HOT SPRINGS NATIONAL PARK

101 Reserve St.
Hot Springs, AR 71901

Design and Install Fire Alarm and Suppression
in Quarters 70A/B and 71A/B

HOSP
PMIS NO. 245945

PROJECT SPECIFICATIONS
(100% Final Construction Document (CD))

NATIONAL PARK SERVICE

INTERIOR REGION 3/4/5
March 2026

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DIVISION 01

GENERAL REQUIREMENTS

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SECTION 01 10 00 - DIVISION 1 SHORT FORM GENERAL REQUIREMENTS

PART 1 – GENERAL

ITEM 1 - DESCRIPTION OF WORK

1.1 This project involves the design and installation of fire protection and life safety systems for two historic duplex residential buildings, Quarters 70A/70B and Quarters 71A/71B, constructed in the 1930s as Army-Navy general hospital double NCO quarters and proposed for restoration to their original residential use as temporary National Park Service (NPS) employee housing. Quarters 71A/71B are currently used by law enforcement personnel during normal business hours, Quarters 70A is used for law enforcement fitness activities, and Quarters 70B is vacant and used for storage; however, these interim uses did not involve permanent alterations to the residential layout or life safety features and do not constitute a change of occupancy classification. The proposed work restores the buildings to their historic duplex dwelling function with no increase in the number of dwelling units or occupant load.
The scope includes installation of single-station fire alarm and carbon monoxide alarms, an NFPA 13D wet-pipe automatic sprinkler system, and local alarm notification in accordance with applicable fire codes and NPS standards. Fire protection piping will be routed from the basement up through the recently installed HVAC chase and the piping on floors will be exposed with minimal wall and floor penetrations; the work is limited to the interior of the buildings, and therefore no exterior ground disturbance or impacts to exterior historic building aesthetics are anticipated. A passage opening that interconnects Quarters 71A and 71B kitchens will be infilled with a 1 hour rated wall assembly to restore two separate duplexes.

Each duplex will accommodate up to six occupants and based on the existing conditions, limited scope of work, and residential use, the project was evaluated under the IBC, IEBC, and applicable NPS preservation briefs, is classified as group R-3 / Residential, and, as the buildings are less than three stories in height, it was determined the buildings would fall within the applicability of the IRC for one- and two-family dwellings, as outlined herein.

A. Work shall be in accordance with applicable codes including=, but not limited the following:
    1. International Building Code (2024 Edition)
    2. International Existing Building Code (2024 Edition)
    3. International Residential Code (2024 Edition)
    4. International Fire Code (2024 Edition)
    5. International Mechanical Code (2024 Edition)
    6. International Plumbing Code (2024 Edition)
    7. International Fuel Gas Code (2024 Edition)
    8. International Wildland-Urban Interface Code (2024 Edition)
    9. International Property Maintenance Code (2024 Edition)
    10. National Electrical Code (2023 Edition)
    11. National Fire Protection Association Standards (Latest Editions)
    12. National Park Service Handbooks and Reference Manuals (Latest Editions)
    13. Architectural Barriers Act (2024 Edition)
    14. Accessibility and Universal Design Standards

1.3 Work Covered by the Contract Documents:

A. Park: Hot Springs National Park (HOSP) – 101 Reserve St, Hot Springs, AR 71901 Project Location(s) Quarters 70A/B and 71A/B; see contract drawings.

B. BASE BID:
    15. The installation of an NFPA 13D sprinkler system within Quarters 70A/B and 71A/B as noted within the Contract Documents (refer to Drawings and Specifications 21 05 00 for additional information).

16. The installation of a new signal station smoke alarms and carbon monoxide alarms with strobes within Quarters 70A/B and 71A/Bas noted within the Contract Documents (refer to Drawings and Division 26 Specifications for additional information).

17. The installation and infill of an existing opening between Quarters 71A/B with a 1 hour rated wall assembly to restore two separate duplexes as noted within the Contract Documents (refer to Drawings and Divisions 6 and 9 Specifications for additional information).

18. In addition, the contractor is responsible for minor patching, painting and firestopping of areas affected by the work to maintain existing conditions as noted within the Contract Documents (refer to Drawings and Specifications 07 84 00, 09 29 00 and 09 91 00 for additional information).

C. Work will be performed within the following buildings:
   1. Quarters 70A/B.

   2. Quarters 71A/B.

D. All work will be performed under a single contract.

   Period of performance: Work shall be completed within **152** calendar days of the start date provided on the Notice to Proceed.

   1. Clarification: The Notice to Proceed will be issued with a period of performance that is all inclusive of supply lead times, material deliveries, decommissioning, installation, anticipated average weather days for location, final commissioning, and acceptance of completed work. The contractor will be expected to provide a project schedule with adequate critical path details to ensure all work is completed within the stated calendar days from issuance of the Notice to Proceed. If weather impacts project beyond typical average weather patterns, contractor shall provide documentation in request for additional days.

   Upon contract award, the Contractor shall develop a schedule sequencing plan that outlines demolition and new construction activities and submit it for approval before commencing work.

   The sequence priority of work shall be as follows:
   - Priority #1: Quarters 70A/B *(The duplexes will be vacant during the construction period)*
   - Priority #2: Quarters 71A/B *(The duplexes will be vacant during the construction period)*

   If the Contractor requires changes to the approved schedule, they shall notify the CO and COR at least 7 days in advance, providing an updated schedule along with documentation/justification supporting the proposed changes and an assessment of potential project impacts for reapproval.

   Unless otherwise specified, buildings will not be occupied by NPS staff during work activities.

1.3 Existing Condition Protections:

A. Preservation of Historical and Archeological Fabric:
   1. The Historic and Archeological Data Preservation Act of 1974 provides for the preservation of historical and archeological data that might otherwise be lost as the result of alterations to the terrain caused by a federal or federally licensed activity or program.

2. IF, in connection with operations under this contract, the Contractor, subcontractors, or employees of any of them, discovers, encounters, or becomes aware of any possible historical or archeological remains or data, objects or sites of cultural value on the project area, such as historical ruins, graves or grave markers, fossils, or artifacts not specifically noted within the contract. The Contractor shall immediately suspend all operations in the vicinity and continue work in other areas outside a 50-foot radius of discovery and notify the Contracting Officer immediately. When safe to do so, follow up in writing with photographs within 2 days, giving the location and nature of the findings. No objects of cultural resource value may be removed. Contracting Officer will contact other entities as required.

3. Where appropriate by reason of discovery, the Contracting Officer may order delays in the time of performance and/or changes in the work. If such delays and/or changes are ordered, the time of performance and contract price shall be adjusted in accordance with Changes clause.

4. The Contractor will be responsible for protecting the cultural resources within and adjacent to the project area from damage. In addition, the Contractor will be liable for all damage to the cultural resources caused by their actions or the actions of their agents or representatives. The Contractor shall immediately notify the Contracting Officer or their representative if any damage occurs to any cultural resource and immediately suspend work in the area in which damage has occurred until authorized to proceed.

5. The Contractor agrees to include this language within all subcontracts.

B. The structure involved in the work of this Contract is a designated historic structure listed in the National Register of Historic Places. Every precaution shall be taken by the Contractor to prevent damage to existing historical materials, structural components of the building and to the surrounding area. Should any damage be incurred as a result of the Contractor's operations at the site, it shall be repaired, or the damaged materials replaced in kind by the Contractor to the satisfaction of the Contracting Officer at no additional expense to the Government.

C. There is no excavation required for this project.

1.4 Contract Price Schedule:

A. The Contractor shall complete the price schedule (provided as a separate document) and include it with their formal bid proposal

ITEM 2 – PROTECTING EXISTING UTILITIES

2.1 Contractor shall be responsible for locating and preventing damage to known utilities. If contractor damage occurs, alert CO and COR as soon as safely possible, and repair utility at no additional expense to the NPS. If damage occurs to an unknown utility, contact CO and COR as soon as safely possible.

2.2 Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by NPS or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated below:

A. Notify CO and COR not less than two business days in advance of proposed utility interruptions.

B. Hours for Utility Shutdowns: Shutdowns shall not exceed 2 to 3 hours. Temporary provisions will be needed by the Contractor for periods longer than stated allowance or if required for critical systems as determined by COR.

ITEM 3 - CONTRACTOR'S USE OF PREMISES

3.1 Conduct of Operations: At all times, the contractor shall conduct his operations in conformance with the rules and regulations promulgated by the Secretary of the Interior for the National Park Service, and applicable park rules and regulations prescribed by the Park Superintendent. https://www.nps.gov/fosc/learn/management/superintendent-s-compendium.htm

A. Communications: Contractor shall provide the Contracting Officer and COR with methods of communications including land and/or cell phone numbers (note some areas of work have limited service coverage), email and in case of emergency 24-hour contact options for duration of time operations.

B. No signs or advertisements (except those specified herein and as required for safety) shall be displayed on the construction site or within the park unless approved by the Contracting Officer.

C. Smoking is not permitted within any Federal building or within 25 FT of entrances, operable windows, or outdoor air intakes.

D. Public Use of Site: Contractor shall at all times conduct operations to ensure the least inconvenience to the public. Coordinate with HOSP CO and COR - Contractor shall at all times conduct operations to ensure the least inconvenience to the public.

3.2 On-site work hours:

A. On-site work hours: Work shall be generally performed during normal business working hours of 7 am to 4 pm. Monday through Friday, except when otherwise indicated. Work on Saturdays, Sundays, Federal holidays, early morning, or at night may not be performed without prior consent from the CO and COR. Submit requests for work outside of the stated normal business hours to the CO and COR for approval at least 48 hours in advance of the work.

The following Federal holidays are observed by the National Park Service:
New Year Day
Inauguration Day
Martin Luther King, Jr's Birthday
Washington's Birthday
Memorial Day
Juneteenth National Independence Day
Independence Day
Labor Day
Columbus Day
Veterans Day
Thanksgiving Day
Christmas Day

B. Note: Any of the above holidays falling on a Saturday will be observed on the preceding Friday; holidays falling on Sunday will be observed on the following Monday. The specific day that each holiday is recognized for each year can be found at the following site: Federal Holidays (opm.gov).

3.3 Contractor Use of Site:

A. General: Contractor shall have limited use of the site for construction operations. Limit use of premises to construction area as shown on the Contract Drawing Coversheet site plan. Do not disturb portions of Project site beyond areas in which the Work is indicated.

B. Limits: Confine constructions operations to Quarters 70A/B and 71A/B.

C. Driveways and Entrances: Keep driveways, access roads, and entrances serving premises clear and available to NPS, NPS's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize use of driveways and entrances.

D. Contractor shall not disturb areas outside the defined project work limits. Site disturbance requirements related to earthwork, vegetation clearing, turf matting, and soil compaction remediation are not anticipated for this project.

B. Utilities:
   1. General: Cost or use charges for temporary facilities shall be included in the Contract Sum as required.

   2. Water Service: Water from existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations without any additional permit costs. Use resources wisely and minimize waste of water.

   3. Electric Power Service: Electric power from existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations without any additional permit costs. Power may or may not meet your construction power tool requirements, provide generators if questionable. Use power in a resourceful manner and avoid excess power waste.
   4. Toilets: Contractor shall be able to use the existing park restroom facilities, specific location to be discussed during the preconstruction meeting. The restroom facilities shall be kept in immaculate condition. At the discretion of Park personnel and/or COR; contractor may lose the use of the restroom facilities if they are not kept clean and orderly. Restroom use will be a “One strike and you’re out” policy. If restroom privileges are revoked Contractor will be required to provide a toilet for contracting personnel, sufficiently lighted and ventilated toilet facilities in weatherproof, sight proof, handicap accessible (if required), sturdy enclosures with privacy locks. Coordinate with COR for approved location.

C. Security and Protection Facilities: Contractor shall perform selective demolition and installation work in a manner that minimizes the duration during which building systems are impaired. The National Park Service retains first right of refusal for any demolition items removed from the site. Contractor shall submit a work schedule and coordinate with the NPS on the approved means and measures to be implemented during any temporary loss of protection, unless otherwise directed by the NPS.

D. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with state and federal environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

E. Cleaning of Equipment: N/A

F. Tree and Plant Protection: N/A

G. Pest Control: Follow best practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at project completion. Perform control operations lawfully, using environmentally safe materials.

H. Site Enclosure Fence: N/A

I. Security Enclosure and Lockup: N/A

J. Temporary Enclosures: N/A

3.4 Storage - Staging Areas:

A. Confine Storage of materials and equipment to the building where work is being performed.

1. Most tool and small material storage can be in the buildings were the demolition and installation are taking place No vehicles will be parked around buildings except for loading or unloading, then they will be moved to public parking areas. Vehicles need to be operated and temporarily parked on hard surfaces when available. Such surfaces are limited up close to the structures and can be identified on a map. Work and staging areas will create as minimal interference with the visitor experience as possible.

2. Coordinate all material storage and staging areas with NPS, if needed, to ensure adequate space is available at the various project sites. For Quarters 70A/B and 71A/B, contractor staging is limited to the two parking stalls in front of the garages located on the north side of the buildings. Prior to site mobilization, if material storage and staging areas are needed, the contractor must submit a storage and staging plan to NPS for approval. All dumpsters, staging and storage, must be placed in an area approved by NPS.

3.5 Preservation of Natural Features: N/A

3.6 Hauling Restrictions: N/A

3.7 Housekeeping:

A. Dust and debris shall be vacuumed and cleaned back to original condition, daily or prior to moving to another work area/room. Use dust partitions and plastic sheeting / tape where necessary to protect adjacent reas from dust and debris.

B. Keep project neat, orderly, and in a safe condition at all times.
1. Contractor is responsible for providing dumpsters for waste and recycling and for removing all waste created by the project. Contractor shall recycle to the highest degree possible and empty dumpsters as necessary to avoid debris on site. Coordinate with COR for approved dumpster locations prior to commencing construction.

2. Dispose of waste materials and recycling legally outside the park. The contractor may use park dumpsters for non-recyclables with prior approval by the COR.

3. Address Recycling: NPS goal is to salvage and recycle as much nonhazardous construction waste as possible. Use sustainable methods to extent possible during this project, recycling material as is probable with local means. Maintain accurate documentary records for submittal of all recycled materials used including fly ash and slag cement. Send a report of the weights and categories of construction and demolition waste, and recycling to the COR for entry into the NPS Solid Waste Management Data Base.

4. Manage work activities to reduce dust and debris liberated during demolition and new work..

3.8 Occupancy Requirements for Buildings:

A. Existing Buildings:

1. Occupancy: The buildings will be unoccupied during the entire construction contract period. Contractor will be responsible for maintaining the existing building in a weather tight condition throughout construction period. Repair damage caused by construction operations.

3.9 Photo Documentation:

A. Contractor must provide existing condition, progress, and completion photos. All photos shall be in focus, show maximum range of depth of field general photo and then close up detail photo as needed. Shall be in JPEG digital form and submitted preferably electronically by email or optional via CD-R Archival Gold or DVD-R Archival Gold media with printed labels and 8 mega pixels minimum within 7 days from time of taken or as approved by COR.

B. Existing Condition Images:
   1. Before starting construction, take color, dated, digital images of project site that may be impacted by construction activity.

C. Construction Progress Images:
   1. Document all progress on a weekly basis.

   2. Maintain organized index for photos with date, description, etc.

   3. Additional images as needed when questions or emergency situations occur. Submit within 24 hours.

D. Completion Images:
   1. Document all completed work within scope of work.

   2. Maintain organized index for photos with date, description, etc..

   3. Additional images as needed when questions or emergency situations occur. Submit within 24 hours.

3.10 Fire and Life Safety:

A. As a minimum, conduct one weekly 15 minute "toolbox" safety meetings. These meetings shall be conducted by a foreman or supervisor and attended by all construction personnel at the worksite. Topics need to coincide with work scheduled for the following week. Examples include general electrical hazards, slip, trips and falls, ladder safety and moving vehicles. Document and submit meeting minutes to the CO and COR within one day after the meeting and document the meetings on the daily reports.

B. Comply with the requirements of NFPA 241 (Standard for Safeguarding Construction, Alteration, and Demolition Operations). Take all necessary precautions to prevent fire during construction. Provide adequate ventilation during use of volatile or noxious substances.

C. No grinding, welding, or hot operations requiring a permit shall be conducted onsite.

D. NPS COR and contractor lead on site will validate existing smoke and heat detection devices are active, prior to the contractor leaving the site each evening after work, in the structure under construction.

E. The Contractor shall work with COR to coordinate all work with HOSP Superintendent (Laura Miller) and NPS Resource Management team.

F. The Contractor shall work with COR to coordinate all work and impairments with the NPS Facilities Management Team. The NPS Facilities Management Team will notify the local fire department of work progress and the status of building fire suppression systems.

G. Furnish a minimum of one ABC portable extinguisher for each 1,500 square feet of work area or major fraction thereof during construction. Existing NPS extinguishers will be removed from service during construction. Travel distance to nearest extinguisher shall not exceed 75 feet. Contractor shall perform routine inspections of portable extinguishers to ensure that extinguishers are charged and readily accessible.

H. Store and handle hazardous materials in accordance with manufacturer's and OSHA 29CFR1926 Subpart D requirements 1926 | Occupational Safety and Health Administration (osha.gov). Maintain readily available, on site, Safety Data Sheets (SDS) for each chemical.
   1. Immediately report all spills of hazardous materials to the CO, COR, and park.
   2. Maintain a spill emergency response kit.
   3. Train employees how to respond to a spill and use the emergency response kit.

3.11 Noise and Acoustics Management:

A. Contractor shall not have personal radios or other media sources, and they shall not be broadcast within NPS property.

B. Noise Control: Perform operations to minimize noise. Perform noise-producing work in less sensitive hours of the day or week as directed by the Contracting Officer or COR.

C. Repetitive and/or intermittent, high-level noise: Permitted only during Daytime.

3.12 Indoor air Quality:

A. Where used, sealants, adhesives, paints, coatings, and other similar materials shall be low VOC materials.

3.13 Patch and Painting:

B. Surfaces impacted by the work shall be patched and painted with commercially available low VOC emitting materials meeting commercial standards. Damaged areas must match the existing texture and be primed, followed by two coats of paint matching the adjacent surfaces' sheen. The painted area shall extend to the nearest cut points of the impacted surface, and the extent of the painted area must be approved by the Contracting Officer's Representative (COR) prior to painting. Color selections require approval by the COR before purchase. For existing coated surfaces, apply coatings per the manufacturer's recommendations, ensuring compatibility with the existing finish. All work will be subject to quality assurance inspections and must receive final approval from the COR.

ITEM 4 - COMMENCEMENT, PROSECUTION, AND COMPLETION

4.1 The Contractor shall commence work in accordance with the terms and conditions of the contract. Contractor shall coordinate and incorporate long lead and delivery time items within the schedule.

ITEM 5 - EXAMINATION OF THE SITE

5.1 All bidders are urged to visit the job site and examine existing conditions before submitting bids. Contractors will be accountable for understanding existing conditions. No cost changes for items viewable during site visit will be allowed.

ITEM 6 - ABBREVIATIONS

6.1 The list of abbreviations, standards and organizations which may be used in/referred within the Construction Specifications or Special Provisions, may be found linked from the listed page below. On the home page, follow the link under **"Contracting and Procurement"** labeled **"NPS Reference Standards."** https://www.nps.gov/orgs/1671/do-business-with-us.htm

ITEM 7 - ACCIDENT PREVENTION

7.1 Description: The work of this section consists of establishing and implementing an effective accident prevention program (APP) and providing a safe environment for all personnel and visitors.

7.2 Submittals:

A. Accident Prevention (Safety) Plan (APP): Submit a **site-specific** accident prevention (safety) plan. The Plan shall be written to comply with OSHA and project requirements (a generic plan is not acceptable) including but not limited to the following:

1. Name and qualifications of responsible supervisor to carry out the program.
2. First aid and rescue procedures.
3. Training, both initial and continuing.
4. Outline of each sequenced portion of the work , the hazards associated with each one, and the methods proposed to provide for property protection and safety of the public, National Park Service personnel, and Contractor's employees. Identify the work included under each sequenced portion of the work, with a Job Hazard Analysis (JHA)/Job Safety Analysis (JSA), etc. A sample JHA template may be provided upon request.
5. Planning for possible emergency situations, such as cave-ins, earthquake, explosions, fires, floods, power outages, slides, and windstorms. Such planning shall take into consideration the nature of construction, site conditions, and degree of exposure of persons and property.
6. Contractor to identify nearest location of medical facility for emergencies.
7. Recognition that work will be performed in remote areas with limited communication or cell phone coverage if applicable.
8. Supplemental hazard specific plans may be required IAW 29 CFR 1926 or 1910.

B. Meeting and Inspection Reports: Submit a report of safety meetings and inspections to CO and COR within one day after the meeting and document the meetings on the daily reports.

7.3 Qualification of Employees:

A. Ensure that employees are physically qualified to perform their assigned duties in a safe manner to include operators of vehicles and equipment. Provide operating instructions for all equipment.

B. Do not allow employees to work whose ability or alertness is impaired because of drugs, fatigue, illness, intoxication, or other conditions that may expose themselves or others to injury.

7.4 Accident Reporting: The Contractor shall report all accidents to the CO and COR as soon as safely possible and assist the CO and COR and other officials as required in the investigation of the accident.

7.5 First Aid Facilities: Provide access to facilities for the number of employees and appropriate to the hazards associated with the types of ongoing construction work at the site.

7.6 Emergency Instructions: Post telephone numbers and reporting instructions for ambulance, physician, hospital, fire department, and police in conspicuous locations at the work site.

7.7 Personal Protective Equipment (PPE): It is the Contractor's responsibility to require all those working on or visiting the site to always wear necessary protective equipment.

A. PPE must meet requirements of applicable ANSI standards. Selection shall conform to OSHA 29CFR 1926 Subpart E.

B. A hard hat use area shall be designated by the Contractor. The hard hat area shall be posted by the Contractor in a manner satisfactory to the Contracting Officer.

C. All PPE will be serviceable at all times. At a minimum, maintain one set of PPE including hard hat and all other Accident Prevention Plan required equipment.

7.8 Hazardous Materials: It shall be the responsibility of all operators and contractors, functioning within the park to properly cleanup, mitigate and remediate, if necessary, all unauthorized discharges of hazardous materials or non-hazardous chemical and biological products released from fleet and/or other support vehicles or stationary sources. Response shall be consistent with guidelines established by federal, state, and local regulations, and as outlined within the operator's Safety or Hazardous Materials Business Plan.

A. If a spill, leak, or other release occurs, the operator shall as soon as possible, without impeding cleanup, notify the National Park Service Emergency Dispatch.

7.9 Unforeseen Hazardous Materials: It is not anticipated that the presence of hazardous materials such as PCB, lead paint, friable or non-friable asbestos, or other OSHA-regulated chemicals (29 CFR Part 1910.1000) will be encounter during construction.

1. The project scope involves only minimal disturbance of existing building materials, limited primarily to small penetrations required for installation of the NFPA 13D fire sprinkler system and Single Station Alarms.

2. If materials potentially hazardous to human health are encountered during construction, the Contractor shall immediately stop work in the affected area and notify the Contracting Officer. The NPS will assess the material within 14 calendar days.
   i) If determined non-hazardous, the Contractor will be directed to resume work without change.
   ii) If the material is hazardous and handling is necessary to continue the work, a contract modification will be issued in accordance with FAR 52.243-4, "Changes," and FAR 52.236-2, "Differing Site Conditions.

ITEM 8 - PRECONSTRUCTION CONFERENCE

8.1 If the Contracting Officer decides to conduct a preconstruction conference, the successful offeror will be notified and will be required to attend. The Contracting Officer’s notification will include specific details regarding the date, time, and location of the conference, any need for attendance by subcontractors, and information regarding the items to be discussed. See Item 9.1C below.

ITEM 9 - SUBMITTALS

9.1 General Submittal Procedures:

A. General: Prepare and submit submittals required by individual Technical Specification Sections. Types of submittals are indicated in individual specific sections.
   1. CM-16 Transmittal Form: All submittals shall be transmitted via electronic email using National Park Service form CM-16 form. The form will be provided by the Contracting Officer. No action will be taken on a submittal item unless accompanied by the CM-16 transmittal form. Submit completed CM-16 forms to the CO and the COR.

B. Submittal List: Administrative required submittals are listed below and does not include technical section submittal requirements included in each technical section.

C. Preconstruction Conference Submittal: Satisfactory evidence of liability insurance coverage and workman’s compensation, and any applicable bonds, must be submitted within 10 calendar days of Notice of Award. The following items shall be submitted a minimum of one week prior to the Preconstruction Conference. If all of these documents have not been received one week prior to the scheduled Pre-Construction Conference date, the conference will be cancelled, Notice to Proceed may not be issued, and the Contracting Officer will consider other contractual remedies. Work shall not commence until written Notice to Proceed has been issued. Contracting Officer will notify Contractor of tentative date for the Pre-Construction Conference:

   1. Letter designating Project Superintendent.

2. Construction Schedule and along with sequence of work. (Must include shop drawings, procurement time including long lead time items, mobilization, trade work progression, and completion at minimum.)
3. A comprehensive breakdown of the Schedule of Values.
4. Accident Prevention (Safety) Plan (see section 7 of this document).
5. A list of Subcontractors for this project.
6. Written statements from subcontractors certifying compliance with applicable labor standard clauses (SF1413).
7. Quality Control Plan.
8. Contractors Commissioning Plan.
9. Historic Preservation Treatment Plan Submitted to AHJ (Authority Having Jurisdiction)
   i) National Park Service is the acting Authority Having Jurisdiction.
10. List of Required Construction Permits. Include the following information for each permit:
    i) Name of Permit.
    ii) The Agency(ies) with Jurisdiction issuing the permit.
    iii) Information required from the NPS to complete the permit application.

9.2 Project Submittal Process (Shop Drawings, Product Data, and Samples): Refer to technical sections (Divisions 6 through 26) for required technical submittals.

A. Shop Drawings: Indicate all coordinating materials and work impacting the installation coordination, connection details, anchorage requirements, hardware locations, and installation details and locations.
   1. Submit Shop Drawings according to Part 9.1 of this section to include one digital file (.PDF or .TIF) and two full size hardcopy documents to COR.

B. Product Data: Provide component construction and specification data sheets, anchorage requirements, and any other product specific data.
   1. Submit Product Data according to Part 9.1 of this section to include one digital file (.PDF or .TIF) to COR.

C. Samples: Submit 2 color samples 4” x 6” minimum in size for all product color selections. Paint samples shall be actual paint finish drawdown for all project colors.
   1. Submit Samples CM-16 Transmittal Form according to Part 9.1 of this section to include one digital file (.PDF or .TIF) and physical samples of actual material to COR.

D. For submittals specified above, forward submittals to Contracting Officer and COR at least 15 days before need for approval (depends on length of project).

E. After approving submittals, Contracting Officer and/or COR will return one copy to the Contractor. If submittals are not approved, Contracting Officer will return all copies to Contractor with reasons for rejection. Resubmit, identifying changes. Any work done before approval shall be at Contractor's own risk.

9.3 Approved Equals: If an item in this solicitation is identified as “brand name or equal” or lists more than 1 manufacturer, the description of the proposed item must reflect the characteristics and level of quality that will satisfy the NPS’s needs as demonstrated by the salient physical, functional, or performance characteristics that “equal” products must meet and/or exceed that as specified in the solicitation or relevant specification.

A. For each item proposed as an “approved equal,” submit supporting data, including:
   1. Drawings and samples as appropriate.
   2. Comparison of the characteristics of the proposed item with that specified and with the salient characteristics provided.
   3. Changes required in other elements of the work because of the substitution.
   4. Name, address, and telephone number of vendor.
   5. Manufacturer’s literature regarding installation, operation, and maintenance. Including schematics for electrical systems, and parts lists. Describe availability of maintenance service, and state source of replacement materials.

B. A request for approval constitutes a representation that Contractor:
   1. Has investigated the proposed item and determined that it is equal or superior in all respects to that specified.
   2. Will provide the same warranties for the proposed item as for the item specified.
   3. Has determined that the proposed item is compatible with interfacing items.
   4. Will coordinate the installation of an approved item and make all changes required in other elements of the work because of the substitution.
   5. Waives all claims for additional expenses that may be incurred as a result of the substitution.

C. Approved Equals will be evaluated and approved/disapproved during the submittal process.

9.5 Progress Reporting: The initial Construction Schedule and Schedule of Values are required a minimum of one week prior to the Preconstruction Conference. After the Notice to Proceed is issued and after on-site work begins, progress will be documented via daily logs and by providing an updated Construction Schedule and Schedule of Values when requested; but minimally with each pay application. Submit digital copy electronically (PDF preferred) of all required documents. Construction Schedules are normally in bar chart form and indicate estimated starting and completion dates for each part of the work. For a pay application to be reviewed and processed in a timely manner, the following information must either be submitted prior to or accompany submission of the pay application:

A. Daily/weekly progress reports during construction as part of the administration process , including photo documentation capturing key milestones, completed work, and site conditions. Photos should be dated and referenced in relation to the construction schedule.

B. Updated Schedule of Values: Breakdown each lump-sum item into component work activities used in the schedule, for which progress payments may be requested. The Schedule of Values will form the basis for payment. The work activities broken out within the schedule of values shall be integrated into and made a logical part of the construction baseline schedule submitted under this specification. The total costs for the component work activities shall equal the contract price for that lump-sum item. The Contracting Officer may request data to verify accuracy of dollar values. A sample Schedule of Values format may be provided upon request.

ITEM 10 – TEMPORARY SERVICES

10.1 NPS will provide temporary services (e.g., power and water). It is the Contractor's responsibility to provide temporary services, equipment, tools, and skilled labor as required for the chosen means and methods to perform the work in accomplishing this Contract.

ITEM 11 - PROJECT CLOSEOUT

11.1 Description: The work of this section consists of final cleanup, closeout submittals, final inspection procedures working toward Final Acceptance.

11.2 Cleaning: Remove all tools, equipment, surplus materials, rubbish, debris and protective covering and barriers.. Move attic stock to location coordinated with COR. Each building shall be thoroughly clean and ready for intended use prior to requesting final inspection. Inspector holds the right to reschedule if project is not ready for inspection.

11.3 Completion and Final Inspection: Contractor shall submit written certification of project completion and request a final inspection to the Contracting Officer and COR. The Contracting Officer or designee will make an inspection within 14 days of receipt of request or at a mutually agreeable time. Refer to RM-58 and NPS Acceptance Checklist for inspection requirements. If preliminary or partial inspection is required prior to final inspection, coordinate with COR and NPS Structural Fire team - Bill Dudek.

A. If the work is determined to be complete following the final inspection with minor comments, the COR will prepare and provide the Contractor a Punch List noting outstanding items to be addressed.

B. If the work is not determined to be complete following the final inspection, the Contracting Officer will notify Contractor in writing, stating reasons. Contractor, after completing the work according to the Contract Documents, shall resubmit completion and request a new final inspection. Re-inspection costs may be charged against the Contractor in accordance with the Inspection of Construction contract clause.

C. Contractor shall complete the Punch List within 30 calendar days, or a time directed by the CO.

D. Once Contractor completes all items of work on the Punch List and all contractually required items are accepted, Contracting Officer will issue Letter of Final Acceptance of Work and request the final pay application.

E. If the Contractor fails to complete the work within the time frame, the Contracting Officer may correct the work with an appropriate reduction in contract price or charge for re-inspection costs in accordance with the Inspection of Construction contract clause.

F. Disposition of any permits and warranties required by the specifications in this section.

11.4 Final Acceptance of the Work: After all punch list deficiencies have been corrected, a Letter of Final Acceptance will be issued. A Release of Claims document must be executed and submitted to the Contracting Officer before final payment can occur.

11.5 Warranties

A. Construction Warranty shall be based on date of final acceptance of the work and remain in effect for one year.

B. Provide all manufacturer warranty information of products installed organized by Division. All contact information, extent of coverage and conditions shall be clearly noted as well as date of overall final acceptance.

C. Information shall include operation and maintenance manuals for each warranted product.

11.6 Project Record Drawings (As-builts)

A. Maintain and update contract drawings to reflect actual construction, marking changes, deletions, and additions.

B. Submit completed as-built drawings (1 hard copy, 11”x17”, and an electronic copy in PDF format, along with updated AutoCAD files (.dwg)) upon project completion, reflecting all final construction conditions (refer to Division 28 Specifications for additional information).

ITEM 12 - DEFINITION OF CONTRACT LINE ITEMS

12.1 Summary

A. The intent of this section is to explain, in general, what is and what is not included in a contract line item, and the limits or cut off points where one item ends, and another begins.

B. If no contract line item exists for a portion of the work, include the costs in a related item.

12.2 List of Contract Line Items

A. Contract Line-Item No. 1 – HOSP Design and Install Fire Alarm and Sprinkler System in Quarters 70A/70B and 71A/71B

B. Payment will be made in accordance with the compensation method established by the NPS contract and based on the approved progress of the work.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

DIVISION 06

WOOD, PLASTICS, AND COMPOSITES

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SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Rough carpentry.

B. Related Specification Sections include but are not necessarily limited to:

1. Section 07 92 00 - Joint Sealants.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. The Engineered Wood Association (APA):

a. PRP-108, Performance Standards and Qualification Policy for Structural Use Panels.
b. U450, Storage and Handling of APA Trademarked Panels.
c. Y510, Plywood Design Specification.

2. ASTM International (ASTM):

a. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
b. D2898, Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing.
c. D4442, Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials.
d. D4444, Standard Test Method for Laboratory Standardization and Calibration of Hand-Held Moisture Meters.
e. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

3. American Wood Protection Association (AWPA):

a. M2, Standard for Inspection of Preservative Treated for Industrial Use.
b. M3, Standard for the Quality Control of Preservative Treated Products for Industrial Use.
c. M4, Standard for the Care of Preservative-Treated Wood Products.
d. T1 Processing and Treatment Standard.
e. U1, Use Category System: User Specification for Treated Wood.

4. Environmental Protection Agency (EPA).
5. FM Global (FM):

a. 1-49, Property Loss Prevention Data Sheets - Perimeter Flashing.

6. National Institute of Standards and Technology (NIST):

a. PS 1, Quantitative NMR (Benzoic Acid).
b. PS 20, American Softwood Lumber Standard.

7. Underwriters Laboratories, Inc. (UL):

a. 723, Standard for Test for Surface Burning Characteristics of Building Materials.

B. Qualifications:

1. Wood Treatment Plant: AWPA M3.
2. Treated Wood Inspection: AWPA M2.

C. Miscellaneous:

1. Factory marking:

a. Lumber:

1) Identify type, grade, moisture content, inspection service, producing mill, and other qualities specified.
2) Marking may be omitted, as allowed by the building code, if certificate of inspection is provided for each shipment.

1.3 SUBMITTALS

A. Shop Drawings and Product Data:

1. Product technical data.

1.4 DELIVERY AND STORAGE

A. Delivery, storage and handling of untreated wood products:

1. Lumber: As recommended by the grading agency indicated on the grade stamp.
2. Plywood: APA U450.

B. Delivery, storage, handling and disposal of treated wood products: AWPA M4.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the manufacturers listed in the applicable Articles below are acceptable.

2.2 MATERIALS

A. General:

1. Lumber (for framing, blocking, nailers, furring, grounds and similar members):

a. NIST PS 20.
b. Species:

1) Treated material: As indicated in the appropriate AWPA standard.

a) Provide species of FRTM as necessary to achieve UL rating listed.

c. Grade:

1) For nominal sizes up to and including 2 x 4: Standard and better.
2) For nominal sizes up to 2 inches thick and wider than 4 inches: #2 and better.

2. Non-structural plywood:

a. NIST PS 1.
b. plugged:

1) Exposure: EXP1.
2) Thickness: 1/2 inches. 5/8 inches.
3) Touch sanded.

B. Preservative Treated Material:

1. Moisture content:

a. Prior to treatment: 25%.
b. Kiln-dry after treatment (KDAT), ASTM D4442 and ASTM D4444:

1) Lumber: 19% maximum.
2) Plywood: 18% maximum.

2. Preservative:

a. Waterborne: AWPA T1.
b. As indicated in the appropriate AWPA standard.

3. Pressure-treat material in accordance with AWPA U1.
4. Wherever practicable, material to be treated shall be manufactured in its final form prior to treatment.

C. Fire-Retardant Treated Material (FRTM):

1. Basis of design:

a. Hoover Treated Wood Products, Inc.:

1) Interior: "Pyro-Guard".
2) Exterior: "Exterior Fire-X".

2. Maximum moisture content:

a. Prior to treatment: 25%.
b. Kiln-dry after treatment (KDAT), ASTM D4442 and ASTM D4444:

1) Lumber: 19% (KDAT).
2) Plywood: 15% (KD-15).

3. Fire-retardant preservative:

a. Provide protection against decay:

1) EPA registered for use as a wood preservative.

b. Shall not bleed-through or adversely affect bond of any finish.

4. Pressure-treat material in accordance with AWPA U1.
5. UL Classified:

a. FR-S, UL 723.
b. Exterior: No increase in classification when subjected to the Standard Rain Test, ASTM D2898.
c. Provide UL mark on each piece of FRTM.

6. Maximum flame spread rating: 25, ASTM E84.
7. Wherever practicable, material to be treated shall be manufactured in its final form prior to treatment.

D. Fasteners and Anchors:

1. Nails and screws:

a. Dry, non-corrosive exposure: Hot dipped galvanized meeting ASTM A153 or Type 304 stainless steel.
b. Wet, corrosive, marine, and/or below grade: Type 316 stainless steel.

2. Adhesive anchors, expansion anchors, self-tapping concrete anchors, bolts, nuts, and washers.

PART 3 - EXECUTION

3.1 PREPARATION

A. Verify measurements, dimensions, and shop drawing details before proceeding.

B. Coordinate location of studs, nailers, blocking, grounds and similar supports for attached work.

3.2 ERECTION AND INSTALLATION

A. General:

1. Provide wood materials only where indicated on the drawings or required for blocking, nailers, grounds, and infill wall construction.
2. Install all work securely, using anchoring and fastening methods capable of supporting applied loads.

a. Inside building.
b. Exterior building walls.

B. Anchorage and Fastening

1. Wood to Concrete: Anchor using adhesive or mechanical anchors suitable for the substrate and loading conditions.

a. Separate wood from direct contact with concrete using a polyethylene foam gasket strip:

1) Thickness: 1/4 inch, width equal to wood member.
2) Product: Owens Corning “SillSeal®”.

2. Wood to Metal: Anchor using bolts, nuts, or other mechanical fasteners appropriate for the connection and loading.

a. Provide flat washers under all bolt heads and nuts.
b. Fasten plywood in accordance with APA recommendations.
c. Use fasteners sized to avoid penetrating through members where the opposite face is exposed to view or receives finish materials.
d. Install fasteners without splitting wood; pre-drill where required.
e. Do not drive threaded friction-type fasteners.
f. Tighten bolts and lag screws at installation and retighten as required.

3. Anchor wood to metal using bolts and nuts.
4. Provide flat washers under all bolt heads and nuts.
5. Fasten plywood in accordance with APA recommendations.
6. Use fasteners of size that will not penetrate members where opposite side will be exposed to view or receive finish materials.
7. Install fasteners without splitting of wood; predrill as required.
8. Do not drive threaded friction type fasteners.
9. Tighten bolts and lag screws at installation and retighten as required.

C. Set work to required levels and lines, plumb, true.

1. Shim as required.
2. Cut and fit accurately.

D. Blocking, Nailers, and Grounds

1. Provide wood grounds, nailers, or blocking where required for attachment of other work and surface applied items.

a. Form to shapes indicated or required.

2. Wood Fabrication:

a. Lumber and plywood may be cut, drilled, or ripped as required for installation.
b. Light sanding is permitted to remove raised grain or prepare surfaces for finish.
c. Field-treat cuts in preservative-treated wood only where such treatment is specified elsewhere.

3. Grounds:

a. Provide dressed, key-beveled lumber, minimum 1-1/2 inches wide, of thickness required to bring the face of the ground flush with finish materials.
b. Remove temporary grounds when no longer required.

E. When wood has been exposed to moisture allow to completely dry out prior to covering with additional wood or another material.

F. Correct or replace wood which shows bowing, warping or twisting to provide a straight, plumb and level substrate for applications of other materials.

END OF SECTION

DIVISION 07

THERMAL AND MOISTURE PROTECTION

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SECTION 07 84 00 - FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Firestopping of joints in fire resistance-rated construction, including through-wall penetrations, and membrane penetrations.
2. Smokestopping of joints, through-wall penetrations, and membrane penetrations of smoke-rated construction.
3. Firestopping assemblies.
4. Engineering Judgments furnished by manufacturers of firestopping materials.
5. Special Inspections.

6. Labeling of Firestopping Assemblies.

1.2 REFERENCES

A. Terminology:

1. Terminology indicated below are not defined terms and are not indicated with initial capital letters, but when used in this section have the meaning indicated below:

a. “Engineering judgement” means an evaluation of the anticipated performance of a firestopping materials or assembly that has not been fire tested (including but not limited to firestopping materials or systems that do not have a UL listing). Engineering judgements shall be governed by the International Firestop Council (IFC) Guidelines referenced in this Section and are based on the performance of listed firestopping materials and assemblies and generally accepted engineering principles. As indicated in the IFC guidelines, engineering judgements are issued by a firestopping product manufacturer’s technical engineering employee. Relative to this term, engineering judgements are not issued by and are not the responsibility of Engineer.
b. “Firestopping” means material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in fire rated wall and floor assemblies. The word “firestop” has the same meaning as “firestopping”.
c. “Smokestopping” means material or combination of materials used to retain integrity of smoke-rated construction by maintaining an effective barrier against the spread of smoke, and hot gases through penetrations in smoke-rated partitions and barrier assemblies. The word “smokestop” has the same meaning as “smokestopping.”

B. Reference Standards: Standards referenced in this section include, but are not necessarily limited to, the following:

1. ASTM International (ASTM):

a. E119, Fire Tests of Building Construction and Materials.
b. E814, Standard Method of Fire Tests of Through Penetration Fire Stops.

c. E1399, Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems.
d. E1966, Standard Test Method for Fire Resistive Joint Systems.
e. E2174, Standard Practice for On-site Inspection of Installed Fire Stops.
f. E2393, Standard Practice for On-site Inspection of Installed Fire Resistive Joint Systems and Perimeter Fire Barriers.

2. Firestop Contractors International Association's (FCIA):

a. Firestop Manual of Practice (MOP).

3. FM (FM):

a. FM 4991, Approval Standard for Firestop Contractors.
b. FM Approvals Guide (online product directory).

4. International Firestop Council (IFC):

a. Recommended IFC Guidelines for Evaluating Firestop Systems in Engineering Judgments (EJs), referred to herein as IFC Recommended Guidelines.
b. Firestop Inspection Pocket Guide.

5. UL Solutions (UL):

a. 263, Fire Tests of Building Construction and Materials.
b. 1479, Fire Tests of Through Penetration Fire Stops.
c. 2079, Standard for Tests for Fire Resistance of Building Joint Systems.

6. UL Solutions Product iQ (Online Product Directory):

a. Through Penetration Firestop Systems (XHEZ).
b. Joint Systems (XHBN).
c. Fill, Void, or Cavity Materials (XHHW).
d. Firestop Devices (XHJI).
e. Forming Materials (XHKU).
f. Wall Opening Protective Materials (CLIV).
g. Fire Resistance Ratings (BXRH).

1.3 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the Work required by this Section with other construction that must be performed prior to or concurrent with the Work of this Section.
2. Materials and assemblies furnished as part of the Work of this Section shall be furnished by a single manufacturer. Supplier shall ensure compatibility of all materials and assemblies furnished under this Section and compatibility with other materials with which the Work of this Section will come into contact.

B. Sequencing and Scheduling:

1. Perform installation of firestopping and smokestopping after completing installation of penetrating items and prior to covering or concealing of openings.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:

1. For required firestopping applications for which no qualified previously tested materials or system is commercially available through Supplier, submit to authority having jurisdiction an engineering judgment derived from similar qualified tested system designs or other tests for approval by the Authority Having Jurisdiction prior to installation. Upon Engineer's request, submit to Engineer copy of such engineering judgements and approval by the Authority Having Jurisdiction.
2. Engineering judgment documents shall comply with requirements of International Firestop Council.

B. Qualifications:

1. Design Professional:

a. Where Contractor proposes providing firestopping materials or assemblies that have not been fire tested (including but not limited to, firestopping materials or systems that do not have a UL listing), Supplier shall prepare engineering judgement, submit to, and obtain approval or acceptance by authority having jurisdiction. Such engineering judgement shall be prepared by, or under the direct, personal, supervision and control of design professional registered and licensed in the same jurisdiction as the Site, appropriate for the type of firestopping required.
b. Submit evidence of design professional's compliance with Contract requirements regarding licensure, registration, and insurance.
c. Engineering judgements shall bear design professional's seal, signature, and date.

2. Installer:

a. Entity that selects and installs firestopping materials and assemblies shall be an organization regularly engaged in and experienced in firestopping construction of the types and complexities similar to that required for the Work. Such entity shall be appropriately experienced in the type of Work required and shall possess current, valid, licensure and qualifications, in accordance with Laws and Regulations (where applicable) for the type of firestopping required.
b. Entities that select and install firestopping materials and assemblies shall possess one or more of the following as current, valid accreditations:

1) Hilti Accredited Firestop Specialty Contractor (HAFSC), or
2) Firestop Contractors International Association (FCIA) Levels 1 – 4.

c. In addition, entity selecting and installing firestopping materials and systems shall possess one or more of the following as current, valid certifications:

1) Approved Firestop Contractor in accordance with FM4991.
2) Qualified Firestop Contractor by UL Solutions.
3) Certification acceptable to NPS.

d. Should Contractor propose as entity selecting and installing firestopping an organization with alternative qualifications, accreditation, or certification submit for Engineer's approval appropriate substitution request in accordance with the Contract Documents.
e. Submit to Engineer documentation demonstrating installer's compliance with qualifications requirements of this provision.

1.5 SUBMITTALS

A. Action Submittals: Submit the following:

1. Product Data:

a. Manufacturer's listed firestopping product "design number".
b. For each item required under this Section, submit manufacturer's published product information, including data sheet (as applicable), clearly indicating materials, limitations, optional features that will be furnished and those options or features that will not be furnished.
c. Manufacturer's specifications.

B. Informational Submittals: Submit the following:

1. Engineering Judgements:

a. When UL or third-party listing is not available, provide a written engineering judgment in accordance with IFC Recommended Guidelines and requirements of this Section. Submit to Engineer copy of engineering judgement, sealed, signed, and dated by Supplier's design professional, together with documentation of approval or acceptance by Authority Having Jurisdiction.

2. Supplier Instructions:

a. Instructions for handling and installing.

3. Qualifications Statements:

a. Entity selecting and installing firestopping, in accordance with this Section's "Quality Assurance" Article.
b. Design professional in responsible charge of preparing engineering judgements, if any.

1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements:

1. Properly label packaging of firestopping and smokestopping materials and assemblies with associated UL label where applicable.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with the Contract Documents, provide the required quantity of materials and assemblies by one of the following for each of the associated material or assembly types required:

1. Through Penetration Firestop Systems:

a. Hilti.
b. Rectorseal.

c. 3M.
d. Specified Technologies. (STI).
e. Tremco.
f. Or approved equal.

2. Fire Resistive Joint Systems:

a. Hilti.
b. Rectorseal.
c. 3M.
d. Specified Technologies. (STI).
e. Tremco.
f. Or approved equal.

3. Firestop Track Seal or Gasket:

a. Hilti.
b. 3M.
c. Specified Technologies. (STI).
d. Or approved equal.

4. Firestop Devices:

a. Hilti.
b. 3M.
c. Specified Technologies. (STI).
d. Or approved equal.

5. Intumescent Pads, Wall Opening Protective Materials:

a. Hilti.
b. Rectorseal.
c. 3M.
d. Specified Technologies. (STI).
e. Tremco.
f. Or approved equal.

6. Fire Rated Cable Pathways:

a. Hilti.
b. 3M.
c. Specified Technologies. (STI).
d. Or approved equal.

7. Firestop Putty:

a. Hilti.
b. Rectorseal.
c. 3M.
d. Specified Technologies. (STI).
e. Tremco.
f. Or approved equal.

8. Forming Materials:

a. Johns Manville – MinWool.
b. Rockwool - Roxul.
c. Or approved equal.

9. Composite Sheet:

a. Hilti.
b. 3M.
c. Specified Technologies. (STI).
d. Or approved equal.

2.2 MATERIALS

A. Materials - General:

1. Installer of the Work under this Section shall select specific materials and systems appropriate for each specific firestopping and smoke stopping application required, in accordance with the Contract Documents and Laws and Regulations.
2. Provide firestopping materials and assemblies in accordance with ASTM E814, ASTM E1399, ASTM E2307, UL 1479 and UL 2079, as applicable.
3. Provide tested firestopping materials and assemblies that provide a fire rating equal to that of the construction being penetrated.
4. Firestopping materials and assemblies shall comply with Laws and Regulations, including applicable building code.
5. Previous Testing Required: Furnish only materials and assemblies where identical items were previously tested, under controlled conditions for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire resistance rating involved for each separate item. Such testing shall be in accordance with the following as applicable:

a. Openings and Penetrations: UL 1479 or ASTM E814.
b. Building Joint Systems: ASTM E1966 and ASTM E1399, or UL 2079.
c. Perimeter Fire Barrier Systems: ASTM E2307.

6. Where firestopping is not exposed to view, provide materials and assemblies of manufacturer's standard color.

B. Forming Materials:

1. Comply with ANSI/UL 263.
2. UL listed.
3. Product category BZJZ, Batts and Blankets.

C. Firestop Silicone Elastomer:

1. UL-listed.
2. Fill, Void or Cavity Materials: Product category XHHW.
3. Through Penetration Firestop Systems: Product category XHEZ.

D. Firestop Sealant:

1. UL-listed.
2. Provide as required by the item’s associated UL-listed design.

E. Firestop Putty:

1. UL-listed.
2. Product category QCSN or CLIV, Wall Opening Protective Materials.

F. Firestop collars:

1. UL-Listed.
2. Provide as required by the item's associated UL-listed design.

G. Fire Rated Cable Pathways:

1. UL-Listed.
2. Steel raceway and intumescent pads with adjustable smoke seal sleeve.
3. Fire resistance rating equal to rating of barrier penetrated.
4. Pathway devices:

    a. Allow 0 to 100 percent fill of cables.
    b. Firestopping shall adjust automatically to cabling installation and removal.

5. Size of firestopping shall accommodate quantity and size of cabling required by the Contract Documents plus and equal quantity of cabling installed in the future.
6. Provide cable management devices with gang plates for single or multiple devices.

H. Fire Barrier Pillows:

1. UL listed.
2. Provide pillow that are removable and reusable.
3. Provide pillows have self-locking feature.

I. Backer rod and compressible filler: UL listed, product category XHHW, Fill, Void or Cavity Materials.

J. Identification Labels:

1. Provide pressure-sensitive, self-adhesive, preprinted labels complying with the following.

    a. Tamper proof.
    b. Permanent and weatherproof.
    c. UV stabilized labelling, text, and colors.
    d. Provide labels with preprinted text. Handwritten text on labels is unacceptable.

2. Each firestopping label shall clearly indicate the following:

    a. Firestop Joint Systems:

        1) The words "Warning-Firestop System-Do Not Disturb. Notify Building Management of Any Damage."

    b. Through-Penetration Firestop Systems:

        1) The words "Warning-Through Penetration Firestop System-Do Not Disturb. Notify Building Management of Any Damage."

    c. Name and telephone number of Contractor and installer.
    d. Through-Penetration firestop listing designation or EJ number.

e. Date of Installation, in the form of month, date, year.
f. Through-Penetration firestopping materials and system manufacturer.
g. Installing Technician's Name.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Verify existing conditions and substrates before starting the Work of this Section. Remedy unsatisfactory conditions before proceeding.

B. Installing the Work constitutes Contractor's approval of underlying work, substrates, and field conditions prevailing at the time of the Work.

3.2 INSTALLATION

A. Installation - General:

1. Provide the Work of this Section in accordance with the Contract Documents, Laws and Regulations (including applicable building code), and material, system manufacturer's written installation instructions, and UL listing requirements to provide required fire-resistance rating. When UL listing is not available, install in accordance with approved written engineering judgment. When any such requirements conflict, obtain written interpretation or clarification from Engineer before proceeding further.
2. Provide firestopping materials and systems in accordance with ASTM E814, ASTM E1399, ASTM E2307, UL 1479 and UL 2079, as applicable.
3. Where firestopping will be exposed to view, provide materials and systems of colors matching adjacent construction. Alternatively, if approved by manufacturer of materials and systems and following inspection and approval by Authority Having Jurisdiction, field-paint materials and systems to match color of adjacent construction. Such field-painting shall be in accordance with Section 09 91 00 - Architectural Painting.
4. Do not install firestopping or smoke stopping materials or assemblies when the ambient temperature of the installation location does not comply with manufacturer's written installation instructions for duration of installation and curing.
5. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating or marring adjacent surfaces.

B. Openings and Penetrations:

1. Provide firestopping materials and assemblies for each opening, through-penetration, and membrane penetration in fire-resistant rated construction.
2. Provide Flame (F), Thermal (T), Smoke (L), and Water (W) rated assemblies as necessary to comply with Laws and Regulations (including applicable building code).

C. Building Joint Systems:

1. Provide firestopping materials and assemblies for each joint assembly in or between fire-resistance-rated walls, floors or floor/ceiling assemblies and roofs or roof/ceiling assemblies.

D. Identification:

1. Install firestopping labelling permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be readily visible.
2. Provide identification in accordance with FCIA MOP and FM 4991.

3.3 FIELD QUALITY CONTROL

A. Field Tests and Inspections:

1. Special Inspections of firestopping and smoke stopping Work will be in accordance with the applicable building code.

END OF SECTION

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SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Sealing all joints which will permit penetration of dust, air or moisture.

B. Related Specification Sections include but are not necessarily limited to:

1. Section 07 84 00 - Firestopping.
2. Section 09 91 00 – Architectural Painting.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):

a. C834, Standard Specification for Latex Sealants.
b. C920, Standard Specification for Elastomeric Joint Sealants.
c. C1521, Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints.

2. Underwriters Laboratories, Inc. (UL).

B. Qualifications: Sealant applicator shall have minimum five years experience using products specified on projects with similar scope.

1.3 DEFINITIONS

A. Defect(ive): Failure of watertightness or airtightness.

B. Finish sealant: Sealant material per this specification applied over face of compressible sealant or expanding foam sealant specified, to provide a finished, colored sealant joint.

C. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
2. Installer and applicator are synonymous.

D. "Seal," "sealing" and "sealant": Joint sealant work.

1.4 SUBMITTALS

A. Shop Drawings and Product Data:

1. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.
b. Manufacturer's installation instructions.
c. Manufacturer's recommendations for joint cleaner, primer, backer rod, tooling and bond breaker.

2. Certification from sealant manufacturer stating product being used is recommended for and is best suited for joint in which it is being applied.
3. Certification of applicator qualification.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver material in manufacturer's original unopened containers with labels intact: Labels shall indicate contents and expiration date on material.

1.6 PROJECT CONDITIONS

A. Schedule installation of sealant work after completion of penetrating item installation but prior to covering or concealing of openings.

B. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

C. Do not proceed with the installation of sealant materials when the ambient temperature is outside the manufacturer’s recommended limitations for installation and curing times as printed on the product label and product data sheet.

D. During installation provide masking and drop cloths to prevent sealant materials from contaminating any adjacent surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Polyurethane sealants:

a. Pecora Corporation.
b. Sika.
c. Master Builders Solutions.
d. Tremco Commercial Sealants & Waterproofing.
e. Or equal.

2. Backer rod, compressible filler, primer, joint cleaners, bond breaker:

a. As recommended by sealant manufacturer.

2.2 MATERIALS

A. Sealants - General:

1. Provide colors matching materials being sealed.
2. Where compound is not exposed to view in finished work, provide manufacturer's color which has best performance.
3. Nonsagging sealant for vertical and overhead horizontal joints.
4. Sealants for horizontal joints: Self-leveling pedestrian/traffic grade.
5. Joint cleaner, primer, bond breaker: As recommended by sealant manufacturer.
6. Sealant backer rod and/or compressible filler:

    a. Closed cell polyethylene, polyethylene jacketed polyurethane foam, or other flexible, nonabsorbent, non-bituminous material recommended by sealant manufacturer to:

        1) Control joint depth.
        2) Break bond of sealant at bottom of joint.
        3) Provide proper shape of sealant bead.
        4) Serve as expansion joint filler.

B. Polyurethane Sealant:

1. One or two components.
2. Paintable.
3. Meet ASTM C920 Type S or Type M, Grade NS or P, Class 25, Use NT, T, M, A and O.

    a. Pecora Dynatrol-IXL, Dynatrol II, Urexpan NR-200, NR-201.
    b. Sika Chemical Corporation Sikaflex-1a, Sikaflex-2C NS/SL.
    c. Master Builders Solutions MasterSeal NP-1, NP-II, SL-1 SL-2.
    d. Tremco Dymonic or Dymeric, Vulkem 116,227,45,245.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before use of any sealant, investigate its compatibility with joint surfaces, fillers and other materials in joint system.

B. Use only compatible materials.

C. Where required by manufacturer, prime joint surfaces.

1. Limit application to surfaces to receive sealant.
2. Mask off adjacent surfaces.

D. Provide joint depth for joints receiving polyurea joint filler in accordance with manufacturer's recommendations.

3.2 INSTALLATION

A. Install products in accordance with manufacturer's instructions and UL requirements.

B. Clean all joints.

C. Make all joints water and airtight.

D. At changes in direction of joints, joint intersections and where sealant joints interface with other construction, install continuous sealant as necessary to ensure a weather-tight seal.

E. Make depth of sealing compounds not more than one-half width of joint, but in no case less than 1/4 inches nor more than 1/2 inches unless recommended otherwise by the manufacturer.

F. Provide correctly sized backer rod, compressible filler or compressible sealant in all joints to depth recommended by manufacturer:

1. Take care to not puncture backer rod and compressible filler.
2. Provide joint backer rod as recommended by the manufacturer for polyurea joint filler.

G. Apply bond breaker where required.

H. Tool sealants using sufficient pressure to fill all voids.

I. Upon completion, leave sealant with smooth, even, neat finish.

3.3 SEALANT WORK

A. General:

1. Work includes but is not limited to: Sealing all joints which will permit penetration of dust, air, or moisture.
2. Refer to SCHEDULE for materials to be used.
3. See Specification Section 07 84 00 for firestopping.

B. Wood trim.

C. Openings:

1. Perimeters of door frames.
2. Door thresholds shall be set in a full bed of sealant.

3.4 SCHEDULE

A. Furnish sealant as indicated for the following areas:

1. Exterior areas:

a. Above grade: Polyurethane.
b. Below grade: Polyurethane.

2. Interior areas:

a. Noncorrosive areas:

1) Dry exposure: Polyurethane, unless noted otherwise.

END OF SECTION

DIVISION 09

FINISHES

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SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Gypsum board.

B. Related Specification Sections include but are not necessarily limited to:

1. Section 06 10 00 - Rough Carpentry.
2. Section 09 91 00 - Architectural Painting.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):

a. A653/A653M, Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.C475/C475M, Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board.
b. C840, Standard Specification for Application and Finishing of Gypsum Board.
c. C1002, Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.
d. C1047, Standard Specification for Accessories for Gypsum Wallboard and Gypsum Veneer Base.C1396/C1396M, Standard Specification for Gypsum Board.
e. D3273, Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.

2. Gypsum Association (GA):

a. GA-214, Recommended Levels of Gypsum Board Finish.

3. UL Solutions (UL):

a. Building Materials Directory.
b. Fire Resistance Directory.

1.3 SUBMITTALS

A. Shop Drawings and Product Data:

1. Product technical data.

1.4 DEFINITIONS

A. Wet Area:

1. Toilet rooms, showers, laboratories, janitor closets, or similar areas.
2. Areas within 5 feet of emergency showers, eye wash stations, service sinks, or mop sinks.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Gypsum board and accessories:

a. American Gypsum.
b. Georgia-Pacific Gypsum LLC.
c. National Gypsum.
d. USG Corporation.

2. Coated Fiber-faced Gypsum Board:

a. Georgia-Pacific Gypsum LLC.
b. USG Corporation.

2.2 MATERIALS

A. General:

1. Provide UL Listed materials in fire-resistant rated construction.
2. Furnish in lengths as long as practicable.

B. Gypsum Board (GB):

1. ASTM C1396/C1396M.
2. Thickness: 5/8 inches unless noted otherwise.
3. Edges: Tapered.
4. Fire-rated board: Type X.

2.3 ACCESSORIES

A. Fasteners:

1. Gypsum board:

a. ASTM C1002.
b. Self-drilling, corrosion-resistant bugle head screws.

1) For fastening gypsum board to wood framing: Type W.

2. Cement backer board:

a. Self-drilling, corrosion resistant wafer head screws with strip-out prevention ribs.
b. Do not use drywall screws.

B. Adhesive: As recommended by board manufacturer.

C. Joint Tape:

1. ASTM C475/C475M.
2. Recommended by manufacturer for specified board type and location.

D. Joint Treatment Compound:

1. ASTM C475/C475M.
2. Recommended by manufacturer for specified board type and location.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Verify that wood stud framing has been installed plumb, true, and in accordance with the Contract Documents.
2. Prior to application of gypsum board, ensure that all blocking, backing, and bracing has been installed as necessary for the support of appurtenant items.
3. Install gypsum board in accordance with ASTM C840.
4. Install board in fire-rated construction in accordance with UL requirements.
    a. Self-adhesive applied fire rated tape is not acceptable for use on board joints in fire rated walls.
    b. Tape all joints using conventional fire rated joint tape and joint treatment compound.
5. Erect all board vertically with edges over supporting members.
6. Secure to each support or framing member with screws.
    a. Provide fasteners of sufficient length to penetrate framing member or stud not less than 3/8 inches.
7. In curved wall or ceiling applications use 1/4 inches thick board specifically designed for use in radius construction.
    a. Apply in multiple layers as required to meet minimum drywall thickness specified.
8. In areas having gypsum board ceilings and walls, install ceiling first.
9. Bring boards into contact, but do not force into place.
10. Fit neatly and carefully.
11. Stagger edge joints on opposite side of a partition so they occur on different framing members.
12. Hold board in firm contact with support while fasteners are being driven.
13. Proceed with attachment from center of board toward ends and edges.
14. Scribe board prior to cutting.
15. Where gypsum board abuts concrete, masonry, metal deck, exterior doors and windows, or other dissimilar material; provide 3/8 inches joint between edge of gypsum board and abutting material.

a. Provide continuous casing bead trim on edge of board.
b. Seal joint with sealant and backer rod.
c. See Specification Section 07 92 00 for sealant.

B. Installation:

1. Set fasteners between 3/8 and 1/2 inches from edges and 2 inches in from board corner.

a. Space maximum of 12 inches on center at edges and in field of board.
b. Where board butts at wall/ceiling juncture, hold fasteners back 6 inches from edges.
c. Space fasteners closer if required by UL.

2. Install fasteners, in gypsum board, so that head rests in a slight dimple without cutting face paper or fracturing core or as recommended by board/panel manufacturer.

C. Gypsum Board Finishing:

1. Provide the following minimum levels of gypsum board finish in accordance with GA-214.

a. Areas exposed to view:

1) Surfaces to receive vinyl wall covering: Level #4.
2) Surfaces to receive painted finish: Level #5.

b. Areas not exposed to view:

1) Fire rated partitions: Level #2 unless a higher grade of finish is required by UL.
2) Non-fire rated partitions: Level #2.

2. Provide additional coats of joint compound as required to completely conceal joints, fasteners, accessories, and surface imperfections.

a. Joint photographing, telegraphing, or visible joint ridges will not be acceptable.

3. Sand each coat to remove excess joint compound.

a. Avoid damaging or roughing the gypsum board paper surface.

4. Finish surface shall be smooth and free of tool marks, ridges and visible transitions.
5. Patching and Repair Requirements:

a. Where existing gypsum board surfaces are patched, repaired, or infilled, finish patched areas to match the surrounding wall or ceiling texture and smoothness.
b. Feather edges as required to eliminate visible transitions between new and existing surfaces.
c. Provide finish level equal to adjacent surfaces unless otherwise indicated.

6. Coordination With Painting:

a. Coordinate with Section 09 91 00 to ensure that repainted areas extend edge-to-edge and corner-to-corner of affected walls or ceilings to achieve uniform color and sheen.
b. After primer application, inspect all surfaces and repair, refinish, and re-prime areas exhibiting defects, texture mismatches, or visible patch lines.

7. Refer to ASTM C840 for additional finishing requirements.

END OF SECTION

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SECTION 09 91 00 - ARCHITECTURAL PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Surface Preparation.
2. Field application of:

a. Architectural Coatings.
b. Any other coating, thinner, accelerator, inhibitor, etc., specified or required as part of a complete System specified in this Specification Section.

3. Environmental controls for field application of coatings.

B. Related Specification Sections include but are not necessarily limited to:

1. Section 09 29 00 - Gypsum Board.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. ASTM International (ASTM):

a. D523, Standard Test Method for Specular Gloss.
b. E84, Standard Test Method for Surface Burning Characteristics of Building Materials.

2. Steel Door Institute/American National Standards Institute (SDI/ANSI):

a. A250.10, Test Procedure and Acceptance Criteria For Prime Painted Steel Surfaces for Steel Doors and Frames.

3. The Society for Protective Coatings (SSPC):

a. SP 1, Solvent Cleaning.
b. SP 2, Hand Tool Cleaning.
c. SP 3, Power Tool Cleaning.
d. SP 16, Brush-off Blast Cleaning of Non-Ferrous Metals.

4. The Society for Protective Coatings/NACE International (SSPC/NACE):

a. SP 6/NACE No. 3, Commercial Blast Cleaning.
b. SP 7/NACE No. 4, Brush-off Blast Cleaning.
c. SP 13/NACE No. 6, Surface Preparation of Concrete.

5. United States Environmental Protection Agency (EPA).

1.3 DEFINITIONS

A. Installer or Applicator:

1. Installer or applicator is the person actually installing or applying the product in the field at the Project site.
2. Installer and applicator are synonymous.

B. Approved Factory Finish: Finish on a product in compliance with the finish specified in the Specification Section where the product is specified.

C. Exposed Exterior Surface:

1. Exterior surface which is exposed to view.
2. Exterior surface which is exposed to weather but not necessarily exposed to view.

D. Finished Area:

1. An area that is indicated on Drawings to be painted.

E. Gloss Range:

1. Specular gloss measured in accordance with ASTM D523:

a. Flat: Below 15, at 60 degrees.
b. Eggshell: Between 20 and 35, at 60 degrees.
c. Semi-gloss: Between 35 and 70, at 60 degrees.
d. Gloss: More than 70, at 60-degrees.

F. Paint includes the following:

1. Architectural paints (AP) include: Acrylic latex or alkyd enamel coatings.

1.4 SUBMITTALS

A. Shop Drawings and Product Data:

1. Product technical data including:

a. Acknowledgement that products submitted meet requirements of standards referenced.
b. Manufacturer's surface preparation instructions.
c. Manufacturer's application instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver in original containers, labeled as follows:

1. Name or type number of material.
2. Manufacturer's name and item stock number.
3. Contents, by volume, of major constituents.
4. Warning labels.

5. VOC content.

B. Store materials in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees F.

1.6 PROJECT CONDITIONS

A. Verify that atmosphere in area where painting is to take place is within paint manufacturer's acceptable temperature, humidity, and sun exposure limits.

1. Provide temporary heating, shade and/or dehumidification as required to bring area within acceptable limits.

a. Provide temporary dehumidification equipment properly sized to maintain humidity levels required by paint manufacturer.
b. Provide clean heat with heat exchanger type equipment sufficient in size to maintain temperature on a 24 hour basis.

1) Vent exhaust gases to exterior environment.
2) No exhaust gases shall be allowed to vent into the space being painted or any adjacent space.

2. Do not apply coatings in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide products from a single manufacturer to the greatest extent practicable.

B. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Architectural paints:

a. Benjamin Moore & Co.
b. PPG.
c. Pratt & Lambert.
d. Sherwin-Williams.
e. Tnemec, Inc.

2.2 MATERIALS

A. General:

1. For unspecified materials such as thinner, provide manufacturer's recommended products.
2. Unless noted otherwise, products listed are manufactured by the manufacturer listed below.

a. Products of other manufacturers will be considered for use provided that the product:

1) Is of the same generic formulation.
2) Has comparable application requirements.

3) Meets the same VOC levels or better.
4) Provides the same finish and color options.

3. Coatings shall comply with the VOC limits of EPA.
4. Colors:

a. Paint color(s) and gloss shall match existing adjacent finishes or shall be selected by the Park from the manufacturer's full standard and premium offerings. All color and gloss selections shall be submitted for NPS approval prior purchasing and application.

B. Architectural Paints:

1. Product List:

Generic Description	Product
Acrylic Primer	PPG Pure Performance 9-900
Acrylic Latex	PPG Pure Performance 9-100/9-300/9-500 Series
Epoxy Barrier Coat	Tnemec Series 135 Chembuild
HDP Acrylic	Tnemec Series 1028/1029 Enduratone
Polycarbamide	Tnemec Series 740/750 UVX

2.3 PAINT SYSTEMS

A. Schedule:

Substrate	Prime Coat[1]	Intermediate Coat(s)[1]	Finish Coat[1]
Gypsum Board scheduled to receive "AP"	300 to 400 square feet/GAL Acrylic Primer	300 to 400 square feet/GAL Acrylic Latex [2]	300 to 400 square feet/GAL Acrylic Latex [2]

1. Application rates (SF/GAL) shown are for unthinned materials.
2. Sheen as scheduled or selected.

PART 3 - EXECUTION

3.1 ITEMS TO BE PAINTED

A. Interior Areas:

1. Refer to Room Finish Schedule on Drawings.

a. If space is scheduled to be painted, paint all appurtenant surfaces within the space unless specifically noted otherwise.
b. Provide coating manufacturer's recommended bonding primer.
c. Appurtenant surfaces include but are not limited to:

1) Infilled wall area.

a) Paint color to match existing surfaces.

2) Sprinkler piping

a) Paint to be compatible with CPVC sprinkler pipe.
b) Paint color to match existing surfaces.

3.2 ITEMS NOT TO BE PAINTED

A. General: Do not paint items listed in this Article, unless noted otherwise.

B. Items with Approved Factory Finish: These items may require repair of damaged painted areas or painting of welded connections.

C. Moving parts of mechanical and electrical units where painting would interfere with the operation of the unit.

D. Code labels, equipment identification or rating plates and similar labels, tagging and identification.

E. Contact surfaces of friction-type structural connections.

F. Galvanized steel items, unless specifically noted to be painted.

G. Architectural finishes:

1. Plastic laminate.
2. Solid surface material.
3. Standing and running trim.
4. Anodized aluminum.
5. PVDF coated metals.
6. Factory finished doors and frames.
7. Finish hardware.
8. Glass and glazing.

3.3 PREPARATION

A. General:

1. Prepare surfaces to be painted in accordance with paint manufacturer's instructions and this Specification Section unless noted otherwise in this Specification Section.

a. Where discrepancy between paint manufacturer's instructions and this Specification Section exists, the more stringent preparation shall be provided unless approved otherwise, in writing, by the Engineer.

2. Remove all dust, grease, oil, compounds, dirt, and other foreign matter which would prevent bonding of paint to surface.
3. Adhere to manufacturer's recoat time surface preparation requirements.

a. Surfaces that have exceeded paint manufacturer's published recoat time and/or have exhibited surface chalking shall be prepared prior to additional paint in accordance with manufacturer's published recommendations.

B. Protection:

1. Protect surrounding surfaces not to be coated.
2. Remove and protect hardware, accessories, plates, fixtures, finished work, and similar items; or provide ample in-place protection.
3. Protect code labels, equipment identification or rating plates and similar labels, tagging and identification.

C. Prepare and paint before assembly all surfaces which are inaccessible after assembly.

D. Existing Surfaces:

1. Wherever existing work is cut, patched, or modified; repair and repaint to match new work.
2. Where a wall or ceiling is disturbed and patched, paint entire wall or ceiling.

E. Gypsum Wallboard:

1. Repair minor irregularities left by finishers.
2. Avoid raising nap of paper face on gypsum wallboard.
3. Verify moisture content is less than 8% before painting.
4. After application of prime coat and between subsequent coats, inspect surface and repair holes, dents, irregularities, or other defects as necessary to provide a smooth, uniform finish.

3.4 APPLICATION

A. General:

1. Thin, mix and apply paints in accordance with manufacturer's installation instructions.

a. Where discrepancy exists between manufacturer’s instructions and this Specification Section, the more stringent requirement shall apply.
b. When materials have been thinned, adjust application rates as necessary to achieve film coverage indicated in Part 2 for unthinned materials.
c. Backroll spray applied paints.

2. Temperature and weather conditions:

a. Do not paint surfaces when surface temperature is below 50 degrees F unless product has been formulated specifically for low temperature application and application is approved in writing by Engineer and paint manufacturer's authorized representative.
b. Avoid painting surfaces exposed to hot sun.
c. Do not paint on damp surfaces.

3. Apply materials under adequate illumination.
4. Evenly spread to provide full, smooth coverage.

a. All paint systems are "to cover."

1) When color or undercoats show through, apply additional coats until paint film is of uniform finish and color.

b. Finished paint system shall be uniform and without voids, bugholes, holidays, laps, brush marks, roller marks, runs, sags or other imperfections.

5. If so directed by Engineer, do not apply consecutive coats until Engineer has had an opportunity to observe and approve previous coats.
6. Work each application of material into corners, crevices, joints, and other difficult to work areas.
7. When painting rough surfaces, hand brush and backroll paint to work into all recesses.
8. Smooth out runs or sags immediately or remove and recoat entire surface.
9. Allow preceding coats to dry before recoating.

   a. Recoat within time limits specified by paint manufacturer.
   b. If recoat time limits have expired re-prepare surface in accordance with paint manufacturer's printed recommendations.

10. Allow coated surfaces to cure prior to allowing traffic or other work to proceed.
11. Finish colors not indicated otherwise shall be selected by Engineer from paint manufacturer’s complete offering.

B. Fillers, surfacers, or patching compounds:

1. Provide fillers, surfacers, or patching compounds in accordance with manufacturer’s recommendations and as specified herein as necessary to provide a smooth, defect free substrate.

C. Prime Coat Application:

1. Prime all surfaces indicated to be painted.

   a. Apply prime coat in accordance with paint manufacturer's written instructions and as written in this Specification Section.

2. Ensure field-applied paints are compatible with factory-applied paints or existing coatings.

   a. Employ services of coating manufacturer's qualified technical representative.

      1) Certify through material data sheets.
      2) Perform test patch.

   b. If field-applied coating is found to be not compatible, require the coating manufacturer's technical representative to recommend, in writing, product to be used as barrier coat, thickness to be applied, surface preparation and method of application.
   c. At Contractor's option, coatings may be removed, surface re-prepared, and new coating applied using appropriate paint system listed in the MATERIALS Article, Paint Systems paragraph of this Specification Section.

      1) All damage to surface as result of coating removal shall be repaired to original condition or better by Contractor at no additional cost to Owner.

3. Special coatings prime coat application:

   a. Prime new gypsum board surfaces using sealer as recommended by manufacturer.

      1) Apply at rate per manufacturer’s recommendation.

   b. Prime and fill new concrete and masonry using sealer coat as recommended by manufacturer followed by modified epoxy filler as specified.

c. Prime filled concrete and masonry surfaces with primer at rates and as recommended by manufacturer.

4. Touch up damaged primer coats prior to applying finish coats.

a. Restore primed surface equal to surface before damage.

D. Finish Coat Application:

1. Apply finish coats in accordance with paint manufacturer's written instructions and in accordance with this Specification Section.
2. Touch up damaged finish coats using same application method and same material specified for finish coat.

a. Prepare damaged area in accordance with the PREPARATION Article of this Specification Section.

3.5 FIELD QUALITY CONTROL

A. Application Deficiencies:

1. Surfaces showing runs, laps, brush marks, telegraphing of surface imperfections or other defects will not be accepted.
2. Surfaces showing evidence of fading, chalking, blistering, delamination or other defects due to improper surface preparation, environmental controls or application will not be accepted.

B. Provide protection for painted surfaces.

1. Surfaces showing soiling, staining, streaking, chipping, scratches, or other defects will not be accepted.

C. Measure surface temperature of items to be painted with surface temperature gage specifically designed for such.

D. Measure substrate humidity with humidity gage specifically designed for such.

E. Provide wet paint signs.

3.6 CLEANING

A. Clean paint spattered surfaces.

1. Use care not to damage finished surfaces.

B. Remove masking, adhesive residue or other foreign materials.

C. Upon completion of painting, replace hardware, accessories, plates, fixtures, and similar items.

D. Remove surplus materials, scaffolding, and debris.

END OF SECTION

DIVISION 21

FIRE SUPPRESSION

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SECTION 21 05 00 - FIRE PROTECTION SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Furnish labor, materials, tools, equipment, and services for Fire Protection Systems, as indicated, in accordance with provisions of Contract Documents.

B. Section Includes:

1. Sprinkler systems, NFPA13D wet-pipe.
2. Fire protection piping.
3. Access Panels
4. Modular Soffit System.

C. Related Specification Sections include but are not necessarily limited to:

1. Division 01 - General Requirements.

D. Completely coordinate with work of other trades.

1.2 QUALITY ASSURANCE

A. General:

1. Workmanship and appearance to maintain the building's historical fabric.
2. Use only new material of first-class construction, designed, and guaranteed to perform service required.
3. Provide fully operational systems.
4. Provide complete fire protection systems as described in the Contract Documents and according to criteria of authority (ies) having jurisdiction (AHJ).

    a. Where system requirements as described in the Contract Documents exceed those of the AHJ, meet requirements of both.
    b. Where discrepancies exist among the AHJ requirements, and Contract Documents, the most stringent requirements shall take precedence.

B. Authorities Having Jurisdiction:

1. NPS MWR Structural Fire Protection Manager.

C. Referenced Standards:

1. Latest edition of referenced criteria applies.
2. National Fire Protection Association (NFPA):

    a. 13D, Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes.
    b. 70, National Electrical Code (NEC).
    c. 72, National Fire Alarm and Signaling Code.

3. Underwriter's Laboratories (UL).
4. National Park Service Reference Manual 58 Structural Fire Management.

D. Qualifications:

1. Designer Qualifications:

a. Fire protection systems shall be designed by a NICET Level III designer or licensed Fire Protection Engineer.
b. Drawings to include certification, signature, and registration number of the certified technician.

2. Installer Qualifications:

a. Fire protection system installation shall be supervised onsite, by a minimum NICET Level II technician.
b. Fire Protection Installer shall be licensed and shall provide evidence of the successful completion of at least five projects of equal or greater size and complexity.
c. Use workmen skilled in this trade.

1.3 SYSTEM DESCRIPTION

A. Design Requirements:

1. Design fire sprinkler systems per NFPA 13D, latest edition.

a. Obtain water supply fire flow test prior to designing systems.

1) Provide a fire hydrant flow test in accordance with NFPA 291 if one has not been completed within 12 months of the working plan submittal.

b. Compare flow test results to those listed below and use lowest pressure of the two to design systems.

1) Hydrant flow test results:

a) Date: 12/10/2025.
b) Static pressure: 97 PSIG.
c) Residual pressure: 54 PSIG.
d) Flow: 839 GPM.

2. Design systems using adjusted water supply curve:

a. Adjust the flow test water supply curve to correspond with the low hydraulic grade line as provided by the water supplier.
b. Adjust the flow test water supply curve to correspond with the actual site elevation.

3. Scope of work is comprehensive and includes all design, coordination, approvals, materials, labor, installation, testing, and approvals that results in a complete NFPA 13D compliant automatic fire sprinkler system(s) for buildings as indicated on the Contract Drawings.
4. All areas are to be fully sprinklered unless indicated otherwise on the Contract Drawings.

B. Completely coordinate work of this Specification Section with all other work in order to provide a complete and workable system acceptable to fire authorities and in accordance with the Contract Documents.

1.4 SUBMITTALS

A. Shop Drawings:

1. See Division 01 Specifications for requirements for the mechanics and administration of the submittal process.
2. Submit complete layout drawings of sprinkler systems, alarm and signal devices, and product data as complete package.

a. Shop drawings, hydraulic calculations, and product data submittal PDF's must be bookmarked.

1) Shop drawings must be bookmarked per sheet.
2) Hydraulic calculations must be bookmarked per remote area.
3) Product data must be bookmarked per product.

3. Submit wiring diagrams of control, alarm, and signal devices.
4. Indicate hazard classification of all sprinkled spaces on Shop Drawings.
5. Submit complete hydraulic calculations for all portions of the sprinkler system.
6. Submit catalog data and specifications for all manufactured components supplied as part of the fire protection system.

B. Certifications:

1. Certification that all plans and calculations, including sprinkler flow calculations have been approved by all agencies with jurisdiction.
2. Certification that all required post installation tests and inspections have been completed and approved by all agencies with jurisdiction.

C. Contract Closeout Information:

1. Operation and Maintenance Data:

a. See Division 01 Specifications for requirements for the mechanics, administration, and the content of Operation and Maintenance Manual submittals.

D. Recommended Spare Parts: Spare parts inventory with individual cost.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Alarm and Signal Devices:

a. Potter Electric Signal.

b. System Sensor.
c. Or equal

2. Sprinklers:

a. Reliable Automatic Sprinkler Co., Inc.
b. Tyco Fire Products, LP.
c. Victaulic Co.
d. The Viking Corporation.

3. Fire Sprinkler Alarm Valves:

a. Reliable Automatic Sprinkler Co., Inc.
b. Tyco Fire Products, LP.
c. Victaulic Co.
d. The Viking Corporation.

4. Control Valves:

a. American Fire Products Company.
b. Clow Valve Co.
c. Kennedy Valve.
d. Mueller Company.
e. NIBCO, Inc.
f. Reliable Automatic Sprinkler Co., Inc.
g. The Viking Corporation.
h. Tyco Fire Products, LP.
i. Victaulic Co.
j. Watts Regulator Company.

5. Backflow Prevention Devices:

a. Ames Company, Inc.
b. Conbraco Industries, Inc.
c. FEBCO / Watts Technologies, Inc.
d. Mueller Company.
e. Watts Regulator Company.
f. Zurn Wilkins Industries LLC.

6. Pipe Hangers:

a. Allied Rubber & Gasket Co.
b. Anvil International LLC.
c. Cooper B-Line / Tolco.
d. ERICO International Corp.
e. Ferguson Enterprises, Inc.
f. Hilti, Inc.
g. PHD Manufacturing, Inc.

7. Access Panel:

a. Larsen’s Manufacturing (or equal).
b. Acudor (or equal).
c. Babcock-Davis (or equal).
d. Provide equal products upon approval by NPS COR.

8. Modular Soffit System

a. DecoShield (or equal).
b. JG Innovations (Soffi-Steel) (or equal).
c. Provide equal products upon approval by NPS COR.

B. Submit request for substitution in accordance with Division 01 Specifications.

2.2 MATERIALS

A. Use only new, unused material, designed and guaranteed to perform service required and approved by NFPA.

B. Pipe and Fittings:

1. Pipe and fittings from the existing water service shutoff valve to the residential riser manifold shall be Type L Copper.
2. Pipe and fittings from the top of the residential riser manifold to the extents of the NFPA 13D sprinkler system shall be CPVC
3. Optional pipe materials and joining methods approved by NFPA 13 are allowed if in accordance with applicable agency approval requirements.

2.3 MANUFACTURED UNITS

A. Pipe Hangers:

1. All-purpose type, UL listed and FM approved.
2. Space in accord with requirements of NFPA.
3. Hangers, hanger rods, inserts, and clamps constructed as approved by NFPA.

B. Valves:

1. General:

a. UL and FM approved.
b. Minimum: 175 PSI class.

2. Gate valves (with or without tamper switch).
3. Butterfly valves (with or without tamper switch).
4. Check valves.
5. Detector check valve:

a. 175 LB UL listed, FM approved iron body, cast iron bronze clapper with lead filled brass counterweight, neoprene O-ring seal, tapped bosses each side for bypass meter trim, flanged.

6. Alarm check valve:

a. 175 LB UL listed, FM approved iron body, cast bronze clapper, neoprene O-ring seal, tapped bosses for and with water pressure gages, alarm test valve, main drain valve, alarm retarding chamber.

b. Include angle valves, globe valves, alarm line strainer, orifice restriction, pipe nipples, and fittings.

C. Sprinkler Heads:

1. General:

a. Provide heads of type required for service indicated.
b. Standard 155 DEGF rating except when application requires higher rating.
c. In no case use heads rated less than 50 DEGF higher than anticipated ambient temperature.
d. All sprinklers UL listed.
e. Head application:

1) Basement: Type 1.
2) All rooms on first and second level: Type 2 except as indicated.
3) Sprinkler head Type 1:

a) Upright or pendent design as required.
b) Standard bronze finish.
c) Provide headguard.

4) Sprinkler head Type 2:

a) Horizontal sidewall design.
b) White finish.

D. Alarm and Signal Devices:

1. Water-flow detector:

a. Vane type flow switch with retard mechanism or manual adjustment to prevent false alarm.
b. 175 PSI rated.
c. 115 VAC/30 VDC rated for pilot duty only.
d. Suitable for working pressure of 150 PSI with sensitivity adjusting screw.
e. Provide with contacts for remote signal wiring.

2. Valve tamper switch:

a. 115 VAC/30 VDC.
b. Switches for butterfly valves to be UL approved.

3. Pressure gages:

a. 3-1/2 IN dial, phosphor bronze tube, brass socket, 300 PSI range.

E. Access Panel:

1. Non-fire-rated, flush access panel for all surfaces (gypsum board, plaster, masonry, or similar).
2. Material: 16–18 gauge steel door with steel frame.
3. Finish: Factory-primed or powder-coated for field painting.
4. Lock/Latch: Cylinder lock or screwdriver-operated cam latch.
5. Hinges: Continuous concealed hinge or piano hinge allowing full door opening.
6. Minimum Door Size: As shown on plans; not less than 16" x 16" unless otherwise approved.

F. Modular Soffit System

1. System Description:

    a. Modular snap-fit cover units with concealed snap-lock or equivalent connection to support devices that render covers essentially irremovable with ordinary tools once installed.
    b. Profiles: L-profile for sidewall/corner installations and U-profile for pendant/flat surface installations.
    c. Joints: Internal splice couplings and/or interlocking male/female joints. External couplings not permitted on metallic systems

2. Option A: Metallic Cover System

    a. Covers: Factory-fabricated steel, minimum 24 gauge galvannealed (A60/G90) or equivalent corrosion-resistant steel; smooth finish; factory powder-coated or paint-grip for field finishing.
    b. Support/Attachment Devices: Concealed spring-steel clips, minimum 21 gauge zinc-plated spring steel or equivalent, reverse-curvature design to resist easy removal; each clip capable of resisting not less than 100 lb uplift at free end, verified by manufacturer test data.
    c. Accessories: Tamper-resistant end caps, prefabricated corners, wall flanges, internal couplings, and sealant groove or equivalent detail at wall/ceiling interface to receive caulk.

3. Option B: Nonmetallic Cover System

    a. Covers: Specially engineered, low-smoke, low-combustibility thermoplastic (e.g., CPVC or glass-reinforced resin) meeting Class A/1 interior finish per ASTM E84: Flame Spread ≤ 25 (20 typical) and Smoke Developed ≤ 450 (250 typical). Paintable surface.
    b. Support Devices: Shield clips and combination hangers as applicable; pipe hangers for CPVC shall be UL Listed for use with CPVC sprinkler pipe and compatible with cover system; hangers for steel/copper compatible with cover system and UL Listed.
    c. Accessories: End caps, prefabricated corners, couplings, sprinkler housings sized to maintain NFPA 13 clearance and spray patterns; cleaning and maintenance per manufacturer guidance.

4. Finishes

    a. A. Factory Finish (Metal): Epoxy-polyester hybrid powder coating, color as selected; provide touch-up paint for field cuts/scratches.
    b. B. Field Finish (Nonmetal): Acrylic latex paint; protect sprinklers during painting and remove protection immediately after painting.

5. Warranty

    a. A. Manufacturer’s standard material warranty, minimum 10 years for nonmetallic systems or equal industry standard for metallic systems.

2.4 PERFORMANCE AND DESIGN REQUIREMENTS

A. Sprinkler Systems:

1. Provide sprinkler system types as designated on the Drawings.
2. Design to be hydraulically designed sprinkler system in accordance with applicable NFPA Codes and Standards.
3. Wet pipe systems:

a. Sprinklered areas:

1) Coverage: In accordance with sprinkler listing. Minimum flows to be in accordance with sprinkler listing and applicable NFPA standard.
2) Dwelling unit: 155 DEGF rated.
3) Sprinkler head spacing: In accordance with sprinkler listing and sprinkler hazard.

2.5 MAINTENANCE MATERIALS

A. Sprinkler System:

1. Provide spare sprinkler heads in types and quantities required by NPS.

a. Provide 2 spare heads of each type.

1) The stock of spare sprinklers shall include all types, orientations, and ratings installed.

b. Include sprinkler wrenches and cabinet.

1) One sprinkler wrench as specified by the sprinkler manufacturer shall be provided in the cabinet for each type of sprinkler installed.

c. A list of sprinklers installed in the property shall be posted in the sprinkler cabinet.

1) The list shall include the following:

a) Sprinkler identification number (SIN), if equipped, the manufacturer, model, K-factor, deflector type, thermal sensitivity, pressure rating, and temperature rating.
b) Manufacturer's wrench model number for each sprinkler type.
c) General description.
d) Quantity of each type of sprinkler installed in the property.
e) Quantity of each type of sprinkler to be contained in the cabinet.
f) Issue of revision date of the list.

PART 3 - EXECUTION

3.1 PREPARATION

A. Cooperate with other trades to insure adequate space for equipment and piping placement.

B. Review plans, Specifications and Shop Drawings of other trades to coordinate work.

C. Do not begin installation until all AHJ approvals are submitted to the NPS COR.

3.2 INSTALLATION

A. General:

1. Install in strict accord with approved Shop Drawings.

2. Install all piping, valves, and connections from mains to building fire protection systems.

B. Piping, Valves and Accessories:

1. Install sprinkler piping within first 6 IN of space under floor construction.

a. Where conditions of construction require piping installation at a lower elevation, route piping to avoid interference with work of other trades.
b. Offset, crossover and otherwise route piping to install system in available space.

1) All offsets not shown.

c. Pitch all branch lines, cross mains, feed mains, and risers to drainage points.
d. Provide angle drain valves at all low points.

1) Plugs permitted at offsets when approved by local authority.

2. Provide control valve and flow switch within sprinkler system at each of following locations:

a. Base of all sprinkler risers.

3. Install pressure gages at top of sprinkler riser and elsewhere as required by local authority.

C. Sprinkler:

1. Install in accord with approved Shop Drawings.

a. Modifications made to system design or arrangement after approval of drawings by local authority may only be made after receiving written approval of authority and Engineer.
b. Such modifications do not include minor relocations in piping or head placement.
c. Make all revisions in accord with NFPA 13D.

2. Install approved dirt legs and drain valves at low points of all piping to permit complete drainage of system without disconnection of any piping.

a. Drain valves at base of risers to have 1-1/2 IN hose adapters matching threads of hose systems in the building.

3. Provide chrome-plated escutcheon plates at pipe penetrations of ceilings, floors, and walls.
4. Do not install sprinkler heads through or with escutcheon plate covering suspended ceiling grids.

D. Access Panel:

1. Install access panels flush with adjacent finishes, plumb, square, and rigidly anchored.
2. Coordinate installation with piping, valves, drains, test connections, and all equipment requiring access.
3. Maintain clearances required to fully open the panel door without obstruction.
4. Seal frame perimeter to finish surface where required for appearance.
5. Label interior of panel door with description of equipment served (e.g., “Sprinkler Shutoff Valve,” “Dry System Inspector’s Test,” etc.).

E. Modular Soffit System

1. EXAMINATION

a. Verify substrates are plumb/true and routing is coordinated with piping and other services.

2. INSTALLATION

a. Install in strict accordance with approved shop drawings and manufacturer's printed instructions.
b. Anchor support devices squarely and firmly in straight lines to ensure linear, snug-fitting covers without gaps.
c. Space hangers and clips to hold covers and fittings firmly against mounting surfaces; maintain aesthetics.
d. Provide factory access doors where required; field-cut penetrations neatly to suit; factory perforations only where specified for ventilation.
e. Seal visible voids at interfaces with color-matching siliconized or urethane caulk.
f. Touch up all field-cut ends and scratches to match adjacent finish (metal systems).

3. FIELD QUALITY CONTROL

a. Final Inspection: Confirm covers are secure (not easily removed with ordinary tools), aligned, and free of gaps.

4. CLEANING

a. Clean nonmetallic covers using mild soap or approved cleaners; avoid agents that cause discoloration.

3.3 INSTALLATION OF HANGERS AND SUPPORTS

A. Pipe Support:

1. Listed pipe shall be supported in accordance with any listing limitations.
2. Piping laid on open joists or rafters shall be supported in a manner that prevents lateral movement.
3. Sprinkler piping shall be supported in a manner that prevents the movement of piping upon sprinkler operation.
4. Where sprinkler piping is exposed to the sprinkler protected area, it shall be supported with metal hangers or hangers made of the same material as the structure.

B. Support and Hanger Spacing:

1. Hanger spacing shall be in accordance with NFPA 13D

3.4 FIELD QUALITY CONTROL

A. Test sprinkler piping, including outside supplies, under hydrostatic pressure to 200 PSI or 50 PSI above working pressure, whichever is greater, for 2 HR period.

1. Prove system tight to satisfaction of Structural Fire Inspection and NPS COR.
2. Inside piping to show no leakage.

B. Test complete alarm system including control and signal circuits wired by Electrical Contractor.

1. Complete testing prior to acceptance by NPS COR.

C. Give 14-day advance notice and arrange for field tests and inspections by local authority, including paying for inspection fees and securing permits for same.

D. Each hydraulically calculated system should be identified by a permanent placard attached to the base of the riser indicating the design characteristics of the system.

1. Information on the placard should include the design density and area and the flow and pressure required at the base of the riser.

3.5 USER TRAINING

A. Provide training to end user.

1. Training shall consist of a minimum of 4-hrs.
2. Perform walk-through of each building using Record Drawings to point out system components.
3. Review key items found within the Operations and Maintenance Manual.
4. Include system start-up and shut-down
   Review and demonstrate routine inspection and testing requirements.

3.6 CLOSE-OUT DOCUMENTATION

A. Record drawings.

1. Updated shop drawings to as-built conditions noting any changes executed in the field during installation.

B. Operations and Maintenance Data.

1. Provide manufacturer’s Installation / User Manual.

C. Hydraulic Placard

1. Affix permanent placard at base of riser indicating system design characteristics

END OF SECTION

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DIVISION 26

ELECTRICAL

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SECTION 26 05 00 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Basic requirements for electrical systems.

B. Related Specification Sections include but are not necessarily limited to:

1. Section 26 05 19 - Low-Voltage Electrical Power and Single Station Alarms.
2. Section 26 05 33 - Raceways and Boxes.

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. Aluminum Association (AA):

a. ADM, Aluminum Design Manual.

2. American Institute of Steel Construction (AISC):

a. Steel Construction Manual.

3. ANSI International (ANSI).
4. ASTM International (ASTM):

a. A36/A36M, Standard Specification for Carbon Structural Steel.
b. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
c. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
d. B8, Standard Specification for Concentric-Lay-Stranded Copper Conductors, Hard, Medium-Hard, or Soft.

5. Institute of Electrical and Electronics Engineers, Inc. (IEEE):

a. C2, National Electrical Safety Code (NESC).
b. 837, Standard for Qualifying Permanent Connections Used in Substation Grounding

6. National Fire Protection Association (NFPA):

a. 70, National Electrical Code (NEC).

7. National Electrical Manufacturers Association (NEMA):
8. UL Solutions (UL).

a. 467, Grounding and Bonding Equipment

B. Products to be listed by a Nationally Recognized Testing Laboratory (NRTL) in accordance with applicable product standards.

1. Applicable product standards including, but not limited to, ANSI, FM, IEEE, NEMA and UL.
2. NRTL includes, but is not limited to, CSA Group Testing and Certification (CS), FM, Intertek Testing Services NA, Inc. (ETL), and UL Solutions. (UL).

1.3 DEFINITIONS

A. For the purposes of providing materials and installing electrical work the following definitions shall be used.

1. Outdoor area: Exterior locations where the equipment is normally exposed to the weather and including below grade structures, such as vaults, manholes, handholes and in-ground pump stations.
2. Architecturally finished interior area: Offices, laboratories, conference rooms, restrooms, corridors and other similar occupied spaces.
3. Non-architecturally finished interior area: Pump, chemical, mechanical, electrical rooms and other similar process type rooms.
4. Hazardous areas: Class I, II or III areas as defined in NFPA 70.

1.4 SUBMITTALS

A. Shop Drawings and Product Data:

1. General requirements:

a. Provide manufacturer's technical information on products to be used, including product descriptive bulletin.
b. Include data sheets that include manufacturer's name and product model number.
c. Acknowledgement that products are NRTL listed or are constructed utilizing NRTL recognized components.
d. Manufacturer's delivery, storage, handling and installation instructions.
e. Product installation details.
f. Short Circuit Current Rating (SCCR) nameplate marking per NFPA 70, include any required calculations.See individual specification sections for any additional requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect nameplates on electrical equipment to prevent defacing.

1.6 AREA DESIGNATIONS

A. Designation of an area will determine the NEMA rating of the electrical equipment enclosures, types of conduits and installation methods to be used in that area.

1. Outdoor areas:

a. Wet.
b. Also, corrosive and/or hazardous when specifically designated on the Drawings or in the Specifications.

2. Indoor areas:

a. Dry.
b. Also, wet, corrosive and/or hazardous when specifically designated on the Drawings or in the Specifications.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, refer to specific Electrical Specification Sections and specific material paragraphs below for acceptable manufacturers.

B. Provide all components of a similar type by one (1) manufacturer.

2.2 MATERIALS

A. Field touch-up of galvanized surfaces.

1. Zinc-rich primer.

a. One coat, 3.0 mils, ZRC by ZRC Products.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install and wire all equipment, and perform all tests necessary to assure conformance to the Drawings and Specification Sections and ensure that equipment is ready and safe for energization.

B. Install equipment in accordance with the requirements of:

1. NFPA 70.
2. IEEE C2.
3. The manufacturer's instructions.

C. In general, conduit routing is not shown on the Drawings.

1. The Contractor is responsible for routing all conduits including those shown on one-line and control block diagrams and home runs shown on floor plans.
2. Conduit routings and stub-up locations that are shown are approximate; exact routing to be as required for equipment furnished and field conditions.

D. When complete branch circuiting is not shown on the Drawings:

1. A homerun indicating panelboard name and circuit number will be shown and the circuit number will be shown adjacent to the additional devices (e.g., light fixture and receptacles) on the same circuit.
2. The Contractor is to furnish and install all conduit and conductors required for proper operation of the circuit.

3. The indicated home run conduit and conductor size shall be used for the entire branch circuit.

E. Install equipment plumb, square and true with construction features and securely fastened.

F. Install electrical equipment, including pull and junction boxes, minimum of 6 inches from process, gas, air and water piping and equipment.

G. Install equipment so it is readily accessible for operation and maintenance, is not blocked or concealed and does not interfere with normal operation and maintenance requirements of other equipment.

H. Device Mounting Schedule:

1. Unless indicated otherwise on the Drawings, mounting heights are as indicated below:

a. Light switch (to center): 46 inches.
b. Receptacle in architecturally finished areas (to center): 18 inches.
c. Receptacle on exterior wall of building (to center): 18 inches.
d. Receptacle in non-architecturally finished areas (to center): 46 inches.
e. Telephone outlet in architecturally finished areas (to center): 18 inches.
f. Telephone outlet for wall-mounted phone (to center): 46 inches.
g. Safety switch (to center of operating handle): 54 inches.
h. Separately mounted motor starter (to center of operating handle): 54 inches.
i. Pushbutton or selector switch control station (to center): 46 inches.

I. Panelboard (to top): 72 inches.Avoid interference of electrical equipment operation and maintenance with structural members, building features and equipment of other trades.

1. When it is necessary to adjust the intended location of electrical equipment, unless specifically dimensioned or detailed, the Contractor may make adjustments of up to 6 inches in equipment location with the Engineer's approval.

J. Provide electrical equipment support system per the following area designations:

1. Dry areas:

a. Galvanized system consisting of galvanized steel channels and fittings, nuts and hardware.
b. Field touch-up cut ends and scratches of galvanized components with the specified primer during the installation, before rust appears.

2. Wet areas:

a. Galvanized system consisting of galvanized steel channels and fittings, nuts and hardware.
b. Field touch-up cut ends and scratches of galvanized components with the specified primer during the installation, before rust appears.

K. Provide all necessary anchoring devices and supports rated for the equipment load based on dimensions and weights verified from approved submittals, or as recommended by the manufacturer.

1. Do not cut, or weld to, building structural members.
2. Do not mount safety switches or other equipment to equipment enclosures, unless enclosure mounting surface is properly braced to accept mounting of external equipment.

L. Screen or seal all openings into equipment mounted outdoors to prevent the entrance of rodents and insects.

M. Do not use materials that may cause the walls or roof of a building to discolor or rust.

N. Provide Grounding and Bonding as required to assure ground continuity is continuous throughout the entire Project.

O. Provide field markings and/or documentation of available short-circuit current (available fault current) and related information for equipment as required by the NFPA 70 and other applicable codes.

P. Provide equipment or control panels with Short Circuit Current Rating (SCCR) labeling as required by NFPA 70 and other applicable codes.

1. Determine the SCCR rating by one of the following methods:

a. Method 1: SCCR rating meets or exceeds the available fault current of the source equipment when indicated on the Drawings.
b. Method 2: SCCR rating meets or exceeds the source equipment's Amp Interrupting Current (AIC) rating as indicated on the Drawings.
c. Method 3: SCCR rating meets or exceeds the calculated available short circuit current at the control panel.

2. The source equipment is the switchboard, panelboard, motor control center or similar equipment where the equipment or control panel circuit originates.

3.2 FOR METHOD 3, PROVIDE CALCULATIONS JUSTIFYING THE SCCR RATING. UTILIZE SOURCE EQUIPMENT AVAILABLE FAULT CURRENT OR AIC RATING AS INDICATED ON THE DRAWINGS.FIELD QUALITY CONTROL

A. Replace equipment and systems found inoperative or defective and re-test.

B. The protective coating integrity of support structures and equipment enclosures shall be maintained.

1. Repair galvanized components utilizing a zinc rich paint.
2. Repair painted components utilizing touch up paint provided by or approved by the manufacturer.
3. Repair surfaces which will be inaccessible after installation prior to installation.
4. See Specification Section 26 05 33 for requirements for conduits and associated accessories.

C. Replace nameplates damaged during installation.

END OF SECTION

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SECTION 26 05 19 - LOW-VOLTAGE ELECTRICAL POWER AND SINGLE STATION ALARMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Material and installation requirements for:

a. Single Station Smoke Alarms.
b. Single Station Combination Smoke/Carbon Monoxide Alarms.
c. Building wire.
d. Power cable.
e. Wire connectors.
f. Insulating tape.
g. Pulling lubricant.

B. Related Specification Sections include but are not necessarily limited to:

1. Section 26 05 00 - Common Work Results for Electrical.
2. Section 26 05 33 – Raceways and Boxes

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. Insulated Cable Engineers Association (ICEA):
2. National Electrical Manufacturers Association (NEMA):
3. National Electrical Manufacturers Association/Insulated Cable Engineers Association (NEMA/ICEA):

a. WC 70/S-95-658, Non-Shielded Power Cables Rated 2000 Volts or Less for the Distribution of Electrical Energy.

4. National Fire Protection Association (NFPA):

a. 70, National Electrical Code (NEC).
b. 262, Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

5. UL Solutions (UL):

a. 44, Standard for Safety Thermoset-Insulated Wires and Cables.
b. 83, Standard for Safety Thermoplastic-Insulated Wires and Cables.
c. 217, Standard for Smoke Alarms, 8th Edition
d. 467, Standard for Safety Grounding and Bonding Equipment.
e. 486A, Standard for Safety Wire Connectors and Soldering Lugs for use with Copper Conductors.
f. 486C, Standard for Safety Splicing Wire Connections.
g. 510, Standard for Safety Polyvinyl Chloride, Polyethylene and Rubber Insulating Tape.

h. 1581, Standard for Safety Reference Standard for Electrical Wires, Cables, and Flexible Cords.
i. 2034, Single and Multiple Station Carbon Monoxide Alarms, 5th Edition

1.3 DEFINITIONS

A. Cable: Multi-conductor, insulated, with outer sheath containing either building wire or instrumentation wire.

B. Power Cable: Multi-conductor, insulated, with outer sheath containing building wire, No. 14 AWG and larger.

C. Building Wire: Single conductor, insulated, with or without outer jacket depending upon type.

1.4 SUBMITTALS

A. Shop Drawings and Product Data:

1. Shop drawings:

a. Provide scaled shop drawings detailing the locations of smoke alarm and carbon monoxide alarms

2. Product technical data:

a. Provide submittal data for all products specified in PART 2 of this Specification Section except:

1) Single Station Smoke alarms
2) Single Station Combination Smoke/Carbon monoxide alarms.
3) Cable
4) Wire connectors.

b. See Section 26 05 00 for additional requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. See Section 26 05 00.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Single Station Photoelectric Smoke Alarms:

a. BRK.
b. First Alert.
c. Gentex.

d. Kidde.
e. Universal Security Instruments.

2. Single Station Combination Photoelectric Smoke/Carbon Monoxide Alarms:

a. BRK.
b. First Alert.
c. Kidde.
d. Universal Security Instruments.

3. Building wire, power and control cable :

a. Alphawire.Cerrowire.
b. General Cable.
c. Southwire Company.
d. Syston Cable.Or equal.

4. Wire connectors:

a. Burndy Corporation.
b. Buchanan.
c. Ideal.
d. Ilsco.
e. 3M Co.
f. Thomas and Betts.
g. Or equal.

5. Insulating and color coding tape:

a. 3M Co.
b. Plymouth Bishop Tapes.
c. Red Seal Electric Co.
d. Or equal.

2.2 MANUFACTURED UNITS

A. Single-Station 120V AC Smoke Alarm with Integral Horn and Strobe:

1. Provide self-contained, 120V AC powered smoke alarm device with integral audible and visual signaling, hardwired and electrically interconnected, without connection to a building fire alarm control panel.
2. Wireless or radio-frequency interconnection methods shall not be permitted; interconnection shall be via hardwired conductors only.
3. Actuation of any one device shall cause all interconnected devices to sound and activate their integral horns and strobes.
4. Devices shall be UL listed for smoke alarm signaling use in accordance with UL 217, and installed in compliance with NFPA 72, NFPA 70 and applicable local codes.
5. Audible output shall be a minimum of 85 dBA at 10 feet and shall produce a Temporal-3 alarm pattern.
6. Visual signaling shall be provided by an integral strobe rated at a minimum of 177 candela, unless otherwise required by code.
7. Devices shall operate on 120V AC, 60 Hz power, be hardwired to a branch circuit, and include integral battery backup capable of operating both audible and visual signals upon loss of normal power.

8. Devices shall include a low-profile enclosure suitable for wall or ceiling mounting, an accessible test and silence feature, visual indication of power and alarm status, and a tamper-resistant battery compartment.
9. Combination smoke alarm and carbon monoxide alarm devices shall be permitted and may be provided in lieu of separate smoke alarms and carbon monoxide alarms, provided the combination device is listed for both functions and complies with all applicable code requirements for each alarm type.

B. Single-Station 120V AC Combination Smoke/Carbon Monoxide Alarm with Integral Horn:

1. Provide self-contained, single-station smoke and carbon monoxide (CO) alarm device powered by 120V AC, hardwired and electrically interconnected, without connection to a building fire alarm control panel.
2. The smoke sensor shall meet the requirements for Single-Station 120V AC Smoke Alarm above.
3. Wireless or radio-frequency interconnection methods shall not be permitted; interconnection shall be via hardwired conductors only.
4. Actuation of any one carbon monoxide alarm shall cause all interconnected carbon monoxide alarms to activate.
5. Devices shall be UL listed in accordance with UL 2034 and installed in compliance with NFPA 72, NFPA 70, and applicable local codes.
6. Carbon monoxide sensing elements shall be electrochemical or equivalent technology listed for long-term stability and accuracy.
7. Devices shall include an integral audible alarm with a sound output of not less than 85 dBA at 10 feet.
8. Devices shall operate on 120V AC, 60 Hz power, be hardwired to a branch circuit, and include integral battery backup capable of operating the alarm upon loss of normal power.
9. Devices shall include a low-profile enclosure suitable for wall or ceiling mounting as permitted by the manufacturer, an accessible test and silence feature, visual indication of power and alarm condition, and a tamper-resistant battery compartment.
10. Combination smoke alarm and carbon monoxide alarm devices shall be permitted and may be provided in lieu of separate smoke alarms and carbon monoxide alarms, provided the combination device is listed for both functions and complies with all applicable code requirements for each alarm type.

C. Building Wire:

1. Conductor shall be copper with 600 V rated insulation.
2. Conductors shall be solid.
3. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
4. Conform to NEMA/ICEA WC 70/S-95-658 and UL 83 for type THHN/THWN and THHN/THWN-2 insulation.
5. Conform to NEMA/ICEA WC 70/S-95-658 and UL 44 for type XHHW-2 insulation.

D. Power Cable:

1. Conductor shall be copper with 600 V rated insulation.
2. Surface mark with manufacturer's name or trademark, conductor size, insulation type and UL label.
3. Conform to NEMA/ICEA WC 70/S-95-658 and UL 83 and UL 1277 for type THHN/THWN insulation with an overall PVC jacket.
4. Conform to NEMA/ICEA WC 70/S-95-658 and UL 44 and UL 1277 for type XHHW-2 insulation with an overall PVC jacket.
5. Number of conductors as required, including a bare ground conductor.
6. Individual conductor color coding:

a. ICEA S-58-679, Method 4.
b. See PART 3 of this Specification Section for additional requirements.

7. Conform to NFPA 70 Type TC.

E. Wire Connectors:

1. Twist/screw on type:

a. Insulated pressure or spring type solderless connector.
b. 600 V rated.
c. Ground conductors: Conform to UL 486C and/or UL 467 when required by local codes.
d. Phase and neutral conductors: Conform to UL 486C.

2. Compression and mechanical screw type:

a. 600 V rated.
b. Ground conductors: Conform to UL 467.
c. Phase and neutral conductors: Conform to UL 486A.

3. Terminal block type:

a. High density, screw-post barrier-type with white center marker strip.
b. 600 V and ampere rating as required, for power circuits.
c. 600 V, 20 ampere rated for control circuits.
d. 300 V, 15 ampere rated for instrumentation circuits.
e. Conform to NEMA ICS 4 and UL 486A.

F. Insulating and Color Coding Tape:

1. Pressure sensitive vinyl.
2. Premium grade.
3. Heat, cold, moisture, and sunlight resistant.
4. Thickness, depending on use conditions: 7, 8.5, or 10 mil.
5. For cold weather or outdoor location, tape must also be all-weather.
6. Color:

a. Insulating tape: Black.
b. Color coding tape: Fade-resistant color as specified herein.

7. Comply with UL 510.

G. Pulling Lubricant: Cable manufacturer's standard containing no petroleum or other products which will deteriorate insulation.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Smoke Alarms and Carbon Monoxide Alarms:

1. Install in compliance with NFPA 72, NFPA 70, manufacturer’s installation requirements, and all applicable local codes and authority having jurisdiction (AHJ) requirements.

B. Permitted Usage of Insulation Types:

1. Type THHN/THWN and THHN/THWN-2:

a. Building wire and power and control cable No. 8 AWG and smaller in architectural and non-architectural finished areas.

C. Conductor Size Limitations:

1. Feeder and branch power conductors shall not be smaller than No. 12 AWG unless otherwise indicated on the Drawings.

D. Color Code All Wiring as Follows:

1. Building wire:

	120 V
Line	Black
Neutral	White
Ground	Green

a. Conductors No. 6 AWG and smaller: Insulated phase, neutral and ground conductors shall be identified by a continuous colored outer finish along its entire length.

E. Install all wiring in raceway unless otherwise indicated on the Drawings.

1. Multiple branch circuits for similar loads may be combined in a common raceway, such as multiple lighting circuits or multiple receptacle circuits or other 120Vac circuits. Do not combine lighting and receptacle circuits.

a. Contractor is responsible for making the required adjustments in conductor and raceway size, in accordance with all requirements of the NFPA 70, including but not limited to:

1) Up sizing conductor size for required ampacity de-ratings for the number of current carrying conductors in the raceway.
2) The neutral conductors may not be shared.
3) Up sizing raceway size for the size and quantity of conductors.

F. Splices and terminations for the following circuit types shall be made in the indicated enclosure type using the indicated method.

1. Feeder and branch power circuits:

a. Device outlet boxes:

1) Twist/screw on type connectors.

b. Junction and pull boxes and wireways:

1) Twist/screw on type connectors for use on No. 8 and smaller wire.

2) Compression, mechanical screw or terminal block or terminal strip type connectors for use on No. 6 AWG and larger wire.

3.2 FIELD QUALITY CONTROL

A. Functional Test and Demonstration.

1. Test functionality of each installed alarm device.

a. Smoke alarms shall be tested with UL Listed canned smoke.

1) Ensure that the activation of one smoke alarm initiates horns and strobes of all smoke alarms within the dwelling unit.

b. Carbon Monoxide alarms shall be tested with carbon monoxide test gas or by depressing the devices test button.

1) Ensure that the activation of one CO alarm initiates horns (and strobes if combination smoke CO alarm) of all CO alarms within the dwelling unit.

c. Complete the NFPA Installation and Inspection Form Single-and Multiple-Station Alarms and Household Fire Alarm Systems (ref NFPA 72, Figure 7.8.2(m)).

3.3 USER TRAINING

A. Provide training to end user.

1. Training shall consist of a minimum of 4-hrs.
2. Perform walk-through of each building using Record Drawings to point out system components.
3. Review key items found within the Operations and Maintenance Manual.
4. Include system start-up and shut-down.
5. Review and demonstrate routine inspection and testing requirements.

3.4 CLOSE-OUT DOCUMENTATION

A. Record drawings.

1. Updated shop drawings to as-built conditions noting any changes executed in the field during installation.

B. Operations and Maintenance Data.

1. Provide manufacturer’s Installation / User Manual.

3.5 EXTRA STOCK

1. Provide two (2) of each alarm type installed in original packaging.

END OF SECTION

SECTION 26 05 33 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Material and installation requirements for:

a. Conduits.
b. Conduit fittings.
c. Conduit supports.
d. Wireways.
e. Outlet boxes.
f. Pull and junction boxes.

B. Related Specification Sections include but are not necessarily limited to:

1. Section 26 05 00 - Common Work Results for Electrical.
2. Section 26 05 19 - Low Voltage Electrical Power and Single Station Alarms

1.2 QUALITY ASSURANCE

A. Referenced Standards:

1. Aluminum Association (AA).
2. American Iron and Steel Institute (AISI).
3. ASTM International (ASTM):

a. A123/A123M, Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
b. A153/A153M, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
c. D2564, Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems.

4. National Electrical Manufacturers Association (NEMA):

a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
b. RN 1, Polyvinyl Chloride (PVC) Externally Coated Galvanized Rigid Steel Conduit and Intermediate Metal Conduit.
c. TC 2, Electrical Polyvinyl Chloride (PVC) Tubing and Conduit.
d. TC 3, Polyvinyl Chloride (PVC) Fittings for Use with Rigid PVC Conduit and Tubing.
e. TC 14.AG, Aboveground Reinforced Thermosetting Resin Conduit and Fittings.
f. TC 14.BG, Belowground Reinforced Thermosetting Resin Conduit and Fittings.

5. National Electrical Manufacturers Association/American National Standards Institute (NEMA/ANSI):

a. C80.1, Electric Rigid Steel Conduit (ERSC).

b. C80.3, Steel Electrical Metallic Tubing (EMT).
c. C80.5, Electrical Aluminum Rigid Conduit (ERAC).
d. OS 1, Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

6. National Fire Protection Association (NFPA):

a. 70, National Electrical Code (NEC).

7. UL Solutions (UL):

a. 1, Standard for Flexible Metal Conduit.
b. 6, Electrical Rigid Metal Conduit - Steel.
c. 50, Enclosures for Electrical Equipment, Non-Environmental Considerations.
d. 360, Standard for Liquid-Tight Flexible Metal Conduit.
e. 467, Grounding and Bonding Equipment.
f. 514A, Metallic Outlet Boxes.
g. 514B, Conduit, Tubing, and Cable Fittings.
h. 651, Standard for Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings.
i. 797, Electrical Metallic Tubing - Steel.
j. 870, Standard for Wireways, Auxiliary Gutters, and Associated Fittings.
k. 2515, Aboveground Reinforced Thermosetting Resin Conduit (RTRC) and Fittings.

1.3 SUBMITTALS

A. Shop Drawings and Product Data:

1. Product technical data:

a. Provide submittal data for all products specified in PART 2 of this Specification Section except:

1) Conduit fittings.
2) Support systems.

b. See Section 26 05 00 for additional requirements.

1.4 DELIVERY, STORAGE, AND HANDLING

A. See Section 26 05 00.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with the Contract Documents, the following manufacturers are acceptable:

1. Rigid metal conduits and electrical metallic tubing:

a. Allied Tube and Conduit.
b. Western Tube and Conduit Corporation.
c. Wheatland Tube.

d. Or equal.

2. Rigid nonmetallic conduit:

a. Prime Conduit.
b. Cantex, Inc.
c. Osburn Associates, Inc.
d. Champion Fiberglass, Inc.
e. United Fiberglass of America, Inc.
f. Or equal.

3. Flexible conduit:

a. AFC Cable Systems.
b. Anamet, Inc.
c. Electri-Flex Company.
d. International Metal Hose Company.
e. Southwire Company, LLC.
f. Or equal.

4. Wireway:

a. Hoffman Engineering.
b. Wiegmann by Hubbell.
c. Square D by Schneider Electric.
d. Or equal.

5. Conduit fittings and accessories:

a. Appleton by Emerson Electric Co.
b. Carlon by Thomas & Betts.
c. Cantex, Inc.
d. Crouse-Hinds by Eaton.
e. Killark by Hubbell.
f. Osburn Associates, Inc.
g. O-Z/Gedney by Emerson Electric Co.
h. Raco by Hubbell.
i. Steel City by Thomas & Betts.
j. Thomas & Betts.
k. Or equal.

6. Support systems:

a. Unistrut by Atkore International, Inc.
b. B-Line by Eaton.
c. Kindorf by Thomas & Betts.
d. Minerallac Company.
e. CADDY by Pentair.
f. Superstrut by Thomas & Betts.
g. Or equal.

7. Outlet, pull and junction boxes:

a. Appleton by Emerson Electric Co.
b. Crouse-Hinds by Eaton

c. Killark by Hubbell.
d. O-Z/Gedney by Emerson Electric Co.
e. Steel City by Thomas & Betts.
f. Raco by Hubbell
g. Bell by Hubbell.
h. Hoffman Engineering.
i. Wiegmann by Hubbell.
j. B-Line by Eaton.
k. Adalet.
l. RITTAL North America LLC.
m. Stahlin by Robroy Enclosures.
n. Or equal.

2.2 RIGID METAL CONDUITS

A. Rigid Galvanized Steel Conduit (RGS):

1. Mild steel with continuous welded seam.
2. Metallic zinc applied by hot-dip galvanizing or electro-galvanizing.
3. Threads galvanized after cutting.
4. Internal coating: Baked lacquer, varnish or enamel for a smooth surface.
5. Standards: NFPA 70 Type RMC, NEMA/ANSI C80.1, UL 6.

2.3 ELECTRICAL METALLIC TUBING (EMT)

A. Mild steel with continuous welded seam.

B. Metallic zinc applied by hot-dip galvanizing or electro-galvanizing.

C. Internal coating: Baked lacquer, varnish, or enamel for a smooth surface.

D. Standards: NFPA 70 Type EMT, NEMA/ANSI C80.3, UL 797.

2.4 RIGID NONMETALLIC CONDUIT

A. Schedules 40 (PVC-40) and 80 (PVC-80):

1. Polyvinyl-chloride (PVC) plastic compound which includes inert modifiers to improve weatherability and heat distribution.
2. Rated for direct sunlight exposure.
3. Fire retardant and low smoke emission.
4. Shall be suitable for use with 90 degrees C wire and shall be marked "maximum 90 degrees C".
5. Standards: NFPA 70 Type PVC, NEMA TC 2, UL 651.

2.5 FLEXIBLE CONDUIT

A. Flexible Galvanized Steel Conduit (FLEX):

1. Formed of continuous, spiral wound, hot-dip galvanized steel strip with successive convolutions securely interlocked.
2. Standard: NFPA 70 Type FMC, UL 1.

B. PVC-Coated Flexible Galvanized Steel (liquid-tight) Conduit (FLEX-LT):

1. Core formed of continuous, spiral wound, hot-dip galvanized steel strip with successive convolutions securely interlocked.
2. Extruded PVC outer jacket positively locked to the steel core.
3. Liquid and vaportight.
4. Standard: NFPA 70 Type LFMC, UL 360.

2.6 WIREWAY

A. General:

1. Suitable for lay-in conductors.
2. Designed for continuous grounding.
3. Covers:

   a. Hinged or removable in accessible areas.
   b. Non-removable when passing through partitions.

4. Finish: Rust inhibiting primer and manufacturer's standard paint inside and out except for stainless steel type.
5. Standards: UL 870, NEMA 250.

B. General Purpose (NEMA 1 rated) Wireway:

1. 14 or 16 gage steel without knockouts.
2. Cover: Solid, non-gasketed and held in place by captive screws.

C. Raintight (NEMA 3R) Wiring Trough:

1. 14 or 16 GA galvanized steel without knockouts.
2. Cover: Non-gasketed and held in place by captive screws.

D. Watertight (NEMA 4X rated) Wireway:

1. 14 GA Type 304 or 316 stainless steel bodies and covers without knockouts and 10 GA stainless steel flanges.
2. Cover: Fully gasketed and held in place with captive clamp type latches.
3. Flanges: Fully gasketed and bolted.

2.7 CONDUIT FITTINGS AND ACCESSORIES

A. Fittings for Use with RGS :

1. General:

   a. In hazardous locations listed for use in Class I, Groups C and D locations.

2. Locknuts:

   a. Threaded steel or malleable iron.
   b. Gasketed or non-gasketed.
   c. Grounding or non-grounding type.

3. Bushings:

    a. Threaded, insulated metallic.
    b. Grounding or non-grounding type.

4. Hubs: Threaded, insulated and gasketed metallic for raintight connection.
5. Couplings:

    a. Threaded straight type: Same material and finish as the conduit with which they are used on.
    b. Threadless type: Gland compression or self-threading type, concrete tight.

6. Unions: Threaded galvanized steel or zinc plated malleable iron.
7. Conduit bodies (ells and tees):

    a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
    b. Standard and mogul size.
    c. Cover:

        1) Clip-on type with stainless steel screws.
        2) Gasketed or non-gasketed galvanized steel, zinc plated cast iron or cast copper free aluminum.

8. Conduit bodies (round):

    a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
    b. Cover: Threaded screw on type, gasketed, galvanized steel, zinc plated cast iron or cast copper free aluminum.

9. Sealing fittings:

    a. Body: Zinc plated cast iron or cast copper free aluminum with threaded hubs.
    b. Standard and mogul size.
    c. With or without drain and breather.
    d. Fiber and sealing compound: UL listed for use with the sealing fitting.
    e.

10. Expansion couplings:

    a. 2 inches nominal straight-line conduit movement in either direction.
    b. Galvanized steel with insulated bushing.
    c. Gasketed for wet locations.
    d. Internally or externally grounded.

11. Expansion/deflection couplings:

    a. 3/4 inches nominal straight-line conduit movement in either direction.
    b. 30 degrees nominal deflection from the normal in all directions.
    c. Metallic hubs, neoprene outer jacket and stainless steel jacket clamps.
    d. Internally or externally grounded.
    e. Watertight, raintight and concrete tight.

12. Standards: UL 467, UL 514B, UL 1203.

B. Fittings for Use with EMT:

1. Connectors:

    a. Straight, angle and offset types furnished with locknuts.
    b. Zinc plated steel.
    c. Insulated gland compression type.
    d. Concrete and raintight.

2. Couplings:

    a. Zinc plated steel.
    b. Gland compression type.
    c. Concrete and raintight.

3. Conduit bodies (ells and tees):

    a. Body: Copper free aluminum with threaded hubs.
    b. Standard and mogul size.
    c. Cover:

        1) Screw down type with steel screws.
        2) Gasketed or non-gasketed galvanized steel or copper free aluminum.

4. Standard: UL 514B.

C. Fittings for Use with FLEX:

1. Connector:

    a. Zinc plated malleable iron.
    b. Squeeze or clamp-type.

2. Standard: UL 514B.

D. Fittings for Use with FLEX-LT:

1. Connector:

    a. Straight or angle type.
    b. Metal construction, insulated and gasketed.
    c. Composed of locknut, grounding ferrule and gland compression nut.
    d. Liquid tight.

2. Standards: UL 467, UL 514B.

2.8 ALL RACEWAY AND FITTINGS

A. Mark Products:

1. Identify the nominal trade size on the product.
2. Stamp with the name or trademark of the manufacturer.

2.9 OUTLET BOXES

A. Metallic Outlet Boxes:

1. Hot-dip galvanized steel.
2. Conduit knockouts and grounding pigtail.
3. Styles:

   a. 2 inches x 3 inches rectangle.
   b. 4 inches square.
   c. 4 inches octagon.
   d. Masonry/tile.

4. Accessories:

   a. Flat blank cover plates.
   b. Barriers.
   c. Extension, plaster or tile rings.
   d. Box supporting brackets in stud walls.
   e. Adjustable bar hangers.

5. Standards: NEMA/ANSI OS 1, UL 514A.

B. Cast Outlet Boxes:

1. Zinc plated cast iron or die-cast copper free aluminum with manufacturer's standard finish.
2. Threaded hubs and grounding screw.
3. Styles:

   a. "FS" or "FD".
   b. "Bell".
   c. Single or multiple gang and tandem.
   d. "EDS" or "EFS" for hazardous locations.

4. Accessories: 40 mil PVC exterior coating and 2 mil urethane interior coating.
5. Standards: UL 514A, UL 1203.

2.10 PULL AND JUNCTION BOXES

A. NEMA 1 Rated:

1. Body and cover: 14 GA minimum, galvanized steel or 14 GA minimum, steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
2. With or without concentric knockouts on four sides.
3. Flat cover fastened with screws.

B. NEMA 3R Rated:

1. Body and cover: 14 GA minimum, steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
2. Drip shield top and seam-free sides, front and back.
3. With or without concentric knockouts on bottom.

C. Slip-on removable cover fastened on bottom edge with screws or continuous hinged cover fastened with screws.NEMA 4 Rated:

1. Body and cover: 14 GA steel finished with rust inhibiting primer and manufacturers standard paint inside and out.
2. Seams continuously welded and ground smooth.
3. No knockouts.
4. External mounting flanges.
5. Hinged or non-hinged cover held closed with stainless steel screws and clamps.
6. Cover with oil resistant gasket.

D. NEMA 4X Rated (metallic):

1. Body and cover: 14 GA Type 304 or 316 stainless steel.
2. Seams continuously welded and ground smooth.
3. No knockouts.
4. External mounting flanges.
5. Hinged door and stainless steel screws and clamps.
6. Door with oil-resistant gasket.

E. NEMA 4X Rated (Nonmetallic):

1. Body and cover: Ultraviolet light protected fiberglass-reinforced polyester boxes.
2. No knockouts.
3. External mounting flanges.
4. Hinged door with quick release latches and padlocking hasp.
5. Door with oil resistant gasket.

F. Miscellaneous Accessories:

1. Rigid handles for covers larger than 9 square feet or heavier than 25 pounds.
2. Split covers when heavier than 25 pounds.
3. Weldnuts for mounting optional panels and terminal kits.
4. Terminal blocks: Screw-post barrier-type, rated 600 volt and 20 ampere minimum.

G. Standards: NEMA 250, UL 50.

2.11 SUPPORT SYSTEMS

A. Multi-conduit Surface or Trapeze Type Support and Pull or Junction Box Supports:

1. Material requirements.

a. Galvanized steel: ASTM A123/A123M or ASTM A153/A153M.
b. Stainless steel: AISI Type 316.
c. PVC coat galvanized steel: ASTM A123/A123M or ASTM A153/A153M and 20 mil PVC coating.

B. Single Conduit and Outlet Box Support Fasteners:

1. Material requirements:

a. Zinc plated steel.
b. Stainless steel.

c. Malleable iron.
d. PVC coat malleable iron or steel: 20 mil PVC coating.
e. Steel protected with zinc phosphate and oil finish.

2.12 OPENINGS AND PENETRATIONS IN WALLS AND FLOORS

A. Sleeves, smoke and fire stop fitting through walls and floors:

1. See Specification Section 07 84 00.

PART 3 - EXECUTION

3.1 RACEWAY INSTALLATION - GENERAL

A. Shall be in accordance with the requirements of:

1. NFPA 70.
2. Manufacturer instructions.

B. Size of Raceways:

1. Raceway sizes are shown on the Drawings, if not shown on the Drawings, then size in accordance with NFPA 70.
2. Unless specifically indicated otherwise, the minimum raceway size shall be:

a. Conduit: 3/4 inches.
b. Wireway: 2-1/2 inches x 2-1/2 inches.

C. Field Bending and Cutting of Conduits:

1. Utilize tools and equipment recommended by the manufacturer of the conduit, designed for the purpose and the conduit material to make all field bends and cuts.
2. Do not reduce the internal diameter of the conduit when making conduit bends.
3. Prepare tools and equipment to prevent damage to the PVC coating.
4. Degrease threads after threading and apply a zinc rich paint.
5. Debur interior and exterior after cutting.

D. Male threads of conduit systems shall be coated with an electrically conductive anti-seize compound.

E. The protective coating integrity of conduits, fittings, outlet, pull and junction boxes and accessories shall be maintained.

1. Repair galvanized components utilizing a zinc rich paint.
2. Repair painted components utilizing touch up paint provided by or approved by the manufacturer.
3. Repair PVC coated components utilizing a patching compound, of the same material as the coating, provided by the manufacturer of the conduit; or a self-adhesive, highly conformable, cross-linked silicone composition strip, followed by a protective coating of vinyl tape.

a. Total nominal thickness: 40 mil.

4. Repair surfaces which will be inaccessible after installation prior to installation.

F. Remove moisture and debris from conduit before wire is pulled into place.

1. Pull mandrel with diameter nominally 1/4 inches smaller than the interior of the conduit, to remove obstructions.
2. Swab conduit by pulling a clean, tight-fitting rag through the conduit.
3. Tightly plug ends of conduit with tapered wood plugs or plastic inserts until wire is pulled.

G. Only nylon or polyethylene rope shall be used to pull wire and cable in conduit systems.

H. Where portions of a raceway are subject to different temperatures and where condensation is known to be a problem, as in cold storage areas of buildings or where passing from the interior to the exterior of a building, the raceway shall be sealed to prevent circulation of warm air to colder section of the raceway.

I. Fill openings in walls, floors, and ceilings and finish flush with surface.

1. See Specification Section 07 92 00.
2. The same materials of construction shall be used for non-fire-rated walls.
3. Use the following to seal fire-rated walls:

a. For single conduit penetrations:

1) Flanged and segmented to install around in-place conduits.

b. For blockouts:

1) Mounting frame and elastomeric sealing material to be set in place prior to installation of conduits.

J. Where conduit terminates at a cable tray system, fit conduit with an insulated bushing.

3.2 RACEWAY ROUTING

A. Raceways shall be routed in the field unless otherwise indicated.

1. Conduit and fittings shall be installed, as required, for a complete system that has a neat appearance and is in compliance with all applicable codes.
2. Run in straight lines parallel to or at right angles to building lines.
3. Locate sleeves or conduits penetrating floors, walls, and beams so as not to significantly impair the strength of the construction. Do not place conduit penetrations in columns.
4. Conduit shall not interfere with, or prevent access to, piping, valves, ductwork, or other equipment for operation, maintenance and repair.
5. Provide pull boxes or conduit bodies as needed so that there is a maximum of 360 degrees of bends in the conduit run or in long straight runs to limit pulling tensions.

B. All conduits within a structure shall be installed exposed except as follows:

1. Concealed above gypsum wall board or acoustical tile suspended ceilings.
2. Conduits in architecturally finished areas shall be concealed.

C. Maintain minimum spacing between parallel conduit and piping runs in accordance with the following when the runs are greater than 30 feet:

1. Between instrumentation and telecommunication: 1 inch.
2. Between instrumentation and 125 V, 48 V and 24 VDC, 2 inches.

3. Between instrumentation and 600 V and less AC power or control: 6 inches.
4. Between instrumentation and greater than 600 VAC power: 12 inches.
5. Between telecommunication and 125 V, 48 V and 24 VDC, 2 inches.
6. Between telecommunication and 600 V and less AC power or control: 6 inches.
7. Between telecommunication and greater than 600 VAC power: 12 inches.
8. Between 125 V, 48 V and 24 VDC and 600 V and less AC power or control: 2 inches.
9. Between 125 V, 48 V and 24 VDC and greater than 600 VAC power: 2 inches.
10. Between 600 V and less AC and greater than 600 VAC: 2 inches.
11. Between process, gas, air and water pipes: 6 inches.

D. Conduits shall be installed to eliminate moisture pockets.

1. Where water cannot drain to openings, provide drain fittings in the low spots of the conduit run.

E. Conduit shall not be routed on the exterior of structures except as specifically indicated on the Drawings.

F. Where sufficient room exists within the housing of roof-mounted equipment, the conduit shall be stubbed up inside the housing.

G. Provide all required openings in walls, floors, and ceilings for conduit penetration.

1. See Specification Section 07 92 00.

3.3 RACEWAY APPLICATIONS

A. Permitted Raceway Types Per Wire or Cable Types:

1. Power wire or cables: All raceway types.

B. Permitted Raceway Types Per Area Designations:

1. Dry areas:

a. RGS.
b. IMC.

C. EMT above 10 feet.Permitted Raceway Types Per Routing Locations:

1. In stud framed walls:

a. EMT.
b. RAC.
c. RGS.
d. IMC.

2. Above acoustical tile ceilings:

a. EMT.
b. RAC.
c. RGS.
d. IMC.
e. NEMA 1 rated wireway.

D. FLEX conduits shall be installed for connections to fixtures, HVAC equipment and other similar devices above the ceilings.

1. The maximum length shall not exceed:

a. 6 feet to light fixtures.
b. 3 feet to all other equipment.

E. NEMA 1 Rated Wireway:

1. Surface mounted in electrical rooms.
2. Surface mounted above removable ceilings tiles of an architecturally finished area.

3.4 CONDUIT FITTINGS AND ACCESSORIES

A. Threaded connections shall be made wrench-tight.

B. Terminate Conduits:

1. In metallic outlet boxes:

a. RGS:

1) Conduit hub and locknut.
2) Insulated bushing and two locknuts.
3) Use grounding type locknut or bushing when required by NFPA 70.

b. EMT: Compression type connector and locknut.

2. In NEMA 1 rated enclosures:

a. RGS:

1) Conduit hub and locknut.
2) Insulated bushing and two locknuts.
3) Use grounding type locknut or bushing when required by NFPA 70.

b. EMT: Compression type connector and locknut.

3.5 CONDUIT SUPPORT

A. Permitted multi-conduit surface or trapeze type support system per area designations and conduit types:

1. Dry or wet areas:

a. Galvanized system consisting of: Galvanized steel channels and fittings, nuts and hardware and conduit clamps.
b. Aluminum system consisting of: Aluminum channels, fittings and conduit clamps with stainless steel nuts and hardware.

2. Conduit type shall be compatible with the support system material.

a. Galvanized steel system may be used with RGS and IMC and EMT.

B. Permitted single conduit support fasteners per area designations and conduit types:

1. Architecturally finished areas:

a. Material: Zinc plated steel, or steel protected with zinc phosphate and oil finish.
b. Types of fasteners: Spring type hangers and clips, straps, hangers with bolts, clamps with bolts and bolt on beam clamps.
c. Provide anti-rattle conduit supports when conduits are routed through metal studs.

2. Dry or wet and/or hazardous areas:

a. Material: Zinc plated steel, stainless steel and malleable iron.
b. Types of fasteners: Straps, hangers with bolts, clamps with bolts and bolt on beam clamps.

3. Conduit type shall be compatible with the support fastener material.

a. Zinc plated steel, steel protected with zinc phosphate and oil finish and malleable iron fasteners may be used with RGS and EMT.

C. Conduit Support General Requirements:

1. Maximum spacing between conduit supports per NFPA 70.
2. Support conduit from the building structure.
3. Do not support conduit from process, gas, air or water piping; or from other conduits.
4. Provide hangers and brackets to limit the maximum uniform load on a single support to 25 LBS or to the maximum uniform load recommended by the manufacturer if the support is rated less than 25 pounds.

a. Do not exceed maximum concentrated load recommended by the manufacturer on any support.
b. Conduit hangers:

1) Continuous threaded rods combined with struts or conduit clamps: Do not use perforated strap hangers and iron bailing wire.

c. Do not use suspended ceiling support systems to support raceways.
d. Hangers in metal roof decks:

1) Utilize fender washers.
2) Not extend above top of ribs.
3) Not interfere with vapor barrier, insulation, or roofing.

5. Conduit support system fasteners:

a. Use sleeve-type expansion anchors as fasteners in masonry wall construction.
b. Do not use concrete nails and powder-driven fasteners.

3.6 OUTLET, PULL AND JUNCTION BOX INSTALLATION

A. General:

1. Install products in accordance with manufacturer's instructions.
2. See Section 26 05 00 and the Drawings for area classifications.
3. Fill unused punched-out, tapped, or threaded hub openings with insert plugs.

4. Size boxes to accommodate quantity of conductors enclosed and quantity of conduits connected to the box.

B. Outlet Boxes:

1. Permitted uses of metallic outlet boxes:

a. Housing of wiring devices:

1) Recessed in all stud framed walls and ceilings.
2) Recessed in poured concrete, concrete block and brick walls of architecturally finished areas and exterior building walls.

b. Pull or junction box:

1) Above gypsum wall board or acoustical tile ceilings.
2) Above 10 feet in an architecturally finished area where there is no ceiling.

2. Mount device outlet boxes where indicated on the Drawings and at heights as scheduled in Section 26 05 00.
3. Set device outlet boxes plumb and vertical to the floor.
4. Outlet boxes recessed in walls:

a. Install with appropriate stud wall support brackets or adjustable bar hangers so that they are flush with the face of the wall.

5. Back-to-back are not permitted.

C. Pull and Junction Boxes:

1. Install pull or junction boxes in conduit runs where indicated or required to facilitate pulling of wires or making connections.

a. Make covers of boxes accessible.

2. Permitted uses of NEMA 1 enclosure:

a. Pull or junction box surface mounted above removable ceiling tiles of an architecturally finished area.
b. Pull or junction box surface mounted above 10 feet in areas designated as dry in architecturally and non-architecturally finished areas.
c. Pull or junction box surface mounted in areas designated as dry in architecturally and non-architecturally finished areas.

3. Permitted uses of NEMA 3R enclosure:

a. Pull or junction box surface mounted in exterior locations.
b. as wet and/or highly corrosive.

END OF SECTION

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