. Appenx, Inc., 1-800-443-6032, www.appenx.com
7. ASI-Modulex, Inc.
8. Best Sign Systems Inc.
9. Bunting Graphics, Inc.
10. Fossil Industries, Inc.
11. Gemini Incorporated.
12. Grimco, Inc.
13. Innerface Sign Systems, Inc.
14. InPro Corporation
15. Matthews International Corporation; Bronze Division.
16. Mills Manufacturing Company.
17. Mohawk Sign Systems.
18. Nelson-Harkins Industries.
19. Seton Identification Products.
20. Signature Signs, Incorporated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate signs and accessories where indicated, using mounting methods of types described and complying with manufacturer's written instructions.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free of distortion and other defects inappearance.
2. Interior Wall Signs: Install signs on walls adjacent to latch side of door where applicable. Where not indicated or possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door.

B. Wall-Mounted Signs: Comply with sign manufacturer's written instructions except where more stringent requirements apply.

Two-Face Tape: Mount signs to smooth, nonporous surfaces. Do not use this method

for vinyl-covered or rough surfaces.

1. Hook-and-Loop Tapes: Mount signs to smooth, nonporous surfaces.
2. Magnetic Tape: Mount signs to smooth, nonporous surfaces.
3. Silicone-Adhesive Mounting: Attach signs to irregular, porous, or vinyl-covered surfaces.
4. Flush Mounting: Mount characters with backs in contact with wall surface.
5. Concealed anchors and fasteners as recommended by manufacturer

END OF SECTION 10 14 00

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 12 21 23 – SUN SHADES

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. Manually operated sunscreen roller shades.
2. Manually operated double-roller sunscreen and room-darkening shades.

1.3 RELATED SECTIONS

A. Section 06 10 00 - Rough Carpentry: Wood blocking for mounting roller shades and accessories.

1.4 REFERENCES

A. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. NFPA 701-99 - Fire Tests for Flame-Resistant Textiles and Films.

1.5 SUBMITTALS

A. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
3. Storage and handling requirements and recommendations.
4. Mounting details and installation methods.

B. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, and relationship to adjacent work.

C. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details. Field verify all opening sizes.

D. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing manufacturer's full range of available colors and patterns.

E. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.

F. Maintenance Data: Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.

B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.

C. Fire-Test-Response Characteristics: Passes NFPA 701-99 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

D. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.

1.7 DELIVERY, STORAGE & HANDLING

A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Install roller shades after finish work including painting 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. Roller Shade Hardware, Chain and Shadecloth: Manufacturer's standard non-depreciating twenty-five year limited warranty.

B. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas.

PART 2 - PRODUCTS

2.1 APPLICATIONS/SCOPE

A. Roller Shade Schedule:

1. Shade Type SR.1: Manual operating, chain drive, sunscreen roller shades in all exterior windows of rooms and spaces shown on the Drawings.
2. Shade Types DR.1 and DR.2: Manual operating interior, chain drive "double" solar and room darkening blackout roller shades, operating independently of each other, in all exterior windows of rooms and spaces shown on Drawings, and related mounting systems and accessories.

2.2 SHADE CLOTH

A. Environmentally Certified Shadecloth: Fabricated from TPO for both core yarn and jacket, single thickness, non-raveling 0.030 inch (0.762 mm) thick fabric.

1. Weave: 5 percent open, 2x2 basket weave pattern.
2. Color: Selected from manufacturer's standard colors.

B. Room darkening (PVC Free) Shadecloth with opaque acrylic backing: .008 inches thick (.19 mm) blackout material and weighing .94 lbs. per square yard, comprising of 53% fiberglass, 45% acrylic, 2% poly finish.

1. Color: Selected from manufacturer’s standard colors.

2.3 SHADE BAND

A. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.

1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.
2. Shade band and Shade Roller Attachment:
   a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch (39.37 mm) in diameter for manual shades, and less than 2.55 inches (64.77 mm) for motorize shades are not acceptable.
   b. Provide for positive mechanical engagement with drive / brake mechanism.
   c. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.
   d. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.

e. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets are not acceptable.

2.4 SHADE FABRICATION

A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.

B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design. Fabricate hem as follows:

1. Concealed hemtube.

C. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified standards. Battens shall be roll-formed stainless steel or tempered steel, as required.

D. Blackout shadebands, when used in side channels, shall have horizontally mounted, roll-formed stainless steel or tempered-steel battens not more than 3 feet (115 mm) on center extending fully into the side channels. Battens shall be concealed in a integrally-colored fabric to match the inside and outside colors of the shadeband, in accordance with manufacturer's published standards for spacing and requirements.

1. Battens shall be roll formed of stainless steel or tempered steel and concave to match the contour of the roller tube.
2. Batten pockets shall be self-colored fabric front and back RF welded into the shadecloth. A self-color opaque liner shall be provided front and back to eliminate any see through of the batten pocket that shall not exceed 1-1/2 inches (38.1 mm) high and be totally opaque. A see-through moiré effect, which occurs with multiple layers of transparent fabrics, shall not be acceptable.

2.5 COMPONENTS

A. Access and Material Requirements:

1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.

B. Manual Operated Chain Drive Hardware and Brackets:

1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.

2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
3. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable.
4. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
5. Drive Bracket / Brake Assembly:
   a. Drive Bracket shall be fully integrated with all accessories, including, but not limited to: fascia, and room darkening side / sill channels.
   b. Drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.
   c. The brake shall be an over -unning clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.
   d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
   e. The entire assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.

C. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41 kg) minimum breaking strength. Nickel plate chain shall not be accepted.

2.6 ACCESSORIES

A. Fascia:

1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
2. Fascia shall fully conceal brackets, shade roller and fabric on the tube.
3. Notching of Fascia for manual chain shall not be acceptable.

B. Room Darkening Side and Sill Channels:

1. Extruded aluminum with polybond edge seals and mounting brackets and with concealed fastening. Exposed fastening is not acceptable. Channels shall accept one-piece exposed blackout hembar with vinyl seal to assure side light control and sill light control.
   a. Side channels, 1-15/16 inches (49.2 mm) wide by 1-3/16 inches (30.1 mm) deep.
   b. Color: Selected from manufacturer's standard colors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearances for window operation hardware.

B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

C. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

D. Engage Installer to train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 12 49 40

SECTION 23 05 29

PIPE HANGERS AND SUPPORTS FOR HVAC PIPING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SECTION INCLUDES:

A. Pipe hangers and supports.

1.03 RELATED SECTIONS:

A. Section 23 01 00 - General HVAC Requirements

F. Section 23 07 19 - HVAC Piping Insulation

G. Section 23 23 00 – Refrigerant Piping

1.04 SUBMITTALS:

A. Shop drawings and product data in accordance with Section 230100.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

A. Grinnell

B. Michigan

C. Unistrut

2.02 PIPE HANGERS AND SUPPORTS:

A. All hangers and supports shall be galvanized or cadmium plated except those indicated as copper plated.

B. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Malleable iron, adjustable swivel split ring.

C. Hangers for Pipe Sizes 2 to 4 Inches and Cold Pipe Sizes 6 Inches and Over: Carbon steel, adjustable, clevis.

D. Hangers for Hot Pipe Sizes 6 inches and Over: Adjustable steel yoke, cast iron roll, double hanger.

E. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods; cast iron roll and stand for hot pipe sizes 6 inches and over.

F. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.

G. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp; adjustable steel yoke and cast iron roll for hot pipe sizes 6 inches and over.

H. Vertical Support: Steel riser clamp.

I. Floor Support for Pipe Sizes to 4 Inches and All Cold Pipe Sizes: Cast iron adjustable pipe saddle, locknut nipple, floor flange, and concrete pier or steel support.

J. Floor Support for Hot Pipe Size 6 Inches and Over: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.

K. Copper Pipe support: Carbon steel ring, adjustable, copper plated.

L. Shield for Insulated Piping 2 Inches and Smaller: Eighteen (18) gauge galvanized steel shield over insulation in 180 degrees segments, minimum 12 inches long at pipe support.

M. Shield for Insulated Piping 2-1/2 Inches and Larger (Except Cold Water Piping): Pipe covering protective saddles.

N. Shields for Insulated Cold Water Piping 2-1/2 Inches and Larger: Hard block non-conducting saddles in 90 degrees segments, 12 inch minimum length, block thickness same as insulation thickness.

2.03 HANGER RODS:

A. Steel Hanger Rods: Threaded both ends, threaded one end, or continuous threaded. Rods shall be galvanized.

2.04 INSERTS:

A. Malleable iron case over galvanized steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms: size inserts to suit threaded hanger rods.

PART 3 - EXECUTION

3.01 INSERTS:

A. Provide inserts for placement in concrete formwork by others.

B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.

C. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.

D. Where concrete slabs form finished ceilings, provide inserts to be flush with slab surface.

3.02 PIPE HANGERS AND SUPPORTS:

A. Support horizontal piping as follows:

PIPE SIZE	ROD DIAMETER	STEEL PIPE SPACING	COPPER PIPE SPACING	PVC PIPE SPACING
Through 1"	3/8"	8'	6'	5'
1-1/4"	3/8"	10'	10'	5'
1-1/2"	3/8"	10'	10'	5'
2"	3/8"	12'	10'	5'
2-1/2"	1/2"	12'	12'	5'
3"	1/2"	12'	12'	5'
4"	5/8"	16'	12'	5'
6"	3/4"	16'	N/A	5'
8"	7/8"	20'	N/A	5'
10"	1"	20'	N/A	5'

B. Install hangers to provide minimum 1/2" space between finished covering and adjacent work.

C. Place a hanger within 12" of each horizontal elbow.

D. Use hangers with 1-1/2" minimum vertical adjustment.

E. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.

F. Where several pipes can be installed in parallel and at same elevation, provide multiple or trapeze hangers.

G. Support riser piping independently of connected horizontal piping.

END OF SECTION

SECTION 23 05 53 - EQUIPMENT, PIPING AND DUCTWORK IDENTIFICATION

PART 1 – GENERAL

1.1 RELATED SECTIONS:

- Refer to other sections of Division 23 for items to be identified according to this section.
- Refer to Division 26 for electrical identification.

1.2 SCOPE OF SECTION:

This section contains the requirements relating to the materials and methods used to identify items described in Division 23.

1.3 GENERAL:

The record drawings shall include mechanical identification on all serviceable components of piping and duct work systems and shall reference applicable valve tag charts and/or riser diagrams. Consult with CONTRACTING OFFICER for numbering.

1.4 CODES AND STANDARDS:

Comply with ANSI A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

PART 2 - PRODUCTS

2.1 PAINTED IDENTIFICATION MATERIALS:

A. After piping has been finish painted, the installer of the piping shall identify the type of service lines with applied color bands and stenciled letters and indicate direction of flow with stenciled arrows. Color bands shall be 1 inch wide, finished in gloss enamel; lettering and arrows shall be same color as the bands. Indicators shall be applied at connections to pumps, chillers and other equipment; at entrances to spaces; adjacent to valves; near access doors to pipe spaces and at 30-foot maximum intervals on long pipe runs. Letters be positioned to be easily read from a normal standing position.

B. STENCILS:
Standard fiberboard stencils, prepared for required applications with letter sizes generally complying with recommendations of ANSI A13.1 for piping and similar applications but not less than 1-1/4" high letters for ductwork and not less than 3/4" high letters for access door signs and similar operational instructions.

C. STENCIL PAINT:
Standard exterior type stenciling enamel; black, except as otherwise indicated; either brushing grade or pressurized spray-can form and grade.

2.2 VALVE TAGS:

A. BRASS VALVE TAGS:
Provide 19-gauge polished brass valve tags with stamp-engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high and with 5/32" hole for fastener. Provide 1-1/2" diameter tags except as otherwise indicated. Valve tags shall be attached to the valve with brass or aluminum chain. Valve tags shall have stamped abbreviations of the system in addition to the valve number.

B. PLASTIC LAMINATE VALVE TAGS:
Provide manufacturer's standard 3/32" thick engraved plastic laminate valve tags, with piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener. Provide 1-1/2" square black tags with white lettering, except as otherwise indicated.

2.3 ENGRAVED PLASTIC-LAMINATE SIGNS:

A. GENERAL:
Provide engraving stock melamine plastic laminate, in the sizes and thickness indicated, engraved with engraver's standard letter style of the sizes and wording indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate.

B. THICKNESS:
1/16" for units up to 20 square inches or 8" length; 1/8" for larger units.

C. FASTENERS:
Self-tapping stainless steel screws.

2.4 WRAP-AROUND PLASTIC IDENTIFICATION:

All plumbing/mechanical piping identification shall adhere to ANSI A13.1 – 1981. Interior piping , all locations, shall utilize Seton "Setmark" or equal pipe markers. All pipe markers shall be snap around whenever possible. Markers shall be located at each wall, floor or ceiling penetration, whether exterior or interior, and every 20 ft. thereafter. Markers shall be fully legible from floor level showing medium contained in pipe, and directional arrows.

Piping shall be identified as follows: DOMESTIC COLD WATER SUPPLY, DOMESTIC HOT WATER SUPPLY, GAS, CONDENSATE, MAKE UP WATER, WASTE, VENT & others by
approval by submittals.

Piping in exposed areas, with canvas cloth jackets, to be painted with two coats of latex based, off-white color or color approved by Architect, paint suitable as per jacketing manufacturers instructions, prior to piping identifications.

PART 3 – EXECUTION

1.1 INSTALLATION REQUIREMENTS:

A. COORDINATION:
Coordinate new labeling with existing labeling through Project Manager. Where identification is to be applied to surfaces that require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, identification shall be installed after completion of covering and painting. Identification is to be installed prior to installation of acoustical ceilings and similar removable concealment.

B. DUCTWORK IDENTIFICATION:
1. General: Provide for identification of air supply, return, exhaust, intake, and relief ductwork with stenciled signs and arrows, showing ductwork service and direction of flow, in black and white.

2. Locations: Ductwork shall be identified every 20’ in spaces with removable ceilings and at each access door in spaces with hard ceilings. Exposed ductwork shall be identified every 20’ in mechanical rooms. As described above, ductwork shall be labeled on both sides of floor and wall penetrations.

3. Access Doors: Provide engraved plastic-laminate signs on each access door in ductwork and housings, indicating purpose of access (to what equipment) and other maintenance and operating instructions, and appropriate and procedural information.

C. PIPING SYSTEM IDENTIFICATION:
1. General: Provide for pipe markers as follows:
Wrap around plastic identification with application system as indicated under Part 2 – Products in this Section. Include arrows to show normal direction of flow. For hot non-insulated pipes, install a segment of pipe insulation with appropriate piping identification.
2. Locate identification as follows wherever piping is exposed to view in occupied spaces, machine rooms, accessible maintenance spaces and exterior non- concealed locations.
   a. Near each valve and control device.
   b. Near each branch, excluding short take-offs for fixtures and terminal units; mark each pipe at branch, where there could be question of flow pattern.
   c. At locations where pipes pass through walls, floors, ceilings, or enter non-accessible enclosures.
   d. At access doors, manholes and similar access points which permit view of concealed piping.
   e. At major equipment items and other points of origination and termination.
   f. Spaced intermediately at maximum spacing of 50' along each piping run, except reduce spacing to 25' in congested areas of piping and equipment.

g. On piping above removable acoustical ceilings, except omit intermediately spaced markers.
h. Identify non potable piping and outlets.

3. Use the following band colors and letter

designations: Type of Service

Color	Designation
of flow)	
Domestic Cold Water Supply	Light Blue DCWS
Domestic Cold Water Return	Light Blue DCWR
Gas	Yellow GAS
Condensate Water	Aluminum COND

D. VALVE IDENTIFICATION**:**

Provide for valve tags on every valve cock and control device in each piping system; exclude check valves, valves within factory-fabricated equipment units, plumbing fixture faucets, convenience and lawn-watering hose bibs, and shut-off valves at plumbing fixtures. HVAC terminal devices and similar rough-in connections of end- use fixtures and units. List each tagged valve in a valve schedule for each piping system.

E. MECHANICAL EQUIPMENT IDENTIFICATION:
Provide for engraved plastic laminate sign on or near each major item of mechanical equipment and each operational device. Consult with CONTRACTING OFFICER for “numbering” of valves or identification requirements. Fans, controls, switches, ventilators, pumps and other items of equipment, which have had the manufacturer’s data tags removed or rendered illegible, be equipped with new tags by the installer. Tags shall be brass plates on which operational data plus information regarding areas or other equipment served is stamped. Permanently attach tags to the equipment in locations where they can easily be read. Provide signs for the following general categories of equipment and operational devices:

1. Blower Coil Units
2. Cabinet Unit Heaters
3. Main control and operating valves, including safety devices.
2. Meters, gauges, thermometers and similar units.
3. Ductless Indoor AC Units.
5. Condensing Units
6. Other items as specified by Project Manager.

END OF SECTION

SECTION 26 09 23

LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following lighting control devices:

1. Time switches.
2. Outdoor photoelectric switches.
3. Indoor occupancy sensors.
4. Lighting contactors.

B. Related Sections include the following:

1. Division 26 Section "Wiring Devices" for wall-box dimmers, wall-switch occupancy sensors, and manual light switches.

1.03 DEFINITIONS

A. LED: Light-emitting diode.

B. PIR: Passive infrared.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show installation details for occupancy and light-level sensors.

1. Interconnection diagrams showing field-installed wiring.

C. Field quality-control test reports.

D. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1.05 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.06 COORDINATION

A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.01 TIME SWITCHES

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. Area Lighting Research, Inc.; Tyco Electronics.

2. Grasslin Controls Corporation; a GE Industrial Systems Company.

3. Intermatic, Inc.

4. Leviton Mfg. Company Inc.

5. Lightolier Controls; a Genlyte Company.

6. Lithonia Lighting; Acuity Lighting Group, Inc.

7. Paragon Electric Co.; Invensys Climate Controls.

8. Square D; Schneider Electric.

9. TORK.

10. Watt Stopper .

B. Electronic Time Switches: Electronic, solid-state programmable units with alphanumeric display; complying with UL 917..

1. Program: 8 on-off set points on a 24-hour schedule and an annual holiday schedule that overrides the weekly operation on holidays.

2. Astronomic Time: Selected channels.

3. Battery Backup: For schedules and time clock.

2.02 OUTDOOR PHOTOELECTRIC SWITCHES

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. Area Lighting Research, Inc.; Tyco Electronics.

2. Grasslin Controls Corporation; a GE Industrial Systems Company.

3. Intermatic, Inc.

4. Lithonia Lighting; Acuity Lighting Group, Inc.

5. Novitas, Inc.

6. Paragon Electric Co.; Invensys Climate Controls.

7. Square D; Schneider Electric.

8. TORK.

9. Watt Stopper.

B. Description: Solid state, with DPST dry contacts rated for 1800-VA tungsten or 1000-VA inductive, to operate connected relay, contactor coils, or microprocessor input; complying with UL 773A.

1. Light-Level Monitoring Range: 1.5 to 10 fc (16.14 to 108 lx), with an adjustment for turn-on and turn-off levels within that range and a directional lens in front of photocell to prevent fixed light sources from causing turn-off.

2. Time Delay: 15-second minimum, to prevent false operation.

3. Surge Protection: Metal-oxide varistor, complying with IEEE C62.41.1, IEEE C62.41.2, and IEEE 62.45 for Category A1 locations.

4. Mounting: Twist lock complying with IEEE C136.10, with base-and-stem mounting or stem-and-swivel mounting accessories as required to direct sensor to the north sky exposure.

2.03 INDOOR OCCUPANCY SENSORS

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. Watt Stopper.

2. Hubbell Lighting.

3. Leviton Mfg. Company Inc.

4. Lithonia Lighting; Acuity Lighting Group, Inc.

5. Sensor Switch, Inc.

B. General Description: Wall- or ceiling-mounting, solid-state units with a separate relay unit.

1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.

2. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.

3. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.

4. Mounting:
   a. Sensor: Suitable for mounting in any position on a standard outlet box.
   b. Relay: Externally mounted through a 1/2-inch (13-mm) knockout in a standard electrical enclosure.

c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.

5. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.

C. PIR Type: Ceiling mounting; detect occupancy by sensing a combination of heat and movement in area of coverage.

1. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm).

2. Detection Coverage (Room): Detect occupancy anywhere in a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.

3. Detection Coverage (Corridor): Detect occupancy within 90 feet (27.4 m) when mounted on a 10-foot- (3-m-) high ceiling.

D. Ultrasonic Type: Ceiling mounting; detect occupancy by sensing a change in pattern of reflected ultrasonic energy in area of coverage.

1. Detector Sensitivity: Detect a person of average size and weight moving not less than 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).

2. Detection Coverage (Small Room): Detect occupancy anywhere within a circular area of 600 sq. ft. (56 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.

3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.

4. Detection Coverage (Large Room): Detect occupancy anywhere within a circular area of 2000 sq. ft. (186 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.

5. Detection Coverage (Corridor): Detect occupancy anywhere within 90 feet (27.4 m) when mounted on a 10-foot- (3-m-) high ceiling in a corridor not wider than 14 feet (4.3 m).

E. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit.

1. Sensitivity Adjustment: Separate for each sensing technology.

2. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm), and detect a person of average size and weight moving not less than 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).

3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.

2.04 LIGHTING CONTACTORS

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. Allen-Bradley/Rockwell Automation.

2. ASCO Power Technologies, LP; a division of Emerson Electric Co.

3. Eaton Electrical Inc.; Cutler-Hammer Products.

4. GE Industrial Systems; Total Lighting Control.

5. Grasslin Controls Corporation; a GE Industrial Systems Company.

6. Hubbell Lighting.

7. Lithonia Lighting; Acuity Lighting Group, Inc.

8. MicroLite Lighting Control Systems.

9. Square D; Schneider Electric.

10. TORK.

11. Watt Stopper.

B. Description: Electrically operated and electrically held, complying with NEMA ICS 2 and UL 508.

1. Current Rating for Switching: Listing or rating consistent with type of load served, including tungsten filament, inductive, and high-inrush ballast

(ballast with 10 percent or less total harmonic distortion of normal load current).

2. Fault Current Withstand Rating: Equal to or exceeding the available fault current at the point of installation.

3. Enclosure: Comply with NEMA 250.

4. Provide with control and pilot devices as **indicated on Drawings**, matching the NEMA type specified for the enclosure.

2.05 CONDUCTORS AND CABLES

A. Power Wiring to Supply Side of Remote-Control Power Sources: Not smaller than No. 12 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

B. Class 1 Control Cable: Multiconductor cable with stranded-copper conductors not smaller than No. 18 AWG. Comply with requirements in Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

PART 3 - EXECUTION

3.01 SENSOR INSTALLATION

A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.02 CONTACTOR INSTALLATION

A. Mount electrically held lighting contactors with elastomeric isolator pads, to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.03 WIRING INSTALLATION

A. Wiring Method: Comply with Division 26 Section "Low-Voltage Electrical Power Conductors and Cables." Minimum conduit size shall be 1/2 inch (13 mm).

B. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.

C. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.

D. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.04 IDENTIFICATION

A. Identify components and power and control wiring according to Division 26 Section "Identification for Electrical Systems."

1. Identify controlled circuits in lighting contactors.

2. Identify circuits or luminaries controlled by photoelectric and occupancy sensors at each sensor.

B. Label time switches and contactors with a unique designation.

3.05 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:

1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.

2. Operational Test: Verify operation of each lighting control device, and adjust time delays.

B. Lighting control devices that fail tests and inspections are defective work.

3.06 ADJUSTING

A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit

B. occupied conditions. Provide up to two visits to Project during other-than- normal occupancy hours for this purpose.

3.07 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lighting control devices. Provide a minimum of 4 hours of training. Refer to Division 01 Section "Demonstration and Training."

END OF SECTION 26 09 23

THIS PAGE INTENTIONALLY LEFT BLANK

SECTION 16 12 00 CONDUCTORS AND CABLES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

1.03 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Qualification Data: For testing agency.

C. Field Quality-Control Test Reports: From a qualified testing and inspecting agency engaged by Contractor.

1.04 QUALITY ASSURANCE

A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the InterNational Electrical Testing Association and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.

2.02 CONDUCTORS AND CABLES

A. Manufacturers:

1. American Insulated Wire Corp.; a Leviton Company.

2. General Cable Corporation.

3. Rome.

4. Southwire Company.

B. Refer to Part 3 "Conductor and Insulation Applications" Article for insulation type, cable construction, and ratings.

C. Conductor Material: Copper complying with NEMA WC 5, stranded.

D. Conductor Insulation Types: Type THW, THHN-THWN.

2.03 CONNECTORS AND SPLICES

A. Manufacturers:

1. AFC Cable Systems, Inc.

2. AMP Incorporated/Tyco International.

3. Hubbell/Anderson.

4. O-Z/Gedney; EGS Electrical Group LLC.

5. 3M Company; Electrical Products Division.

B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 – EXECUTION

3.01 CONDUCTOR AND INSULATION APPLICATIONS

A. Service Entrance: Type THHN-THWN, single conductors in raceway.

B. Exposed Feeders: Type THHN-THWN, single conductors in raceway

C. Feeders Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspaces: Type THHN-THWN, single conductors in raceway.

E. Exposed Branch Circuits, including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

G. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.

H. Underground Feeders and Branch Circuits: Type UF multiconductor cable.

I. Fire Alarm Circuits: Type THHN-THWN, in raceway.

J. Class 1 Control Circuits: Type THHN-THWN, in raceway.

K. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.02 INSTALLATION

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Division 16 Section "Basic Electrical Materials and Methods."

F. Seal around cables penetrating fire-rated elements according to Division 7 Section "Through-Penetration Firestop Systems."

G. Identify and color-code conductors and cables according to Division 16 Section "Basic Electrical Materials and Methods".

3.03 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches (300 mm) of slack.

3.04 FIELD QUALITY CONTROL

A. Testing: Perform the following field quality control testing:

1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.

2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.

B Test Reports: Prepare a written report to record the following:

1. Test procedures used.

2. Test results that comply with requirements.

3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION

SECTION 26 27 26 WIRING DEVICES

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Snap switches.
3. Wall-switch occupancy sensors.
4. Wall-switch timer switches.

B. Related Sections include the following:

1.03 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter.

C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.

D. RFI: Radio-frequency interference.

E. TVSS: Transient voltage surge suppressor.

F. UTP: Unshielded twisted pair.

1.04 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. Cooper Wiring Devices; a division of Cooper Industries, Inc. (Cooper).
2. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
3. Leviton Mfg. Company Inc. (Leviton).
4. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2.02 STRAIGHT BLADE RECEPTACLES

A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.

B. GFCI receptacles, 125 V. 20A, feed- through type, include indicator light that is lighted when device is tripped.

2.03 SNAP SWITCHES

A. Comply with NEMA WD 1 and UL 20.

B. Switches, 120/277 V, 20 A,

1. Description: Single pole, with neon-lighted handle, illuminated when switch is "ON."

2.04 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: 0.035-inch- thick, satin-finished stainless steel
3. Material for Unfinished Spaces: Smooth, high-impact thermoplastic.

2.05 OCCUPANCY SENSORS

A. Wall-Switch Sensors:

1. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

a. Watt Stopper
b. Cooper; 6111 for 120 V, 6117 for 277 V.
c. Hubbell; WS1277.
d. Leviton; ODS 10-ID.
e. Pass & Seymour: WS3000.

2.06 TIMER SWITCHES

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. Leviton Mfg. Company Inc.
2. Lightolier Controls; a Genlyte Company.
3. Lithonia Lighting; Acuity Lighting Group, Inc..
4. Watt Stopper (The).

B. Timer Switches: Adjustable from 5 minutes to 12 hours.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.

4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
8. Tighten unused terminal screws on the device.
9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device mounting screws in yokes, allowing metal-to-metal contact.

E. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

3.02 IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

END OF SECTION 26 27 26

THIS PAGE IS INTENTIONALLY BLANK

SECTION 26 28 16 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
1. Nonfusible switches.
2. Molded-case circuit breakers (MCCBs).
3. Enclosures.

1.03 DEFINITIONS

A. NC: Normally closed.

B. NO: Normally open.

C. SPDT: Single pole, double throw.

1.04 SUBMITTALS

A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).
4. Include evidence of NRTL listing for series rating of installed devices.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.

C. Field quality-control reports.
   1. Test procedures used.
   2. Test results that comply with requirements.
   3. Results of failed tests and corrective action taken to achieve test results that comply with requirements. D. Manufacturer's field service report.

E. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
   1. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
   2. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device.

1.05 QUALITY ASSURANCE

A. Testing Agency Qualifications: Member company of NETA or an NRTL.
   1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

B. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single source from single manufacturer.

C. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

D. 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.

E. Comply with NFPA 70.

1.06 COORDINATION

A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.

PART 2 - PRODUCTS

2.01 NONFUSIBLE SWITCHES

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:
   1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
   2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
   3. Siemens Energy & Automation, Inc.
   4. Square D; a brand of Schneider Electric.

B. Type HD, Heavy Duty, Single Throw, 240-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:
   1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
   2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
   3. Lugs: Mechanical type, suitable for number, size, and conductor material.

2.02 MOLDED-CASE CIRCUIT BREAKERS

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:
   1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
   2. General Electric Company; GE Consumer & Industrial - Electrical Distribution.
   3. Siemens Energy & Automation, Inc.
   4. Square D; a brand of Schneider Electric.

B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.

C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

D. Adjustable, Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.

E. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:

1. Instantaneous trip.
2. Long- and short-time pickup levels.
3. Long- and short-time time adjustments.
4. Ground-fault pickup level, time delay, and I^2t response.

F. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and letthrough ratings less than NEMA FU 1, RK-5.

G. Features and Accessories:
1. Standard frame sizes, trip ratings, and number of poles.
2. Lugs: Mechanical or Compression type, suitable for number, size, trip ratings, and conductor material.
3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.

2.03 ENCLOSURES

A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.

1. As noted on drawings.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.

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

3.02

INSTALLATION

A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.

B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.

C. Comply with NECA 1.

3.03 IDENTIFICATION

A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."
   1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
   2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.04 FIELD QUALITY CONTROL.

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

C. Perform tests and inspections.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

D. Acceptance Testing Preparation:
   1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
   2. Test continuity of each circuit.

E. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
3. Test and adjust controls, remote monitoring, and safeties. Replace damaged and malfunctioning controls and equipment.

F. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.

G. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.05 ADJUSTING

A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 26 28 16

SECTION 26 50 00 FIRE ALARM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. This Section includes fire alarm systems with manual stations, detectors, signal equipment, controls, and devices.

1.03 DEFINITIONS

A. FACP: Fire alarm control panel.

B. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.04 SYSTEM DESCRIPTION

A. General: Noncoded, addressable-analog system with manual and automatic alarm initiation; automatic sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only.

1.05 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Operating Instructions: For mounting at the FACP.

C. Product Certificates: Signed by manufacturers of system components certifying that products furnished comply with requirements.

D. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.

E. Field Test Reports: Indicate and interpret test results for compliance with performance requirements. Comply with NFPA 72.

F. Maintenance Data: For fire alarm systems to include in maintenance manuals specified in Division 1. Comply with NFPA 72.

G. Submissions to Authorities Having Jurisdiction: In addition to distribution requirements for Submittals specified in Division 1 Section "Submittals," make an identical submission to authorities having jurisdiction. Include copies of annotated Contract Drawings as needed to depict component locations to facilitate review. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to the Contracting Officer for review.

H. Certificate of Completion: Comply with NFPA 72.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is an authorized representative of the FACP manufacturer for both installation and maintenance of units required for this Project.

B. Manufacturer Qualifications: A firm experienced in manufacturing systems similar to those indicated for this Project and with a record of successful in-service performance.

C. Source Limitations: Obtain fire alarm system components through one source from a single manufacturer.

D. Compliance with Local Requirements: Comply with applicable building code, local ordinances and regulations, and requirements of authorities having jurisdiction.

E. Comply with NFPA 72.

1.07 EXTRA MATERIALS

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. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but not less than one unit.

2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but not less than one unit.

3. Smoke Detectors and Heat Detectors: Quantity equal to 10 percent of amount of each type installed, but not less than one unit of each type.

4. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than one unit of each type.

6. Keys and Tools: One extra set for access to locked and tamperproofed components.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products as indicated on drawings:

2.02 FUNCTIONAL DESCRIPTION OF SYSTEM

A. Control of System: By the FACP.

B. System Supervision: Automatically detect and report open circuits, shorts, and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.

C. Priority of Signals: Automatic alarm response functions resulting from an alarm signal from one zone or device are not altered by subsequent alarm, supervisory, or trouble signals. An alarm signal is the highest priority. Supervisory and trouble signals have second- and third-level priority. Higher-priority signals take precedence over signals of lower priority, even when the lower-priority condition occurs first. Annunciate and display all alarm, supervisory, and trouble signals regardless of priority or order received.

D. Noninterference: A signal on one zone shall not prevent the receipt of signals from other zones.

E. System Reset: All zones are manually resettable from the FACP after initiating devices are restored to normal.

F. Transmission to Remote Alarm Receiving Station: Automatically route alarm, supervisory, and trouble signals to a remote alarm station by means of a digital alarm communicator transmitter and telephone lines.

G. Transmission to Remote Alarm Receiving Station: Automatically route alarm, supervisory, and trouble signals to a remote alarm receiving station by means of a radio alarm transmitter.

H. System Alarm Capability during Circuit Fault Conditions: System wiring and circuit arrangement prevent alarm capability reduction when a single ground occurs in an initiating device circuit, signal line circuit, or notification-appliance circuit.

I. System Alarm Capability during Circuit Fault Conditions: System wiring and circuit arrangement prevent alarm capability reduction when a single ground or open circuit occurs in an initiating device circuit, signal line circuit, or notification-appliance circuit.

J. System Alarm Capability during Circuit Fault Conditions: System wiring and circuit arrangement prevent alarm capability reduction when an open circuit, ground or wire-to-wire short occurs, or an open circuit and a ground occur at the same time in an initiating device circuit, signal line circuit, or notification-appliance circuit.

K. Loss of primary power at the FACP initiates a trouble signal at the FACP. The FACP indicates when the fire alarm system is operating on the secondary power supply.

L. Loss of primary power at the FACP initiates a trouble signal at the FACP and the annunciator. An emergency power light is illuminated at both locations when the system is operating on the secondary power supply.

M. Basic Alarm Performance Requirements: Unless otherwise indicated, operation of a manual station, automatic alarm operation of a flame or heat detector, operation of a sprinkler flow device, or verified automatic alarm operation of a smoke detector initiates the following:

N. Basic Alarm Performance Requirements: Unless otherwise indicated, operation of a manual station, automatic alarm operation of a smoke or flame or heat detector, or operation of a sprinkler flow device initiates the following:

1. Notification-appliance operation.

2. Identification at the FACP and the remote annunciator of the zone originating the alarm.
3. Identification at the FACP and the remote annunciator of the device originating the alarm.
4. Transmission of an alarm signal to the remote alarm receiving station.
5. Unlocking of electric door locks in designated egress paths.
6. Release of fire and smoke doors held open by magnetic door holders.
7. Shutdown of fans and other air-handling equipment serving zone when alarm was initiated.
8. Recording of the event in the system memory.
9. Recording of the event by the system printer.

O. Alarm Silencing, System Reset and Indication: Controlled by switches in the FACP.

P. Alarm Silencing, System Reset and Indication: Controlled by switches in the FACP and the remote annunciator.

1. Silencing-switch operation halts alarm operation of notification appliances and activates an "alarm silence" light. Display of identity of the alarm zone or device is retained.
2. Subsequent alarm signals from other devices or zones reactivate notification appliances until silencing switch is operated again.
3. When alarm-initiating devices return to normal and system reset switch is operated, notification appliances operate again until alarm silence switch is reset.

Q. Water-flow alarm switch operation initiates the following:

1. Notification-appliance operation.
2. Flashing of the device location-indicating light for the device that has operated.

R. Operating a heat detector in the elevator shaft shuts down elevator power by operating a shunt trip in a circuit breaker feeding the elevator.

S. Smoke detection for zones or detectors with alarm verification initiates the following:

1. Audible and visible indication of an "alarm verification" signal at the FACP.
2. Activation of a listed and approved "alarm verification" sequence at the FACP and the detector.

3. Recording of the event by the system printer.
4. General alarm if the alarm is verified.
5. Cancellation of the FACP indication and system reset if the alarm is not verified.

T. Sprinkler valve-tamper switch operation initiates the following:

1. A supervisory, audible, and visible "valve-tamper" signal indication at the FACP and the annunciator.
2. Flashing of the device location-indicating light for the device that has operated.
3. Recording of the event by the system printer.
4. Transmission of supervisory signal to remote alarm receiving station.

U. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system initiates the following:

1. A supervisory, audible, and visible "sprinkler trouble" signal indication at the FACP and the annunciator.
2. Flashing of the device location-indicating light for the device that has operated.
3. Recording of the event by the system printer.
4. Transmission of trouble signal to remote central station.

V. Removal of an alarm-initiating device or a notification appliance initiates the following:

1. A "trouble" signal indication at the FACP and the annunciator for the device or zone involved.
2. Recording of the event by the system printer.
3. Transmission of trouble signal to remote alarm receiving station.

W. FACP Alphanumeric Display: Plain-English-language descriptions of alarm, supervisory, and trouble events; and addresses and locations of alarm-initiating or supervisory devices originating the report. Display monitoring actions, system and component status, system commands, programming information, and data from the system's historical memory.

2.03 MANUAL PULL STATIONS

A. Description: Fabricated of metal or plastic, and finished in red with molded, raised-letter operating instructions of contrasting color. Device to match existing or as indicated on drawings.

2.04 DETECTORS

A. Device to match existing, or as indicated on drawings.

2.05 RADIO ALARM TRANSMITTER

A. Devices existing, or as indicated on drawings.

2.06 WIRE

A. Wire to be per manufacturer's recommendations.

PART 3 - EXECUTION

3.01 EQUIPMENT INSTALLATION

A. Connect the FACP with a disconnect switch with lockable handle or cover.

B. Manual Pull Stations: Mount semiflush in recessed back boxes.

C. Water-Flow Detectors and Valve Supervisory Switches: Connect for each sprinkler valve station required to be supervised.

D. Ceiling-Mounted Smoke Detectors: Not less than 4 inches (100 mm) from a side wall to the near edge. For exposed solid-joist construction, mount detectors on the bottom of joists. On smooth ceilings, install not more than 30 feet (9 m) apart in any direction.

E. Smoke Detectors near Air Registers: Install no closer than 60 inches (1520 mm).

F. Duct Smoke Detectors: Comply with manufacturer's written instructions.

1. Verify that each unit is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
2. Install sampling tubes so they extend the full width of the duct.

G. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Combine audible and visible alarms at the same location into a single unit.

H. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling.

I. Device Location-Indicating Lights: Locate in public space near the device they monitor.

J. FACP: Surface mount with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.

K. Antenna for Radio Alarm Transmitter: Mount to building structure as recommended by manufacturer. Use mounting arrangement and substrate connection that will resist 100-mph (160-km/h) wind load with a 1.3 gust factor without damage.

3.02 WIRING INSTALLATION

A. Wiring Method: Install wiring in metal raceway according to Division 16 Section "Raceways and Boxes." Conceal raceway except in unfinished spaces and as indicated.

B. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by the manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

C. Cable Taps: Use numbered terminal strips in junction, pull and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

D. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes and covers red.

E. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signal from other floors or zones.

F. Wiring to Remote Alarm Transmitting Device: 1-inch (25-mm) conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

3.03 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to Division 16 Section "Basic Electrical Materials and Methods."

B. Identify system components, wiring, cabling, and terminals according to Division 16 Section "Electrical Identification."

C. Install instructions frame in a location visible from the FACP.

D. Paint power-supply disconnect switch red and label "FIRE ALARM."

3.04 GROUNDING

A. Ground cable shields and equipment according to system manufacturer's written instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

B. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.

C. Install grounding electrodes of type, size, location, and quantity as indicated. Comply with installation requirements in Division 16 Section "Grounding."

D. Ground equipment and conductor and cable shields. For audio circuits, minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

E. Ground radio alarm transmitter system and equipment as required by the Air Force AFI.

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and connections and to supervise pretesting, testing, and adjustment of the system. Report results in writing.

B. Pretesting: After installation, align, adjust, and balance the system and perform complete pretesting. Determine, through pretesting, the compliance of the system with requirements of Drawings and Specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones, and retest

until satisfactory performance and conditions are achieved. Prepare forms for systematic recording of acceptance test results.

C. Report of Pretesting: After pretesting is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of witnesses to preliminary tests.

D. Final Test Notice: Provide a minimum of 10 days' notice in writing when the system is ready for final acceptance testing.

E. Minimum System Tests: Test the system according to procedures outlined in NFPA 72. Minimum required tests are as follows:

1. Verify the absence of unwanted voltages between circuit conductors and ground.
2. Test all conductors for short circuits using an insulation-testing device.
3. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on record drawings.
4. Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.
5. Test initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of initiating and indicating devices. Observe proper signal transmission according to class of wiring used.
6. Test each initiating and indicating device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.
7. Test the system for all specified functions according to the approved operation and maintenance manual. Systematically initiate specified functional performance items at each station, including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices required to be affected by the item under all system sequences. Observe indicating lights, displays, signal tones, and annunciator indications. Observe all voice audio for routing, clarity, quality, freedom from noise and distortion, and proper volume level.
8. Test Both Primary and Secondary Power: Verify by test that the secondary power system is capable of operating the system for the period and in the manner specified.

F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets Specifications and complies with applicable standards.

G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit log on the satisfactory completion of tests.

H. Tag all equipment, stations, and other components at which tests have been satisfactorily completed.

3.06 CLEANING AND ADJUSTING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and marred finish to match original finish. Clean unit internally using methods and materials recommended by manufacturer.

3.07 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel as specified below:

1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, adjusting, and maintaining equipment and schedules. Provide a minimum of 8 hours' training.
2. Training Aid: Use the approved final version of the operation and maintenance manual as a training aid.
3. Schedule training with Contracting Officer, with at least seven days' advance notice.

3.08 ON-SITE ASSISTANCE

A. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels, controls, and sensitivities to suit actual occupied conditions. Provide up to three requested visits to Project site for this purpose.

END OF SECTION

THIS PAGE IS INTENTIONALLY BLANK.

SECTION 26 51 00 INTERIOR LIGHTING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Exterior and Interior lighting fixtures, lamps, and ballasts.
2. Emergency lighting units.
3. Exit signs.
4. Lighting fixture supports.

1.03 DEFINITIONS

A. BF: Ballast factor.

B. CCT: Correlated color temperature.

C. CRI: Color-rendering index.

D. HID: High-intensity discharge.

E. LER: Luminaire efficacy rating.

F. Lumen: Measured output of lamp and luminaire, or both.

G. Luminaire: Complete lighting fixture, including ballast housing if provided.

1.04 SUBMITTALS

A. Product Data: For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, finishes, and the following:

1. Physical description of lighting fixture including dimensions, emergency battery and charger.

B. Installation instructions.

1.05 QUALITY ASSURANCE

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. Comply with NFPA 70.

1.06 COORDINATION

A. Coordinate layout and installation of lighting fixtures and suspension system with other construction that penetrates ceilings or is supported by them, including HVAC equipment, fire-suppression system, and partition assemblies.

1.07 WARRANTY

A. Special Warranty for Emergency Lighting Batteries: Manufacturer's standard form in which manufacturer of battery-powered emergency lighting unit agrees to repair or replace components of rechargeable batteries that fail in materials or workmanship within specified warranty period.

1. Warranty Period for Emergency Fluorescent Ballast and Batteries: Five years from date of Substantial Completion. Full warranty shall apply for first year, and prorated warranty for the remaining four years.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Products: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. Daybrite
2. Lithonia
3. Cooper

B. Lighting fixtures are scheduled on the drawings

2.02 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

A. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.

B. HID Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B.

C. Metal Parts: Free of burrs and sharp corners and edges.

D. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.

E. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

F. Diffusers and Globes:

1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

a. Lens Thickness: At least 0.125 inch minimum unless otherwise indicated.
b. UV stabilized.

G. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps and ballasts. Labels shall be located where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.

1. Label shall include the following lamp and ballast characteristics:

a. "USE ONLY" and include specific lamp type.
b. Lamp diameter code (T-4, T-5, T-8, etc.), tube configuration (twin, quad, triple, etc.), base type, and nominal wattage for fluorescent and compact fluorescent luminaires.
c. Lamp type, wattage, bulb type (ED17, BD56, etc.) and coating (clear or coated) for HID luminaires.
d. Start type (preheat, rapid start, instant start, etc.) for fluorescent and compact fluorescent luminaires.
e. ANSI ballast type (M98, M57, etc.) for HID luminaires.
f. CCT and CRI for all luminaires.

2.03 BALLASTS FOR LINEAR FLUORESCENT LAMPS

A. General Requirements for Electronic Ballasts:

1. Comply with UL 935 and with ANSI C82.11.

2. Designed for type and quantity of lamps served.

3. Ballasts shall be designed for full light output

B. Electronic Programmed-Start Ballasts for T5 Lamps: Comply with ANSI C82.11 and the following:

1. Lamp end-of-life detection and shutdown circuit for T5 diameter lamps.
2. Automatic lamp starting after lamp replacement
3. Ballast Manufacturer Certification: Indicated by label.

C. Ballasts for Low-Temperature Environments:

1. Temperatures 0 Deg F and Higher: Electronic type rated for 0 deg F starting and operating temperature with indicated lamp types.

2.04 BALLASTS FOR COMPACT FLUORESCENT LAMPS

A. Description: Electronic-programmed rapid-start type, complying with UL 935 and with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated:

1. Lamp end-of-life detection and shutdown circuit.
2. Automatic lamp starting after lamp replacement.
3. Sound Rating: Class A.
4. Total Harmonic Distortion Rating: Less than 10 percent.
5. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
6. Operating Frequency: 20 kHz or higher.
7. Lamp Current Crest Factor: 1.7 or less.
8. BF: 0.95 or higher unless otherwise indicated.
9. Power Factor: 0.98 or higher.
10. Interference: Comply with 47 CFR 18, Ch. 1, Subpart C, for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.

2.05 EMERGENCY FLUORESCENT POWER UNIT

A. Internal Type: Self-contained, modular, battery-inverter unit, factory mounted within lighting fixture body and compatible with ballast. Comply with UL 924.

1. Emergency Connection: Operate one fluorescent lamp continuously at an output of 1100 lumens each. Connect unswitched circuit to battery-inverter unit and switched circuit to fixture ballast.

2.06 BALLASTS FOR HID LAMPS

A. Electronic Ballast for Metal-Halide Lamps: Include the following features unless otherwise indicated:

1. Minimum Starting Temperature: Minus 20 deg F for single-lamp ballasts.
2. Rated Ambient Operating Temperature: 130 deg F.
3. Lamp end-of-life detection and shutdown circuit.
4. Sound Rating: Class A.
5. Total Harmonic Distortion Rating: Less than 20 percent.
6. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
7. Lamp Current Crest Factor: 1.5 or less.
8. Power Factor: 0.90 or higher.

2.07 EXIT SIGNS

A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:

1. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.
2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

   a. Battery: Sealed, maintenance-free, nickel-cadmium type.
   b. Charger: Fully automatic, solid-state type with sealed transfer relay.
   c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
   d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
   e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of dischargecycle.

2.08 EMERGENCY LIGHTING UNITS

A. General Requirements for Emergency Lighting Units: Self-contained units complying with UL 924.

1. Battery: Sealed, maintenance-free, lead-acid type.
2. Charger: Fully automatic, solid-state type with sealed transfer relay.

3. Operation: Relay automatically turns lamp on when power-supply circuit voltage drops to 80 percent of nominal voltage or below. Lamp automatically disconnects from battery when voltage approaches deep-discharge level. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.

4. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.

5. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

2.09 FLUORESCENT LAMPS

A. T5HO rapid-start, high-output lamps, rated 54 W maximum, nominal length of 45.2 inches, 5000 initial lumens (minimum), CRI 85 (minimum), color temperature 5000 K, and average rated life of 20,000 hours unless otherwise indicated.

B. T5 rapid-start lamps, rated 28 W maximum, nominal length of 45.2 inches, 2900 initial lumens (minimum), CRI 85 (minimum), color temperature 5000 K, and average rated life of 20,000 hours unless otherwise indicated.

C. T5 rapid-start lamps, rated 14 W maximum, nominal length of 22 inches, 1350 initial lumens (minimum), CRI 85 (minimum), color temperature 4100 K, and average rated life of 20,000 hours unless otherwise indicated.

D. Compact Fluorescent Lamps: 4-Pin, CRI 82 (minimum), color temperature 4100 K, average rated life of 10,000 hours at three hours operation per start, unless otherwise indicated.

1. 18 W: T4, double or triple tube, rated 1200 initial lumens (minimum).

2.10 HID LAMPS

A. Metal-Halide Lamps: ANSI C78.43, with minimum CRI 65, and color temperature 4000 K.

2.11 LIGHTING FIXTURE SUPPORT COMPONENTS

A. Comply with Division 26 Section "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.

C. Twin-Stem Hangers: Two, 1/2-inch steel tubes with single canopy designed to

mount a single fixture. Finish same as fixture.

D. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, 12 gage.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Lighting fixtures:

1. Set level, plumb, and square with ceilings and walls unless otherwise indicated.
2. Install lamps in each luminaire.

B. Lay-in Ceiling Lighting Fixtures Supports: Use grid as a support element.

1. Install ceiling support system rods or wires, independent of the ceiling suspension devices, for each fixture. Locate not more than 6 inches from lighting fixture corners.
2. Support Clips: Fasten to lighting fixtures and to ceiling grid members at or near each fixture corner with clips that are UL listed for the application.
3. Fixtures of Sizes Less Than Ceiling Grid: Install as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two 3/4-inch metal channels spanning and secured to ceiling tees.

C. Suspended Lighting Fixture Support:

1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging.
2. Stem-Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers.
3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.
4. Do not use grid as support for pendant luminaires. Connect support wires or rods to building structure.

D. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.02 IDENTIFICATION

A. Install labels with panel and circuit numbers on concealed junction and outlet boxes. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

3.03 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

END OF SECTION 26 51 00

SECTION 27 05 00 COMMON WORK RESULTS FOR COMMUNICATIONS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Communications equipment coordination and installation.
2. Sleeves for pathways and cables.
3. Sleeve seals.
4. Grout.
5. Common communications installation requirements.

1.03 DEFINITIONS

A. EPDM: Ethylene-propylene-diene terpolymer rubber.

B. NBR: Acrylonitrile-butadiene rubber.

1.04 COORDINATION

A. Coordinate arrangement, mounting, and support of communications equipment:

1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
2. To provide for ease of disconnecting the equipment with minimum interference to other installations.
3. To allow right of way for piping and conduit installed at required slope.
4. So connecting pathways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.

B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.

C. Coordinate location of access panels and doors for communications items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 08 Section "Access Doors and Frames."

D. Coordinate sleeve selection and application with selection and application of firestopping.

PART 2 - PRODUCTS

2.01 SLEEVES FOR PATHWAYS AND CABLES

A. Sleeves for Rectangular Openings: Galvanized sheet steel.

1. Minimum Metal Thickness:

a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and no side more than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).

b. For sleeve cross-section rectangle perimeter equal to, or more than, 50 inches (1270 mm) and 1 or more sides equal to, or more than, 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

2.02 SLEEVE SEALS

A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.

1. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below

a. Advance Products & Systems, Inc.
b. Calpico, Inc.
c. Metraflex Co.
d. Pipeline Seal and Insulator, Inc.

2. Sealing Elements: EPDM or NBR interlocking links shaped to fit surface of cable or conduit. Include type and number required for material and size of pathway or cable.

3. Pressure Plates: Stainless steel. Include two for each sealing element.

4. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.03 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 - EXECUTION

3.01 COMMON REQUIREMENTS FOR COMMUNICATIONS INSTALLATION

A. Comply with NECA 1.

B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.

C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.

D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both communications equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.

E. Right of Way: Give to piping systems installed at a required slope.

3.02 SLEEVE INSTALLATION FOR COMMUNICATIONS PENETRATIONS

A. Communications penetrations occur when pathways, cables, wireways, or cable trays penetrate concrete slabs, concrete or masonry walls, or fire-rated floor and wall assemblies.

B. Concrete Slabs and Walls: Install sleeves for penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of slabs and walls.

C. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.

D. Fire-Rated Assemblies: Install sleeves for penetrations of fire-rated floor and wall assemblies unless openings compatible with firestop system used are fabricated during construction of floor or wall.

E. Cut sleeves to length for mounting flush with both surfaces of walls.

F. Extend sleeves installed in floors **2 inches (50 mm)** above finished floor level.

G. Size pipe sleeves to provide **1/4-inch (6.4-mm)** annular clear space between sleeve and pathway or cable, unless indicated otherwise.

H. Seal space outside of sleeves with grout for penetrations of concrete and masonry

1. Promptly pack grout solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect grout while curing.

I. Interior Penetrations of Non-Fire-Rated Walls and Floors: Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint.

J. Fire-Rated-Assembly Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pathway and cable penetrations. Install sleeves and seal pathway and cable penetration sleeves with firestop materials.

K. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.

L. Aboveground, Exterior-Wall Penetrations: Seal penetrations using stainless-steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.

M. Underground, Exterior-Wall Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between pathway or cable and sleeve for installing mechanical sleeve seals.

3.03 SLEEVE-SEAL INSTALLATION

A. Install to seal exterior wall penetrations.

B. Use type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

3.04 FIRESTOPPING

A. Apply firestopping to penetrations of fire-rated floor and wall assemblies for communications installations to restore original fire-resistance rating of assembly.

END OF SECTION 27 05 00

SECTION 27 15 00 COMMUNICATIONS CABLING

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:

1. Pathways.
2. UTP cabling.
3. 62.5/125-micrometer, optical fiber cabling.
4. Coaxial cable.
5. Multiuser telecommunications outlet assemblies.
6. Cable connecting hardware, patch panels, and cross-connects.
7. Telecommunications outlet/connectors.
8. Cabling system identification products.
9. Cable management system.

1.03 DEFINITIONS

A. Basket Cable Tray: A fabricated structure consisting of wire mesh bottom and side rails.

B. BICSI: Building Industry Consulting Service International.

C. Channel Cable Tray: A fabricated structure consisting of a one-piece, ventilated-bottom or solid-bottom channel.

D. Consolidation Point: A location for interconnection between horizontal cables extending from building pathways and horizontal cables extending into furniture pathways.

E. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

F. EMI: Electromagnetic interference.

G. IDC: Insulation displacement connector.

H. Ladder Cable Tray: A fabricated structure consisting of two longitudinal side rails connected by individual transverse members (rungs).

I. LAN: Local area network.

J. MUTOA: Multiuser telecommunications outlet assembly, a grouping in one location of several telecommunications outlet/connectors.

K. Outlet/Connectors: A connecting device in the work area on which horizontal cable or outlet cable terminates.

L. RCDD: Registered Communications Distribution Designer.

M. Solid-Bottom or Nonventilated Cable Tray: A fabricated structure consisting of longitudinal side rails and a bottom without ventilation openings.

N. Trough or Ventilated Cable Tray: A fabricated structure consisting of longitudinal side rails and a bottom having openings for the passage of air.

O. UTP: Unshielded twisted pair.

1.04 CABLING DESCRIPTION

A. Horizontal cable and its connecting hardware provide the means of transporting signals between the telecommunications outlet/connector and the horizontal cross-connect located in the communications equipment room. This cabling and its connecting hardware are called "permanent link," a term that is used in the testing protocols.

1. TIA/EIA-568-B.1 requires that a minimum of two telecommunications outlet/connectors be installed for each work area.
2. Horizontal cabling shall contain no more that one transition point or consolidation point between the horizontal cross-connect and the telecommunications outlet/connector.
3. Bridged taps and splices shall not be installed in the horizontal cabling.
4. Splitters shall not be installed as part of the optical fiber cabling.

B. A work area is approximately 100 sq. ft. (9.3 sq. m), and includes the components that extend from the telecommunications outlet/connectors to the station equipment.

C. The maximum allowable horizontal cable length is 295 feet (90 m). This maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) to the workstation equipment. The maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) in the horizontal cross-connect.

1.05 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA/EIA-568-B.1, when tested according to test procedures of this standard.

1.06 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

B. Testing Agency Qualifications: An NRTL.

1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

C. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 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.

D. 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.

E. Telecommunications Pathways and Spaces: Comply with TIA/EIA-569-A.

F. Grounding: Comply with ANSI-J-STD-607-A.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.

1. Test optical fiber cables to determine the continuity of the strand end to end. Use optical fiber flashlight or optical loss test set.
2. Test optical fiber cables while on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector; including the loss value of each. Retain test data and include the record in maintenance data.

3. Test each pair of UTP cable for open and short circuits.

1.08 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install cables and connecting materials until 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.

1.09 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

B. Coordinate telecommunications outlet/connector locations with location of power receptacles at each work area.

1.10 SOFTWARE SERVICE AGREEMENT

A. Technical Support: Beginning with Substantial Completion, provide software support for two years.

B. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.

1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

PART 2 - PRODUCTS

2.01 PATHWAYS

A. General Requirements: Comply with TIA/EIA-569-A.

B. Cable Support: NRTL labeled for support of Category 6 cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.

1. Support brackets with cable tie slots for fastening cable ties to brackets.
2. Lacing bars, spools, J-hooks, and D-rings.
3. Straps and other devices.

C. Cable Trays: As specified in Section 260536.

2.02 BACKBOARDS

A. Backboards: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches (19 by 1220 by 2440 mm). Comply with requirements in Division 06 Section "Rough Carpentry" for plywood backing panels.

2.03 UTP CABLE

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. Belden CDT Inc.; Electronics Division.
2. Berk-Tek; a Nexans company.
3. CommScope, Inc.
4. Draka USA.
5. Genesis Cable Products; Honeywell International, Inc.
6. KRONE Incorporated.
7. Mohawk; a division of Belden CDT.
8. Nordex/CDT; a subsidiary of Cable Design Technologies.
9. Superior Essex Inc.
10. SYSTIMAX Solutions; a CommScope, Inc. brand.
11. 3M.
12. Tyco Electronics/AMP Netconnect; Tyco International Ltd.

B. Description: 100-ohm, 4-pair UTP, formed into 25-pair, binder groups covered with a blue thermoplastic jacket.

1. Comply with ICEA S-90-661 for mechanical properties.
2. Comply with TIA/EIA-568-B.1 for performance specifications.
3. Comply with TIA/EIA-568-B.2, Category 6.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
   a. Communications, Plenum Rated: Type CMP complying with NFPA 262.
   b. Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.

2.04 UTP CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. American Technology Systems Industries, Inc.
2. Dynacom Corporation.
3. Hubbell Premise Wiring.
4. KRONE Incorporated.
5. Leviton Voice & Data Division.
6. Molex Premise Networks; a division of Molex, Inc.
7. Nordex/CDT; a subsidiary of Cable Design Technologies.
8. Panduit Corp.
9. Siemon Co. (The).
10. Tyco Electronics/AMP Netconnect; Tyco International Ltd.

B. General Requirements for Cable Connecting Hardware: Comply with TIA/EIA-568-B.2, IDC type, with modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of same category or higher.

C. Connecting Blocks: 110-style IDC for Category 6. Provide blocks for the number of cables terminated on the block, plus 25 percent spare. Integral with connector bodies, including plugs and jacks where indicated.

D. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.

1. Number of Terminals per Field: One for each conductor in assigned cables.

E. Patch Panel: Modular panels housing multiple-numbered jack units with IDC-type connectors at each jack for permanent termination of pair groups of installed cables.

1. Number of Jacks per Field: One for each four-pair UTP cable plus spares and blank positions adequate to suit specified expansion criteria.

F. Jacks and Jack Assemblies: Modular, color-coded, eight-position modular receptacle units with integral IDC-type terminals.

G. Patch Cords: Factory-made, four-pair cables in 48-inch (1200-mm) lengths;

terminated with eight-position modular plug at each end.

1. Patch cords shall have bend-relief-compliant boots and color-coded icons to ensure Category 6 performance. Patch cords shall have latch guards to protect against snagging.

2.05 OPTICAL FIBER CABLE

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. Berk-Tek; a Nexans company.
2. CommScope, Inc.
3. Corning Cable Systems.
4. General Cable Technologies Corporation.
5. Mohawk; a division of Belden CDT.
6. Nordex/CDT; a subsidiary of Cable Design Technologies.
7. Optical Connectivity Solutions Division; Emerson Network Power.
8. Superior Essex Inc.
9. SYSTIMAX Solutions; a CommScope, Inc. brand.
10. 3M.
11. Tyco Electronics/AMP Netconnect; Tyco International Ltd.

B. Description: Multimode, 62.5/125-micrometer, minimum 24-fiber, tight buffer, optical fiber cable.

1. Comply with ICEA S-83-596 for mechanical properties.
2. Comply with TIA/EIA-568-B.3 for performance specifications.
3. Comply with TIA/EIA-492AAAA-A for detailed specifications.
4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:

   a. General Purpose, Nonconductive: Type OFN or OFNG.
   b. Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.
   c. Riser Rated, Nonconductive: Type OFNR complying with UL 1666.
   d. General Purpose, Conductive: Type OFC or OFCG.
   e. Plenum Rated, Conductive: Type OFCP, complying with NFPA 262.
   f. Riser Rated, Conductive: Type OFCR, complying with UL 1666.

5. Conductive cable shall be steel armored type.
6. Maximum Attenuation: 3.50 dB/km at 850 nm; 1.5 dB/km at 1300 nm.

7. Minimum Modal Bandwidth: 160 MHz-km at 850 nm; 500 MHz-km at 1300 nm.

C. Jacket:

1. Jacket Color: Orange for 62.5/125-micrometer cable.
2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA/EIA-598-B.
3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

2.06 OPTICAL FIBER CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. ADC.
2. American Technology Systems Industries, Inc.
3. Berk-Tek; a Nexans company.
4. Corning Cable Systems.
5. Dynacom Corporation.
6. Hubbell Premise Wiring.
7. Molex Premise Networks; a division of Molex, Inc.
8. Nordex/CDT; a subsidiary of Cable Design Technologies.
9. Optical Connectivity Solutions Division; Emerson Network Power.
10. Siemon Co. (The).

B. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.

1. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.

C. Patch Cords: Factory-made, dual-fiber cables in 36-inch (900-mm) lengths.

D. Cable Connecting Hardware:

1. Comply with Optical Fiber Connector Intermateability Standards (FOCIS) specifications of TIA/EIA-604-2, TIA/EIA-604-3-A, and TIA/EIA-604-12. Comply with TIA/EIA-568-B.3.

2. Quick-connect, simplex and duplex, Type SC, Type ST, Type LC or Type MT-RJ connectors. Insertion loss not more than 0.75 dB.
3. Type SFF connectors may be used in termination racks, panels, and equipment packages.

2.07 COAXIAL CABLE

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. Alpha Wire Company.
2. Belden CDT Inc.; Electronics Division.
3. Coleman Cable, Inc.
4. CommScope, Inc.
5. Draka USA.

B. Cable Characteristics: Broadband type, recommended by cable manufacturer specifically for broadband data transmission applications. Coaxial cable and accessories shall have 75-ohm nominal impedance with a return loss of 20 dB maximum from 7 to 806 MHz.

C. RG-11/U: NFPA 70, Type CATV.

1. No. 14 AWG, solid, copper-covered steel conductor.
2. Gas-injected, foam-PE insulation.
3. Double shielded with 100 percent aluminum polyester tape and 60 percent aluminum braid.
4. Jacketed with sunlight-resistant, black PVC or PE.
5. Suitable for outdoor installations in ambient temperatures ranging from minus 40 to plus 85 deg C.

D. RG59/U: NFPA 70, Type CATVR.

1. No. 20 AWG, solid, silver-plated, copper-covered steel conductor.
2. Gas-injected, foam-PE insulation.
3. Triple shielded with 100 percent aluminum polyester tape and 95 percent aluminum braid; covered by aluminum foil with grounding strip.
4. Color-coded PVC jacket.

E. RG-6/U: NFPA 70, Type CATV or CM.

1. No. 16 AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.
2. Double shielded with 100 percent aluminum-foil shield and 60 percent aluminum braid.
3. Jacketed with black PVC or PE.
4. Suitable for indoor installations.

F. RG59/U: NFPA 70, Type CATV.

1. No. 20 AWG, solid, copper-covered steel conductor; gas-injected, foam-PE insulation.
2. Double shielded with 100 percent aluminum polyester tape and 40 percent aluminum braid.
3. PVC jacket.

G. RG59/U (Plenum Rated): NFPA 70, Type CMP.

1. No. 20 AWG, solid, copper-covered steel conductor; foam fluorinated ethylene propylene insulation.
2. Double shielded with 100 percent aluminum-foil shield and 65 percent aluminum braid.
3. Copolymer jacket.

H. NFPA and UL compliance, listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 1655 and with NFPA 70 "Radio and Television Equipment" and "Community Antenna Television and Radio Distribution" Articles. Types are as follows:

1. CATV Cable: Type CATV.
2. CATV Plenum Rated: Type CATVP, complying with NFPA 262.
3. CATV Riser Rated: Type CATVR, complying with UL 1666.
4. CATV Limited Rating: Type CATVX.

2.08 COAXIAL CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. Aim Electronics; a brand of Emerson Electric Co.
2. Leviton Voice & Data Division.
3. Siemon Co. (The).

B. Coaxial-Cable Connectors: Type BNC, 75 ohms.

2.09 CONSOLIDATION POINTS

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. American Technology Systems Industries, Inc.
2. Chatsworth Products, Inc.
3. Dynacom Corporation.
4. Hubbell Premise Wiring.
5. Molex Premise Networks; a division of Molex, Inc.
6. Nordex/CDT; a subsidiary of Cable Design Technologies.
7. Ortronics, Inc.
8. Panduit Corp.
9. Siemon Co. (The).

B. Description: Consolidation points shall comply with requirements for cable connecting hardware.

1. Number of Terminals per Field: One for each conductor in assigned cables.
2. Number of Connectors per Field:
   a. One for each four-pair UTP cable indicated.
   b. One for each four-pair conductor group of indicated cables, plus 25 percent spare positions.
3. Mounting: Recessed in ceiling, wall, Desk or Furniture.
4. NRTL listed as complying with UL 50 and UL 1863.
5. When installed in plenums used for environmental air, NRTL listed as complying with UL 2043.

2.10 MULTIUSER TELECOMMUNICATIONS OUTLET ASSEMBLY (MUTOA)

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. Chatsworth Products, Inc.

2. Hubbell Premise Wiring.
3. Molex Premise Networks; a division of Molex, Inc.
4. Nordex/CDT; a subsidiary of Cable Design Technologies.
5. Ortronics, Inc.
6. Panduit Corp.
7. Siemon Co. (The).

B. Description: MUTOAs shall meet the requirements for cable connecting hardware.

1. Number of Terminals per Field: One for each conductor in assigned cables.
2. Number of Connectors per Field:
   a. One for each four-pair UTP cable indicated.
   b. One for each four-pair conductor group of indicated cables, plus 25 percent spare positions.
3. Mounting Recessed in ceiling, wall, Desk or Furniture.
4. NRTL listed as complying with UL 50 and UL 1863.
5. Label shall include maximum length of work area cords, based on TIA/EIA-568-B.1.
6. When installed in plenums used for environmental air, NRTL listed as complying with UL 2043.

2.11 TELECOMMUNICATIONS OUTLET/CONNECTORS

A. Jacks: 100-ohm, balanced, twisted-pair connector; four-pair, eight-position modular. Comply with TIA/EIA-568-B.1.

B. Workstation Outlets: Two or Four port-connector assemblies mounted in single or multigang faceplate.

1. Plastic Faceplate: High-impact plastic. Coordinate color with Division 26 Section "Wiring Devices."
2. Metal Faceplate: Stainless steel complying with requirements in Division 26 Section "Wiring Devices."
3. For use with snap-in jacks accommodating any combination of UTP, optical fiber, and coaxial work area cords.
   a. Flush mounting jacks, positioning the cord at a 45-degree angle.
4. Legend: Factory labeled by silk-screening or engraving for stainless steel.

5. Legend: Machine printed, in the field, using adhesive-tape label.

6. Legend: Snap-in, clear-label covers and machine-printed paper inserts.

2.12 GROUNDING

A. Comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.

B. Comply with ANSI-J-STD-607-A.

2.13 IDENTIFICATION PRODUCTS

A. Comply with TIA/EIA-606-A and UL 969 for labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

B. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

2.14 CABLE MANAGEMENT SYSTEM

A. Manufacturers: Subject to compliance with requirements of this section and with the provisions of the Buy America Act, provide products from one of the manufacturers listed below:

1. iTRACS Corporation.
2. Telsoft Solutions.
3.

B. Description: Computer-based cable management system, with integrated database and graphic capabilities.

C. Document physical characteristics by recording the network, TIA/EIA details, and connections between equipment and cable.

D. Information shall be presented in database view.

E. System shall interface with the following testing and recording devices:

1. Direct upload tests from circuit testing instrument into the personal computer.
2. Direct download circuit labeling into labeling printer.

2.15 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test UTP and optical fiber cables on reels according to TIA/EIA-568-B.1.

C. Factory test UTP cables according to TIA/EIA-568-B.2.

D. Factory test multimode optical fiber cables according to TIA/EIA-526-14-A and TIA/EIA-568-B.3.

E. Factory-sweep test coaxial cables at frequencies from 5 MHz to 1 GHz. Sweep test shall test the frequency response, or attenuation over frequency, of a cable by generating a voltage whose frequency is varied through the specified frequency range and graphing the results.

F. Cable will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

PART 3 - EXECUTION

3.01 ENTRANCE FACILITIES

A. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

3.02 WIRING METHODS

A. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, in attics, and in gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables except in unfinished spaces.

1. Install plenum cable in environmental air spaces, including plenum ceilings.
2. Comply with requirements for raceways and boxes specified in Division 26 Section "Raceway and Boxes for Electrical Systems."

B. Wiring Method: Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

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

3.03 INSTALLATION OF PATHWAYS

A. Cable Trays: Comply with NEMA VE 2 and TIA/EIA-569-A-7.

B. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.

C. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways.

D. Install manufactured conduit sweeps and long-radius elbows whenever possible.

E. Pathway Installation in Communications Equipment Rooms:

1. Position conduit ends adjacent to a corner on backboard where a single piece of plywood is installed, or in the corner of room where multiple sheets of plywood are installed around perimeter walls of room.
2. Install cable trays to route cables if conduits cannot be located in these positions.
3. Secure conduits to backboard when entering room from overhead.
4. Extend conduits **3 inches (76 mm)** above finished floor.
5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

F. Backboards: Install backboards with 96-inch (2440-mm) dimension vertical. Butt adjacent sheets tightly, and form smooth gap-free corners and joints.

3.04 INSTALLATION OF CABLES

A. Comply with NECA 1.

B. General Requirements for Cabling:

1. Comply with TIA/EIA-568-B.1.
2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
3. Install 110-style IDC termination hardware unless otherwise indicated.
4. MUTOA shall not be used as a cross-connect point.
5. Consolidation points may be used only for making a direct connection to telecommunications outlet/connectors:

a. Do not use consolidation point as a cross-connect point, as a patch connection, or for direct connection to workstation equipment.
b. Locate consolidation points for UTP at least 49 feet (15 m) from communications equipment room.

6. Terminate conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.

7. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.

8. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.

9. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.

10. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.

11. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.

12. In the communications equipment room, install a 10-foot- (3-m-) long service loop on each end of cable.

13. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.

C. UTP Cable Installation:

1. Comply with TIA/EIA-568-B.2.

2. Do not untwist UTP cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.

D. Optical Fiber Cable Installation:

1. Comply with TIA/EIA-568-B.3.

2. Cable may be terminated on connecting hardware that is rack or cabinet mounted.

E. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.

2. Suspend UTP cable not in a wireway or pathway a minimum of 8 inches (200 mm) above ceilings by cable supports not more than **60 inches (1524 mm)** apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

F. Installation of Cable Routed Exposed under Raised Floors:

1. Install plenum-rated cable only.
2. Install cabling after the flooring system has been installed in raised floor areas.
3. Coil cable **6 feet (1800 mm)** long not less than **12 inches (300 mm)** in diameter below each feed point.

G. Outdoor Coaxial Cable Installation:

1. Install outdoor connections in enclosures complying with NEMA 250, Type 4X. Install corrosion-resistant connectors with properly designed O-rings to keep out moisture.
2. Attach antenna lead-in cable to support structure at intervals not exceeding 36 inches (915 mm).

H. Group connecting hardware for cables into separate logical fields.

I. Separation from EMI Sources:

1. Comply with BICSI TDMM and TIA/EIA-569-A for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

   a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
   b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
   c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (610 mm).

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).

4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).
c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).

6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

3.05 FIRESTOPPING

A. Comply with TIA/EIA-569-A, Annex A, "Firestopping."

B. Comply with BICSI TDMM, "Firestopping Systems" Article.

3.06 GROUNDING

A. Install grounding according to BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.

B. Comply with ANSI-J-STD-607-A.

C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall allowing at least 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar with a minimum No. 4 AWG grounding electrode conductor from grounding bus bar to suitable electrical building ground.

D. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.07 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA/EIA-606-A. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

1. Color-code cross-connect fields. Apply colors to voice and data service backboards, connections, covers, and labels.

B. Using cable management system software specified in Part 2, develop Cabling Administration Drawings for system identification, testing, and management. Use unique, alphanumeric designation for each cable and label cable, jacks, connectors, and terminals to which it connects with same designation. At completion, cable and asset management software shall reflect as-built conditions.

C. Paint and label colors for equipment identification shall comply with TIA/EIA-606-A for Class 2 level of administration**,** including optional identification requirements of this standard.

D. Cable Schedule: Post in prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.

E. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables, entrance pathways and cables, terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors. Follow convention of TIA/EIA-606-A. Furnish electronic record of all drawings, in software and format selected by Owner.

F. Cable and Wire Identification:

1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).

4. Label each terminal strip and screw terminal in each cabinet, rack, or panel.

   a. Individually number wiring conductors connected to terminal strips, and identify each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with name and number of particular device as shown.
   b. Label each unit and field within distribution racks and frames.

5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.

6. Uniquely identify and label work area cables extending from the MUTOA to the work area. These cables may not exceed the length stated on the MUTOA label.

G. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA/EIA-606-A.

1. Cables use flexible vinyl or polyester that flex as cables are bent.

3.08 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:

1. Visually inspect UTP and optical fiber cable jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA/EIA-568-B.1.

2. Visually confirm Category 6, marking of outlets, cover plates, outlet/connectors, and patch panels.

3. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.

4. Test UTP backbone copper cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.

   a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with

performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

5. Optical Fiber Cable Tests:

   a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
   b. Link End-to-End Attenuation Tests:

      1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in 1 direction according to TIA/EIA-526-14-A, Method B, One Reference Jumper.

         2) Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than that calculated according to equation in TIA/EIA-568-B.1.

6. UTP Performance Tests:

   a. Test for each outlet and MUTOA. Perform the following tests according to TIA/EIA-568-B.1 and TIA/EIA-568-B.2:

      1) Wire map.
      2) Length (physical vs. electrical, and length requirements).
      3) Insertion loss.
      4) Near-end crosstalk (NEXT) loss.
      5) Power sum near-end crosstalk (PSNEXT) loss.
      6) Equal-level far-end crosstalk (ELFEXT).
      7) Power sum equal-level far-end crosstalk (PSELFEXT).
      8) Return loss.
      9) Propagation delay.
      10) Delay skew.

7. Optical Fiber Cable Performance Tests: Perform optical fiber end-to-end link tests according to TIA/EIA-568-B.1 and TIA/EIA-568-B.3.

8. Final Verification Tests: Perform verification tests for UTP and optical fiber systems after the complete communications cabling and workstation outlet/connectors are installed.

   a. Voice Tests: These tests assume that dial tone service has been installed. Connect to the network interface device at the demarcation point. Go off-hook and listen and receive a dial tone. If a test number is available, make and receive a local, long distance, and digital subscription line telephone call.
   b. Data Tests: These tests assume the Information Technology Staff has a

network installed and is available to assist with testing. Connect to the network interface device at the demarcation point. Log onto the network to ensure proper connection to the network.

D. Document data for each measurement. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.

E. End-to-end cabling will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

END OF SECTION 27 15 00

THIS PAGE IS INTENTIONALLY BLANK