TRAINING CENTER
CAPE MAY, NJ

FACILITIES ENGINEERING DIVISION

CMS-1568
Project No.:11159331
June 2019
SPECIFICATION FOR
GALLEY DOMESTIC HOT WATER STORAGE TANK REPAIR
GALLEY, BUILDING 278
TRACEN CAPE MAY
CAPE MAY, NEW JERSEY

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DIVISION 01 – GENERAL REQUIREMENTS

SECTION 01 11 00
SCOPE OF WORK

1. WORK INCLUDED: Work of the Project includes all materials, labor, equipment, services, and all operations necessary for the repair of Domestic Hot Water Generators to the Gymnasium, building 269, United States Coast Guard Training Center (TRACEN) Cape May, New Jersey.:

1.1 Major work items include but are not limited to:

A. GENERAL SCOPE OF WORK FOR THE PROJECT IS DIVIDED INTO 2 PHASES DURING WHICH HOT WATER PRODUCTION CAN BE STOPPED JUST FOR 6-8 HOURS AFTER GALLEY STOPS WORK (AFTER 8:30 PM) ON A NIGHT OF THE SWITCHING OF THE PRODUCTION TO NEW STORAGE TANKS:

B. PHASE 1: IN THIS PHASE CONTRACTOR IS TO RELOCATE HWH-1 ELECTRICAL SERVICE, TEMPORARY REMOVE FROM CURRENT INSTALLATION AN EXISTING HWH-2 AND ASSOCIATED PIPING, PUMPS AND VALVES THAT WILL BE REINSTALLED IN PROPOSED INSTALLATION. UPON REMOVAL OF HEATER, TWO NEW STORAGE TANKS AND ASSOCIATED PIPING, VALVES AND MIXING VALVE WITH CONTROL PANEL AND ACCESSORIES ARE TO BE INSTALLED AND CONNECTED TO EXISTING VALVES THAT ARE CAPPED FOR FUTURE CONNECTION. EXISTING HWH-1 IS TO REMAIN OPERATIONAL AND IT IS TO BE CONNECTED TO TWO NEW STORAGE TANKS. ONLY UPON SUCCESSFUL INSTALLATION OF ABOVE REFERENCED WORK CAN CONTRACTOR PROCEED WITH WORK DESCRIBED IN PHASE 2.

C. PHASE 2: UPON SUCCESSFUL SWITCH TO NEW STORAGE TANKS, CONTRACTOR IS TO DEMOLISH IN PLACE ORIGINAL STORAGE TANK, REPAIR EXISTING CONCRETE PAD THAT APPEARS TO BE HOLLOW BELOW TANK, AND INSTALL PREVIOUSLY DISCONNECTED HWH-2 AND ASSOCIATED DHW AND VENT PIPING AND ACCESSORIES ONTO IT AND CONNECT IT'S PIPING TO NEW INSTALLATION. UPON SUCCESSFUL STARTUP, BOTH HEATER ELECTRICAL INTERLOCKS WITH PREVIOUSLY INSTALLED HEATER, AND SET THEM UP FOR A LEAD-LAG OPERATION.

D. Mobilization, demobilization and clean up;

E. Supervision, materials, equipment, transportation, labor and all other incidentals necessary to complete the work.

2. DRAWINGS: Drawings and the accompanying specifications are the property of the Government and comprise legal documentation that pertains exclusively to this project. Drawings will be made available in a format determined by the solicitation method. CEU Cleveland will not provide hard copies of drawings.

2.1 Construction Drawings:

T-7094-MD	TITTLE SHEET	SHT 1 of 5
T-7095-MD	PHASE 1 PLANS	SHT 2 of 5
T-7096-MD	PHASE 2 PLANS	SHT 3 of 5
T-7097-MD	SCHEDULES & DEATILS	SHT 4 of 5
T-7098-ED	ELECTRICAL PLANS	SHT 5 of 5

SECTION 01 11 16
WORK BY OTHERS

1. WORK NOT INCLUDED IN THE CONTRACT: Non-contractor personnel will accomplish the following work items necessary for completion of the project. However, the contractor must coordinate accomplishment of these work items with the appropriate parties noted below in accordance with Section 01 14 16, "Coordination".

1.1 Work by other Contractors or Service Companies: Contractor personnel and equipment associated with another construction contract in progress may require access to the site during execution of this contract. The contractor shall coordinate work and ensure that work operations do not interfere with the contract currently in progress. The contractor shall allow service contract personnel access to the site for trash removal, snow removal, grounds maintenance or the performance of other related service contracts. The Coast Guard will advise the contractor of the trash removal, grounds maintenance or other recurring maintenance schedules.

SECTION 01 12 16
PROJECT PHASING

1. To minimize interference with Coast Guard operations, utilize the following phasing sequence to accomplish contract work. Coordinate timing between successive phases with Coast Guard personnel to allow for necessary relocations.

   PHASE I See Scope of work description for Phase-1 chapter 1.1 section 011100.

   PHASE II: See Scope of work description for Phase-2 chapter 1.1 section 011100.

SECTION 01 14 00
CONTRACTOR WORK HOURS

1. WORK HOURS: The Contractor will be permitted to perform construction work through the hours of 7:00 am and 4:30 PM Mondays through Thursdays. The Coast Guard base hosts recruit graduations on most Fridays year round. The contractor shall expect increased automobile and pedestrian traffic on Fridays. Excessive noise and other disruptive activities shall be limited on Fridays between the hours of 10:00 am and 12:00 during graduation ceremonies unless otherwise approved by the COR. No major deliveries shall be scheduled between 8:00 and 12:00. Note any departures from these work hours on the Daily Reports.

2. SATURDAY, SUNDAY AND HOLIDAYS: The contractor shall provide the Contracting Officer's Representative at least forty-eight hours advance notice prior to working on weekends or Federal holidays. The Government may reject any such request without impacting the completion time of the contract.

3. CONTRACT COMPLETION: The contractor shall complete work within the time frame indicated upon issuance of the Notice to Proceed for Submittals. Limitations imposed by these work hours will not entitle the Contractor additional time to complete the project. Refer to FAR Clause 52.211-10 "Commencement, Prosecution and Completion of Work".

4. ACCESS TO BASE: Prior to commencement of the contract, the Contractor and all sub-contractors are required to register with the USCG TRACEN Cape May Security Office. Background screenings will be performed by TRACEN Security for all employees of the Contractor and sub-contractors working on the Base. The Contractor shall contact USCG TRACEN Cape May Security Office at (609) 898-6915 for detailed requirements.

SECTION 01 14 13
PRE-BID SITE VISITS

1. GENERAL: Bidders are responsible for visiting the site to field verify existing conditions and determine actual dimensions and the nature of the work required. Failure to visit the site does not relinquish the bidder from determining the extent and scope of the work required and estimating the difficulty and cost to complete the project. Requests for equitable adjustments, in either time or money, arising from failing to field verify site conditions may be denied. Provisions regarding the site visit requirements are outlined in FAR Clause 52.236-3 “Site Investigation and Conditions Affecting the Work”.

2. SITE VISIT: During the Solicitation Phase of this Project, two Pre-Bid site visits will be scheduled by the Owner. The first Pre-Bid site visit will held approximately two weeks after the release of the Solicitation. The second Pre-Bid site visit will be held approximately three weeks after the release of the Solicitation. It is the responsibility

of the contractor to contact the Project Engineer, Predrag Citakovic, Facilities Engineering, Design Section, at (609) 898-6820 to obtain the specific dates, as no other site visits will be schedule.

SECTION 01 14 14
PRE-CONSTRUCTION SITE CONDITIONS

1. SITE CONDITION VERIFICATION: The Contractor shall verify the conditions of the existing site, equipment and facilities potentially affected by the work under this contract. When designated on the submittal list, the contractor shall photograph and/or videotape the conditions in order to document their pre-construction condition. Copies of the photos and videos shall be submitted to the Contracting Officer prior to starting work.

2. UTILITIES:

2.1 Training Center has a dig request policy created to help prevent accidents and interruptions to vital underground facilities. Ten (10) business days prior to excavation or digging to a depth greater than 6 inches, the Contractor shall submit a Dig Request form. Forms will be provided at the pre-construction meeting, at or upon request. The Contractor shall maintain the mark-outs throughout construction.

2.2 At least ten (10) business days prior to any excavation greater than 6 inches deep, the contractor shall contact New Jersey One Call at 1 (800) 272-1000 for mark-out of utilities not owned by the Training Center. The Contractor shall maintain the mark-outs throughout construction. Submit copy of mark-out request to Quality Assurance Office (609) 898 6409, Contracting Officer and COR.

2.3 Contractor shall not proceed with excavation unless an approved dig request has been received.

SECTION 01 14 16
COORDINATION

1. INTERFERENCE WITH COAST GUARD OPERATIONS: Accomplish work in a manner that causes minimal impact on normal operations. The Contractor shall notify the Contracting Officer's Representative at least five working days in advance of any planned outages of water, electrical, telephone, or sanitary facilities. Notify the Contracting Officer's Representative at least one week prior to beginning construction.

2. TRAINING CENTER REGULATIONS:

2.1 The Contractor, his employees, and subcontractors shall become familiar with and obey all Training Center regulations. All personnel employed on the project shall keep within the limits of the work and avenues of ingress and egress, and shall not

enter any other areas outside of the site of the work unless required to do so in the performance of their duties. The Contractor's equipment shall be conspicuously marked for identification

2.2 There shall be NO SMOKING in any Coast Guard building.

2.3 Storage Areas: The Contracting Officer's Representative will determine exact location and boundaries of staging areas. Under no circumstances shall materials be stored in areas that will interfere with aircraft operations.

2.4 Storm Protection: If a gale force wind warning or higher is issued, take precautions to minimize any danger to persons and protect the work and nearby Government property. Precautions shall include, but not be limited to, closings, removing loose materials, tools and equipment, from exposed locations. Remove and secure scaffolding and temporary work. Close openings in the work area if storms of lesser intensity are imminent.

SECTION 01 14 19
FIELD ADJUSTMENTS

1. The Contracting Officer's Representative may authorize field adjustments. Field adjustments are those alterations that do not affect time, price, or intent of the contract documents. All field adjustments shall be documented in the Daily Reports and on the As-Built Drawings.

SECTION 01 18 13
UTILITY PERMITS

1. The Contractor is responsible for obtaining all permits required for connection to all public or private utility systems. This shall include all permit, inspection, administrative and accessory costs normally charged of customers by the utility.

1.1 All Tie-in and/or connection fees will be paid by the Contractor.

SECTION 01 18 14
BUILDING PERMITS

1. NO BUILDING PERMITS from state or local governments are required for work performed on federal property.

SECTION 01 18 17
ENVIRONMENTAL PERMITS

1. Unless directed by other sections of this specification, the Contractor will not be

responsible for obtaining environmental permits.

SECTION 01 26 13
REQUESTS FOR INFORMATION

1. SUMMARY:

1.1 Section Includes: Administrative requirements for requests for information.

2. DEFINITIONS:

2.1 Request for Information: A document submitted by the Contractor requesting clarification of a portion of the contract documents, hereinafter referred to as RFI (Request for Information).

2.2 Proper RFIs: A properly prepared request for information shall include a detailed written statement that indicates the specific Drawings or Specification in need of clarification and the nature of the clarification requested.

A. RFIs shall be sequentially numbered.

B. Drawings shall be identified by drawing number and location on the drawing sheet.

C. Specifications shall be identified by Section number, page and paragraph.

2.3 Improper RFIs: RFIs that are not properly prepared.

A. Improperly prepared RFIs will not be processed by the Contracting Officer, but will be returned unprocessed.

2.4 Frivolous RFIs: RFIs that request information that is clearly shown on the Contract Documents.

A. Frivolous RFIs may be returned unprocessed.

3. CONTRACTOR'S REQUESTS FOR INFORMATION:

3.1 During Bid Phase: Bidders shall submit all questions, in writing, to the Contracting Officer. Requests for Information (RFI) shall be submitted no later than five (5) business days prior to the bid due date. RFIs will be addressed by the USCG three (3) business days prior to the bid due date.

3.2 During Construction Phase: When the Contractor is unable to determine from the Contract Documents, the material, proces or system to be installed, the Contracting Officer shall be requested to make a clarification of the indeterminate item.

A. Wherever possible after contract award, such clarification shall be requested at the next site visit by the Contracting Officer's Representative (COR), with the response entered on the daily reports. When clarification at the COR's site visit is not possible either because of the urgency of the need, or the complexity of the item, Contractor shall prepare and submit an RFI to the Contracting Officer.

B. Contractor shall endeavor to minimize the number of RFIs. In the event that the process becomes unwieldy, in the opinion of the Contracting Officer because of the number and frequency of the RFIs submitted, the Contracting Officer may require the Contractor to abandon the process and submit future requests as either submittals, substitutions or requests for change.

C. RFIs shall be submitted on the form provided by the Contracting Officer. Forms completely filled in, and if prepared by hand, shall be fully legible after photocopying, scanning or fax transmission. Each page of the attachments to RFIs shall bear the RFI number in the upper right corner.

D. RFIs shall be originated by the Prime Contractor.
   1. RFIs from subcontractors or material suppliers shall be submitted through, reviewed by, and signed by the Prime Contractor prior to submitting to the Contracting Officer.
   2. The Contracting Officer will neither act on nor respond to RFIs received directly from subcontractors or suppliers.

E. Contractor shall carefully study the Contract Documents to assure that the requested information is not available therein. RFIs which request information available in the Contract Documents will be deemed either Improper or Frivolous as defined above.

F. In cases where RFIs are issued to request clarification of coordination issues, for example, pipe and duct routing, clearances, specific locations of work shown diagrammatically, and similar items when feasible, Contractor shall fully lay out a suggested solution using drawings or sketches drawn to scale, and submit with the RFI.

G. RFIs shall not be used for the following purposes:
   1. To request approval of submittals.
   2. To request approval of substitutions.
   3. To request changes which entail additional cost or credit.
   4. To request different methods of performing work than those drawn and specified.

H. In the event the Contractor believes that a clarification by the Contracting Officer results in additional cost or time, the Contractor shall not proceed with the work indicated by the RFI until a modification is prepared and

approved. RFIs do not automatically justify a cost increase in the work or a change in the project schedule.

1. Answered RFIs shall not be construed as approval to perform extra work.

I. Contractor shall prepare and maintain a log of RFIs, and at any time requested by the Contracting Officer, Contractor shall furnish copies of the log showing outstanding RFIs. Contractor shall note unanswered RFIs in the log.

J. Contractor shall allow up to 14 days review and response time for RFIs, however, the Contracting Officer will endeavor to respond in a timely fashion to RFIs.

K. The Government reserves the right to issue a change order to expedite the work per FAR Clause 52.243-4, Changes.

4. CONTRACTING OFFICER'S RESPONSE TO RFIs:

4.1 Contracting Officer will respond to RFIs on one of the following forms:

A. Proper RFIs:
1. Change Order
2. Request for Proposal

B. Improper or Frivolous RFIs:
1. Unprocessed RFIs will be returned with a stamp or notation: Not Reviewed.

C. Answers to properly prepared RFIs may be made directly upon the RFI form with supplementary instructions as necessary.

SECTION 01 31 19
PROJECT MEETINGS

1. LOCATION: Project meetings will be conducted either on-site or with a conference call. The following meetings may be held:

1.1 Pre-Construction Conference: After award of a contract, the Coast Guard will arrange a conference with the contractor, and necessary Coast Guard personnel. The purpose of this conference is to orient the Contractor to Government procedures for wage rates, contractual and administrative matters, and to discuss specific issues regarding actual construction.

1.2 Progress and Technical Review Meetings: These meetings generally take place at the project site. Either party may request a meeting to review the progress of the project and/or review or clarify the technical requirements of the specifications.

SECTION 01 32 16
CONSTRUCTION SCHEDULE, SCHEDULE OF VALUES,
AND PROGRESS SCHEDULE

1. In accordance with the Notice to Proceed letter, the Contractor shall submit the following:

1.1 Construction Schedule-This schedule shall be prepared using a horizontal bar graph with time scale. It shall be in an industry accepted Project Management format and shall accurately display:

A. All major categories of work to be performed within the required contract completion date broken out in sufficient detail to track progress throughout the life of the contract. Major work categories should include but are not limited to mobilization, carpentry, plumbing, mechanical, electrical, roofing, concrete, site work, and demobilization. In addition to construction activities, procurement times for critical items, submittal turnaround time, mobilization, final inspection, punchlist work, and demobilization shall be shown on the schedule.

B. The duration of each work category.

C. Any concurrent work categories.

1.2 Schedule of Values-This schedule shall be prepared as a **detailed** cost breakdown of the contract price and be submitted with the Construction Schedule. This schedule shall include but not be limited to costs of materials, equipment, and labor for all major work categories shown on the Construction Schedule. The Contractor shall adhere to the following guidelines when developing the Schedule of Values.

A. Format - The line items in the Schedule of Values shall be the same as that of the Construction Schedule.

B. Bonds - Bonding costs will only be paid in a lump sum if they are broken out separately and included with the schedule of values. The Contractor shall provide evidence that he has furnished full payment to the surety.

C. Materials - To request progress payments for materials delivered to the construction or fabrication site, the particular category of work associated with the materials must be broken down into separate material and labor costs.

2. UPDATES: **Each month and /or with each progress payment request,** the Contractor **shall** submit the following:

2.1 Progress Schedule-This schedule shall be an update of the Construction Schedule.

It shall show the current schedule of all work.

A. Modifications - If modifications are made to the contract, the work added shall be tracked separately from the original Construction Schedule and shall maintain its individuality on the Progress Schedule throughout the life of the contract. Progress Payment requests shall not lump modification costs into the original contract price.

SECTION 01 32 26
CONSTRUCTION DAILY REPORTS

1. GENERAL: **The Contractor shall complete a Daily Report for each and every day after mobilization.** The importance of an accurate, fully detailed Daily Report, promptly delivered to the designated On-Site Representative cannot be overemphasized. The report shall provide an accurate cumulative summary of the history and performance of the work. The Daily Report shall document weather; work hours; work in-place; inspections and tests conducted, and their results; dimensional checks; equipment and material checks; data on workers by classification; the mobilization and demobilization of construction equipment; materials delivered to the site; and any other pertinent noteworthy event; e.g., personnel injury, site visit by Coast Guard personnel, etc.

2. RESPONSIBILITY: The Daily Reports play an important role in settling disputes and claims for both parties. For this reason the On-Site Representative and the Contractor's Superintendent, together, should review the report to ensure its completeness and accuracy. Each day's report shall be submitted to the On-Site Representative no later than 10:00 a.m. the following morning. The maximum allowable retainage will be enforced for late, sporadic or non-submission of Daily Reports. In the absence of an On-Site Representative the Contractor shall mail the Daily Reports directly to the Contracting Officer every Friday. Should the Daily Report indicate an accident, environmental issue, OSHA violation or any crisis the On-Site Representative deems important, the Report should be faxed immediately to the Contracting Officer at (216) 902-6278.

3. DESIGNATED ON-SITE REPRESENTATIVE RESPONSIBILITY: After a Notice to Proceed for site work has been issued the On-Site Representative shall complete a Daily Report for each day until the Contractor mobilizes. After the Contractor is at the site, the On-Site Representative shall ensure that the Contractor completes the Daily Report in accordance with Paragraphs 1 and 2 above. Any items of dispute or other notes the On-Site Representative feels appropriate shall be added to the Daily Report. The On-Site Representative is also responsible for informing the COR when the contractor fails to submit daily reports.

SECTION 01 33 00
SUBMITTAL PROCEDURES

1. GENERAL: The Contractor shall submit to the COR and Contracting Officer, one (1) electronic copy in ".pdf" format of submittals required by this specification and/or itemized on the "List of Submittals" found at the end of this division.

2. REQUEST: A "CONTRACT ITEM ACCEPTANCE REQUEST" shall accompany all submittals. All items shall be individually listed and clearly identified, referencing the applicable Section and Paragraph. A copy of this form is located at the end of this division and may be reproduced as needed. Both sides of Contract Item Acceptance Request sheet shall be submitted. The sheet shall be signed and dated by the Contractor.

2.1 The Contract Item Acceptance Request and the item information shall be consolidated into one .pdf file and one email. Email to the COR and Contracting Officer. Manage email size so as not to exceed the limit allowed by the Coast Guard system. If the email is rejected by the system, reduce the file size and resubmit.

2.2 Up to eleven (11) items may be listed on an individual approval request. Number each Contract Item Acceptance Request consecutively *(Submittals # 1, 2, etc.)* and re-submittals with letters *(Submittal #1A is the first re-submittal of Submittal #1)*.

2.3 Submittals shall be forwarded to the COR and Contracting Officer. The contractor shall allow 14 calendar days, excluding mailing time, for the review process in the Construction Schedule and all project planning. In instances where submittal review must be expedited, the Contractor may annotate the Contract Item Acceptance Request as "Urgent" to request a prompt return. The Coast Guard will make every effort to accelerate the review of each urgent submittal; however, the Contractor should not anticipate a reduced time schedule and shall plan project progress accordingly.

3. DEVIATIONS

3.1 Deviation from specification:

A. The COR and Contracting Officer will consider requests for deviations/substitutions only if submitted within fifteen (15) calendar days after award.

B. Deviations may be considered when a product becomes unavailable through no fault of the Contractor.

C. The Contractor shall document each request with complete data substantiating compliance of proposed deviation with the Contract

documents. *Request for deviation **shall not** be submitted on a Request for Information (RFI) form.*

D. A request constitutes a representation that the Contractor:
   1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
   2. Will provide the same warranty for deviation as for specified product.
   3. Will coordinate installation and make changes to other work which may be required for the work to be completed at no additional cost to the Government.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse the Government for review or redesign services associated with re-approval by the COR and Contracting Officer.

E. If the deviation has a lesser value than the product originally specified, the Contractor shall provide a credit to the Government.

F. Deviations will not be considered when they are indicated or implied on Shop Drawings or Product Data submittals, without a separate written request, or when acceptance will require revisions to the Contract documents.

3.2 Deviation submittal procedures:

A. The Contractor shall mark the "Deviation" block on the Contract Item Acceptance Request (CIAR) form and provide the information stated in Paragraph 3.1 above.

B. The Contractor shall submit shop drawings, product data, and certified test results attesting to proposed product equivalence. Burden of proof is on the Contractor.

C. The COR and Contracting Officer will then review the "deviation" request and either accept or reject the deviation. The COR and Contracting Officer's acceptance of the deviation signifies that the Contractor has provided the information required in Paragraph 3.1. If a credit is due the government, the Contracting Officer will notify the Contract Specialist and the deviation will be processed utilizing the Change Request procedures for a modification to the contract/task order.

D. The COR and Contracting Officer will notify the Contractor of acceptance/rejection of the deviation via an accepted or rejected CIAR. The Contracting Officer will notify the Contractor, in writing, if a modification to the contract is required.

E. If a request for deviation is received without the documentation stated above, the COR and Contracting Officer will return the submittal to the contractor for the required information.

4. ACCEPTANCE: Submittals will be stamped "Accepted, "Accepted with Comment", or "Resubmit". Accepted, Accepted with Comment or Resubmit for each item will be indicated on the Contract Item Acceptance Request form and one copy returned to the Contractor.

4.1 **Prompt re-submittal of items is required**. The Contractor shall furnish a new Contract Item Acceptance Request numbered in accordance with the requirements of paragraph 2.1.

4.2 The actions taken by the Coast Guard are only for general conformity to the contract drawings and specifications and shall not relieve the Contractor from responsibility for error in dimensions and compliance with all terms stipulated by contract.

5. DEFECTIVE WORK: Approval of Submittals does not restrict the Government's right to reject departures from contract requirements, use of damaged or improperly installed items/materials, or latent defects, nor does it prejudice the Government's rights of rejecting any work found defective at Final Inspection and Acceptance.

5.1 Work started or completed prior to submittal acceptance is **solely** at Contractor's risk and may jeopardize contract performance.

6. TYPES OF SUBMITTALS: The paragraphs given below provide descriptions for each type of submittal that may be required within the individual sections of this specification. Refer to the Individual Sections themselves and the List of Submittals document for the required submittals.

6.1 Product Data: Submit pursuant to this section for review for conformance with contract.

A. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Indicate product utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

6.2 Shop Drawings: Submit pursuant to this section for review for conformance with contract.

A. Shop drawing submittals shall be drawings, diagrams, schedules and other data specially prepared for the work of this contract by the contractor or any

subcontractor, manufacturer, supplier or distributor to illustrate a portion of work to be installed under this contract.

B. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. When required by individual specification sections, provide shop drawings signed and sealed by professional engineer responsible for designing components shown on shop drawings.
   1. Include signed and sealed calculations to support design.
   2. Submit drawings and calculations in form suitable for submission to and approval by authorities having jurisdiction.
   3. Make revisions and provide additional information when required by authorities having jurisdiction.

6.3 SAMPLES: Submit pursuant to this section for review for conformance with contract.

A. Samples For Selection as Specified in Product Sections:
   1. Submit to Contracting Officer's Representative for aesthetic, color, or finish selection.
   2. Submit samples of finishes from full range of manufacturers' standard colors, textures, and patterns.

B. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

C. Include identification on each sample, with full Project information.

D. Submit number of samples specified in individual specification sections.

E. Reviewed samples which may be used in the Work are indicated in individual specification sections.

F. Samples will not be used for testing purposes unless specifically stated in specification section.

6.4 Design Data: Submit pursuant to this section for review for conformance with contract.

A. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

6.5 Test Reports: Submit pursuant to this section for review for conformance with contract.

A. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

B. The testing shall have been performed in a laboratory meeting the requirements specified herein. The tests shall have been performed within three years of submittal of the reports for approval. Test reports shall be accompanied by the certificates from the manufacturer certifying that the material and equipment proposed to be supplied is of the same type, quality, manufacture, and make as tested.

6.6 Certifications: Manufacturer's certification furnished by the Contractor on items of materials and equipment incorporated into the work will be accepted only when this method will assure full compliance with the provisions of the contract. Pre-printed certificates will not be acceptable. All certifications shall be in the original. The original of all manufacturers' certifications shall name the appropriate item of equipment or material, specification, standard, or other document specified as controlling the quality of that item and shall have attached thereto certified copies of test data upon which the certifications are based. All certificates shall be signed by the manufacturer's official authorized to sign certificates of conformance or compliance.

A. When specified in individual specification sections, submit certification.

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

6.7 Laboratory Reports: Reports shall cite the contract requirements, the test or analysis procedures used, the actual test results, and include a statement that the item tested or analyzed conforms or fails to conform to the specification requirements. Each report shall be conspicuously stamped on the cover sheet in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements as the case may be. All test reports shall be signed by a representative of the testing laboratory authorized to sign certified test reports. The Contractor shall arrange for immediate and direct delivery of the signed original of all reports, certifications, and other documentation.

6.8 Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing.

A. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

6.9 Manufacturer's Field Reports: When specified in the individual specification sections, submit Manufacturer's Field Reports on tests conducted by manufacturers.

Reports shall cite the contract requirements, the test or analysis procedures used, the actual test results, and include a statement that the item tested or analyzed conforms or fails to conform to the specification requirements. Each report shall be conspicuously stamped on the cover sheet in large red letters "CONFORMS" or "DOES NOT CONFORM" to the specification requirements as the case may be. All test reports shall be signed by a representative of the testing laboratory authorized to sign certified test reports. The Contractor shall arrange for immediate and direct delivery of the signed original of all reports, certifications, and other documentation.

6.10 Manufacturer and Installer Qualifications: When specified in the individual specification sections, submit qualifications of the manufacturers or installers as required. Qualifications shall include a list of projects of similar nature and a list of five references, minimum, with all contact information. Additional references may be required upon request.

SECTION 01 35 29
SAFETY PROGRAM

1. GENERAL: The Contractor is wholly responsible for work site safety. The Contractor shall implement a safety program that protects the lives and health of personnel in the construction area, prevents damage to property, and avoids work interruptions. The Contractor shall provide appropriate safety barricades, signs, signal lights, etc. (see Section 01 56 00, “Lights, Signs & Barricades”) as well as complying with the requirements of all applicable Federal, State and Local safety laws, rules and regulations.

2. COMPLIANCE: The Contractor is specifically required to comply with the requirements of the U. S. Army Corps of Engineers "Safety and Health Requirements Manual" (EM 385-1-1, latest version available) and the “Accident Prevention” clause (FAR 52.236-13). Once accepted, this safety plan shall become part of the contract requirements. Note: This review/acceptance does not in any way relinquish the Contractor from responsibility for work site safety nor the obligation to comply with the OSHA regulations found in 29 CFR 1910 & 1926 or any other State or Local safety law, rule or regulation applicable to the contract work. The Coast Guard will cooperate fully with the Department of Labor (Occupational Safety and Health Administration) in their enforcement of OSHA regulations.

3. SAFETY PLAN: The Contractor shall submit a written safety plan. At a minimum, this plan shall describe the Contractor's general safety program and identify specific safety provisions for hazards incidental to the contract work; e.g., elevated working surfaces, working over water, working from floating work platforms, overhead crane operations, etc.

SECTION 01 51 00
TEMPORARY UTILITIES

1. GENERAL: All temporary utility connections shall be compatible with existing materials and equipment to provide safe and efficient installation, operation and removal.

2. ELECTRICITY: The Contractor may utilize electrical power from the nearest electrical receptacle or panelboard, subject to availability. OSHA requirements will govern the use of such utility. All equipment used shall be supplied by the Contractor. US Coast Guard does not make any guarantee against any voltage variation or service interruption.

2.1 Utility Outages and Shutdown: Needed power outages shall be arranged only with prior approval from Contracting Officer's Representative (COR), with duration and affected areas held to a minimum.

3. TELEPHONE: Telephone services will not be available for use by the Contractor.

4. WATER HOOKUP: Water will be made available at the nearest hydrant or exterior hose bib. All connections to the water system shall be equipped with back flow protection. Temporary potable water pipes and hoses shall be sterilized before being placed in operation and every time the system is opened to the atmosphere for repair or relocation.

5. SANITARY FACILITIES: It shall be the Contractor's responsibility to furnish and maintain approved portable toilet facilities for all Contractor personnel. The On-Site Representative will designate the physical location for the facility and the Contractor shall maintain the toilet facility to the satisfaction of the Government. Contractor personnel are forbidden to use toilet facilities within existing buildings.

SECTION 01 51 13
EQUIPMENT/UTILITY LOCKOUT AND TAGOUT REQUIREMENTS

1. GENERAL: The Contractor shall comply with OSHA 29 CFR 1910.147, "The Control of Hazardous Energy" (Lockout/Tagout). The Contractor shall provide a Lockout/Tagout Plan to the Contracting Officer prior to starting any work affected by the energy in the equipment/utility system.

2. APPLICATION: The Contractor shall be responsible for locking out and tagging out of service, all equipment/utility systems involved in the work under this contract. After the Contracting Officer's Representative has approved an outage, Government personnel and the Contractor shall independently secure the equipment/utility system and tag the respective system out of service. The Contractor shall provide their own locks and chains that are required to secure the equipment/utility systems; e.g., steam, water, air, and/or electricity.

SECTION 01 51 16
TEMPORARY FIRE PROTECTION

1. TEMPORARY FIRE PROTECTION: Install and maintain temporary fire-protection facilities to protect against predictable and controllable fire loss. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations and Demolition Operations".

1.1 HOT WORK PERMIT

A. Prior to performing "Hot Work" (welding, burning, lead melting, blowtorches, tar pots, etc.) or operating other flame-producing devices, the contractor shall request a Hot Work permit. This permit will be issued by the Training Center Fire Department through the Contracting Officer's Representative (COR). This permit will be issued only after job site inspection by a member of the Fire Department for a specific task.

1. All Hot Work will be shut down 30 minutes before the end of work and a fire watch shall be kept at the scene of operation during this 30 minutes.
2. Extinguishers and Fire Watch Personnel: The contractor shall furnish, in accordance with all applicable requirements of the NFPA (National Fire Protection Association) Standards, sufficient fire extinguishers and fire watch personnel to protect the area in which his work is being performed. The size and type of fire extinguisher used will be subject to review by the Training Center Fire Department through the COR.

1.2 BURNING

A. The burning of trash or other waste material shall be prohibited.

1.3 HEATING

A. All sources of temporary heat shall carry an "Underwriters Laboratory" label and portable heaters shall be located to avoid ignition of combustible materials.

B. Electrical heaters shall not be connected to extension cords.

C. Open drumfires are prohibited.

1.4 ELECTRICAL

A. All portable electric devices (saws, sanders, compressors, lights, extension cords) not required to be left on shall be disconnected at the close of work each day.

B. All wires plugged into electrical outlets shall be equipped with male plugs. The inserting of the bare ends of wires into outlets is prohibited.

1.5 FLAMMABLES

A. Oil painting materials (paint, brushes, empty paint cans, rags, paint clothes, drop cloths, etc.) and flammable liquids shall be removed from the building at the close of work each day.

B. Highly flammable liquids such as paints, thinner, etc. that are to be kept inside buildings shall be held to an absolute minimum except in buildings authorized and designed for such storage.

C. Storage of gasoline in excess of (5) gallon containers shall be permitted only by specific approval from the Training Center Fire Chief through the Contracting Officer's Representative.

D. All storage areas containing flammable liquids shall be marked with signs indicating "FLAMMABLES" and "NO SMOKING".

1.6 FIRE HYDRANTS

A. Fire hydrants shall not be used without approval of the Training Center Fire Department through the Contracting Officer's Representative. Where permission is granted for the use of fire hydrants, the contractor shall be required to furnish a gate valve and backflow preventer to fit the 2 1/2-inch outlets.

B. The Training Center Fire Department through the Contracting Officer's Representative will have control of the opening and closing of fire hydrants.

C. A clear space of 15 feet on both sides of fire hydrants shall be maintained at all times.

1.7 EXISTING FIRE DEVICES

A. Fire hose or extinguishers in existing buildings shall not be removed from their locations, unless specifically indicated to be relocated or removed by the plans and specification for the project. No fire hose or extinguishers shall be used for any purpose other than combating a fire.

1.8 SMOKING:

A. Smoking is strictly prohibited in all Government buildings. Smoking is only permitted in designated smoking areas. There shall be NO SMOKING or unsupervised open flame permitted inside any structure, temporary or permanent; nor within 25 feet of combustible material or within 50 feet of flammable liquids or compressed gasses.

1.9 FIRE REPORTING

A. All contractors providing office space or trailers with telephone service shall place or post the fire reporting phone number by the phone. All contractor personnel shall be instructed how to report a fire. Any fire, no matter how small, shall be reported, including those already extinguished, to the Training Center Fire Department immediately. If a Training Center telephone is used, dial extension 6333. If any other telephone is used, dial 911.

SECTION 01 52 13
FIELD OFFICES

1. OFFICE AND STORAGE SHED: A field office for the COR is not required. The Contractor shall provide his own office and storage shed or trailer, if necessary. No equipment or material storage will be provided by the Coast Guard. Locations of the office and sheds shall be provided by the COR at the Pre-Construction meeting.

SECTION 01 54 30
CONFINED SPACE ENTRY

1. COMPLIANCE: The Contractor shall comply with OSHA 29 CFR 1910.146, Permit-Required Confined Space. The Contractor shall provide a Confined Space Entry Plan to the Contracting Officer and the COR and notification to the USCG Training Center Fire Department prior to entering or starting any work in a confined space. The Contractor shall provide all equipment and materials as required to comply with OSHA and complete the work under this contract.

SECTION 01 55 00
ACCESS ROADS AND PARKING

1. ACCESS: Access to the site is available from public roads. Any damage to these roads by the Contractor's vehicles shall be repaired without cost to the Government.

2. PARKING: Vehicular operations and parking shall comply with all applicable government orders and regulations. All driveways and entrances serving the Government shall be kept clear and available to emergency vehicles at all times.

3. VEHICLE AND VEHICLE OPERATION: All vehicles, owned by the Contractor or employees of the Contractor, and operators of these vehicles, shall meet all state regulations for safety, noise, loading and minimum liability insurance. All vehicle operators demonstrating reckless or careless operation in the opinion of the Government shall not be allowed to operate vehicles on government property for the duration of the contract.

4. VISITORS: No visiting vehicles will be permitted on government property unless the operator is employed by a subcontractor or supplier.

SECTION 01 55 29
STAGING AREAS AND ACCESS

1. LOCATION: The Contractor shall store materials and operate equipment within the confines of the staging area identified by the Government. Storage of materials outside of the staging area will not be permitted. A lay down and parking area for Contractor's vehicles, trailers and personnel will be designated by the Contracting Officer's Representative at the Pre-construction meeting.

2. COORDINATION: Obey all U.S. Coast Guard Parking Signs and traffic rules. Vehicles shall not travel or park on grass. If travel or parking on grass is necessary, grass shall be restored to original condition after completion of the project at no cost to the Government.

3. ADJACENT AREAS: The Contractor shall ensure that all land and vegetation adjacent to the staging area and access drive remain undisturbed and undamaged; all damages shall be repaired at no cost to the Government.

SECTION 01 56 00
LIGHTS, SIGNS & BARRICADES

1. GENERAL: The contractor shall provide and maintain all warning lights, sign, and barriers to insure the safety of pedestrians or vehicles traveling near or through any hazardous area caused by the execution of the Contract work.

1.1 TRAFFIC REGULATION

A. Traffic Control Signs and Devices:
   1. Post Mounted and Wall Mounted Traffic Control and Informational Signs: Shall comply with the Manual on Uniform Traffic Control Devices, latest edition.
   2. Traffic Cones and Drums, Flares and Lights: Shall comply with the Manual on Uniform Traffic Control Devices, latest edition.
   3. Provide signs at approaches to site and on site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
   4. Relocate as Work progresses, to maintain effective traffic control.

B. Removal:
   1. Remove equipment and devices when no longer required.
   2. Repair damage caused by installation.

1.2 BARRICADES: Any stored debris, equipment and all areas dangerous to foot or

vehicular traffic shall be barricaded by the Contractor. At night and during other times of poor visibility, barricades shall be illuminated. All barricading, including night illumination shall be maintained by the Contractor. All barricades shall be constructed in accordance with ANSI D6-1.

1.3 PEDESTRIAN TRAFFIC: The Contractor shall arrange his equipment and/or progression of work, so as not to interfere with the normal flow of pedestrian traffic. Where interference is unavoidable, the contractor shall provide a marked, safe, and clean route around the obstruction

1.4 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Provide protection for plants designated to remain. Replace damaged plants.

C. Protect non-owned vehicular traffic, stored materials, site, and structures from damage.

SECTION 01 57 13
EROSION AND SEDIMENT CONTROL

1. GENERAL: The Contractor shall plan and execute all earthwork to minimize the duration of exposure of unprotected soils. Temporary protection shall be provided on side and back slopes as soon as rough grading is completed or when sufficient soil is exposed to require protection to prevent erosion. All earthwork brought to final grade shall be finished immediately.

2. METHODS: The Contractor shall prevent erosion, control sedimentation, and prevent waterborne soil from entering surface waters, ditches, and storm drain inlets by use of any or all of the following methods.

2.1 Mechanical Control: Divert runoff by constructing ditches or berms. Filter runoff using straw bale dikes, filter fabric dams or other methods.

2.2 Sediment Basins: Trap sediment in temporary basins sized to accommodate the runoff of a local 25-year storm. Pump basins dry and remove accumulated sediment after each storm. Use a paved weir or vertical overflow pipe for overflow. Establish effluent quality monitoring programs as required by federal, state, and local regulations.

2.3 Vegetation and Mulch: Protect slopes by accelerated growth of vegetation, mulching, or netting. Stabilize slopes by hydroseeding, sodding, anchoring mulch or netting in place.

2.4 Geotextiles: Protect and stabilize slopes by anchoring geotextile fabric or matting. The Contractor shall use a geotextile designed and sized for the particular application.

2.5 Storm Sewer Inlets: Filter out sediment by installing a 6" layer of ¾" clean, crushed stone over geotextile filter fabric on the inlet grate. Remove and clean silt and sediment build up as required or as direct by the COR.

3. OTHER METHODS: Other erosion and sediment control methods may be used, as authorized by the Contracting Officer.

SECTION 01 57 23
POLLUTION CONTROL

1. VOLATILE ORGANIC COMPOUND (VOC) REGULATIONS: Contractors are required to comply with local, state and federal VOC compliance laws and regulations in the foregoing order of precedence. In order to comply with the provisions of the Clean Air Act, each state must have a State Implementation Plan. Some contractors may be required to abide by the provisions of a Title V Permit. Some contractors may be required by state or local law to operate under the terms of a Compliance Plan to reduce VOC Emissions.

1.1 In accordance with the Notice to Proceed Letter, the contractor will submit copies of any local, state or federal implementation plans, permits or compliance plans required/applicable to the use/application of VOCs at contractor's facility or offsite work places.

1.2 If no local, state or federal implementation plans, permits or compliance plans are required/applicable to the use/application of VOCs, then the contractor shall submit to the designated Contracting Officer a letter, notarized under oath, that such documents are not required.

SECTION 01 58 00
MARINE LIGHTS AND SIGNALS

1. GENERAL: The Contractor's Marine equipment shall display such lights and day signals as may be required under applicable Navigation Rules. The Contractor shall inquire at the nearest Coast Guard Marine Safety Office for specific information on these rules. The Contractor to the satisfaction of the Contracting Officer shall mark offshore structures during all phases of construction and removal. Contractor shall provide any lights, daymarkers or buoys required. Contractor shall contact Commander, Fifth Coast Guard District (dpw) at (757) 398-6486 for issuance of "Notice to Mariners" a minimum of 10 (ten) days in advance of commencing any work.

SECTION 01 65 00
RECOVERED MATERIALS NOTICE

1. GENERAL: It is the intent of Training Center Cape May to comply with the requirements of Section 6002 of the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act (RCRA or the Act) as amended, 42 U.S.C. 6962 and Executive Order 12873 as they apply to the procurement of the materials designated in paragraph 2.

2. DESIGNATED RECOVERED MATERIALS: It is the purpose of this section to designate items that are or can be made with recovered materials. These designated items can be found at http://www.epa.gov/epaoswer/non-hw/procure/products.htm .

3. CONTRACTOR RESPONSBILITY: The contractor should provide recycled materials to the extent practical, provided the materials meet all other requirements of the applicable specification section.

SECTION 01 66 13
HAZARDOUS WASTE

1. GENERAL: The Contractor shall comply with all federal, state, and local environmental regulations dealing with the generation, management, storage, and disposal of solid, toxic, and hazardous wastes. The Contractor shall ensure that all wastes are properly containerized, labeled and placarded, managed, tested, stored, documented/manifested, transported and disposed of in accordance with all applicable regulations. The manifest for all hazardous waste shall be signed by an authorized Coast Guard representative.

2. USED ELECTRIC LAMPS: 40 CFR 273 requires that electric lamps, including incandescent, fluorescent, neon and high intensity discharge (mercury vapor, high/low pressure sodium, metal halide) lamps that are no longer of use be recycled or treated as universal waste. The Contractor shall not dispose of any used electric lamps as solid waste. The Contractor shall recycle all waste electric lamps generated as a result of this work only at a licensed recycling facility.

3. RECYCLABLES: Recycling is a mandatory law of the State of New Jersey.

    A. At the discretion of the COR, certain items of copper (including insulated cable), aluminum and steel shall remain the property of the Training Center. The Contractor shall separate and deliver these materials to a location at the Training Center designated by the COR. The Contractor shall place these materials in their respective bins or dumpsters.

    B. The contractor shall recycle or reuse all other material designated as recyclable or prohibited from landfilling. Definitions for recyclables and landfill prohibited material can be obtained from the CMCMUA regulations.

4. SUBMITTALS: The Contractor shall provide the Contracting Officer with signed and fully executed originals of all hazardous waste profiles, test results, hazardous waste manifests and/or other shipping papers, electric lamp disposal documents and all other required documentation. Maximum payment retention shall be withheld until this documentation is received.

SECTION 01 66 16
SAFETY DATA SHEETS AND MATERIAL HANDLING PROCEDURES

1. DATA SHEETS: Submit a Safety Data Sheet (SDS) for all materials containing hazardous substances required for contract execution. Information provided in SDS's shall meet the requirements of 29 CFR 1910.1200. SDS's require Contracting Officer review and acceptance prior to bringing these materials on site.

2. MATERIAL STORAGE: Limit the quantity of these materials stored on site to the amount needed for execution of work. Storage of excess materials will not be permitted. Assure that the storage of these materials comply with all applicable federal, state, and local laws and regulations and provide additional storage facilities (paint lockers, etc.) as required for the storage of such materials. Coordinate the physical location of storage areas with the On-site Representative prior to bringing these materials on site.

3. PROTECTIVE MEASURES: The contractor shall take all protective measures outlined on the SDS's and as required by federal, state, and local regulations to protect all personnel in the vicinity of the work area from exposure to these materials. The Contractor shall include any required protective measures in the Safety Plan (See Section 01 35 29, "Safety Program"). The Contracting Officer's Representative shall review protective measures prior to allowing use of these materials.

4. DISPOSAL OF EXCESS MATERIAL: The Contractor shall dispose of all excess hazardous materials as required by the SDS and all applicable federal, state, and local laws and regulations.

SECTION 01 71 33
PROTECTION FROM WEATHER AND CONSTRUCTION OPERATIONS

1. TEMPORARY ENCLOSURES: Protect existing facilities/equipment and new construction, whether in progress or newly completed, from the adverse effects of the weather and construction operations. Provide temporary enclosures, coverings and barriers as required to afford protection against exposure, weather and wind damage and from construction operations which could degrade, stain, age, or reduce the finished quality of new work or damage existing facilities and equipment.

2. CONTRACTOR'S STAGING AND STOCKPILING: The Contractor is responsible for the protection and use of materials for the project inside or outside the facility,

including his dumpster and spot a pot used on site. Should the USCG notify the Contractor of a weather emergency such as an impending Hurricane, the Contractor will need to tie-down or move these temporary facilities to higher ground. Hurricane season is from June 1 - November 30.

3. REAPPLICATION: All temporary closures or enclosures shall be made ready for immediate re-application in the event of sudden storms or man-made conditions requiring protection of existing facilities or completed construction.

4. CLIMATE CONTROL: Where temporary heat is required during construction to protect work completed or to heat facilities in operation by the Coast Guard, all openings shall be made weather tight to allow the maintenance of 68 degrees F heat minimum with the existing or temporary heating equipment or 78 degrees F. maximum with existing or temporary cooling. NOTE TO OFFEROR: CLIMATE CONTROL SPECIFICALLY REQUIRED BY THIS CONTRACT WILL BE SPECIFIED IN THE STATEMENT OF WORK AND/OR ASSOCIATED DRAWINGS.

5. PIPING: Prevent water-filled pipes or tanks from freezing for both interior and exterior systems installed or in storage.

SECTION 01 74 00
GENERAL CLEANUP & SITE RESTORATION OF WORK AREAS

1. GENERAL: The Contractor shall remove and properly dispose of all trash and debris incidental to the contract work from the limits of government property, as well as all adjacent affected areas. The Contracting Officer shall determine the extent and interval of these cleanups.

2. WORK AREA CLEANUP: At the end of each day the entire work area and all adjacent affected areas shall be thoroughly cleaned by removing all trash, debris, dust, etc. caused by the contract work. Any floor, wall or ceiling surfaces that may have been stained or soiled by the contract work shall be restored to pre-construction condition.

3. SITE RESTORATION: If at any time while performing the contract the Contractor causes damage or destruction to any portion of any Government facility or grounds; e.g., bulkheads, pavement, lawns, shrubbery, etc., it shall be the Contractor's responsibility to replace and/or restore the damage as approved by the Contracting Officer's Representative at no additional cost to the Government.

4. POST CONSTRUCTION CLEANUP: Upon completion of the job, the Contractor shall clean up the job site, returning it to a state of cleanliness equal to or exceeding that in which it was found. The Contractor shall properly dispose of any trash, extra materials, dirt, debris, or other litter that remains. If the job site appearance is not to the satisfaction of the Contracting Officer's Representative, final acceptance will not be approved.

SECTION 01 78 00
AS BUILT DRAWINGS

1. GENERAL: Maintain one full size set of contract drawings to record variations from the original design. **All deviations shall be neatly and clearly marked in RED** on these drawings to show work and/or materials actually provided. As Built drawings shall be **updated** as work progresses and kept at the work site for the duration of the contract. These drawings shall be available for Contracting Officer Representative review upon request.

2. DISCOVERED UTILITIES: Indicate the exact location and depth of any **underground utility lines discovered in the course of the work** on the As-Built drawings.

3. PERMITTED VARIATIONS: As Built drawings shall reflect the actual construction and materials provided when alternative materials or work methods are allowed in the specifications and/or drawings or if the scope is altered by award of bid items, subsequent changes or modifications.

4. STANDARDS: Variations shown on As Built drawings shall be neat, clear and conform with standard drafting practices. Mark-ups shall include supplementary notes, legends, and details necessary to convey the exact representation of construction actually provided. As Built drawings shall be clearly labeled “AS-BUILT” and dated.

5. SUBMITTAL: Submit one “.pdf” digital copy and one ANSI D sized (22”x34”) paper copy of the As Built drawings for Contracting Officer and COR acceptance upon completion of the contract. **Final payment will not be until all required As-Built drawings are accepted.** Maximum retention shall be withheld for late or incomplete As Built drawings.

SECTION 01 78 23
OPERATING INSTRUCTIONS AND TRAINING

1. MANUALS: Upon completion of the work, but before the work is accepted by the Government, the Contractor must forward one (1) .pdf file and one (1) complete bound set of instructions, tabbed and identified for reference, for all equipment and/or systems provided under this contract. The instructions shall include component parts, manufacturer's certificates, warranty slips, parts lists, descriptive brochures, and manufacturer's maintenance and operating instructions as indicated below.

1.1 Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.

1.2 Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project, and subject matter of binder when multiple binders are required.

1.3 Internally subdivide binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

1.4 Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

1.5 Contents: Prepare Table of Contents for each volume, with each product or system description identified, typed on white paper, in three parts as follows:

A. Part 1: Directory, listing names, addresses, and telephone numbers of Contracting Officer's Representative, Contractor, Subcontractors, and major equipment suppliers.

B. Part 2: Operation and maintenance instructions arranged by process flow and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   1. Significant design criteria.
   2. List of equipment.
   3. Parts list for each component.
   4. Operating instructions.
   5. Maintenance instructions for equipment and systems.
   6. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

C. Part 3: Project documents and certificates, including the following:
   1. Shop drawings and product data.
   2. Air and water balance reports.
   3. Certificates.
   4. Photocopies of warranties

2. TRAINING: When requested by the COR, the Contractor shall provide up to two hours of training, which shall explain to the Government's personnel all procedures necessary to operate and maintain all equipment and systems on a continuing basis. A verification of training shall be provided.

SECTION 01 80 00
FACILITY PREVENTATIVE MAINTENANCE PROGRAM (FPMP)

1. GENERAL: The intent of this section is for the Contractor to complete the Equipment Enrollment Form (EEF) spreadsheet for systems that have been installed or demolished under this project and are listed in the USCG Approved Equipment Enrollment Catalog. Both the USCG Approved Equipment Enrollment Catalog and Equipment Enrollment Form (EEF) are provided as Reference Documents in the

solicitation.

At a minimum, the following items require UNIFORMAT II Level 4 designations if the components are used in the contract.

a. //Plumbing Systems//
b. //HVAC Systems//
c. //Electrical Systems//
d. //Fire Alarm Systems//
e. //Fire Suppression Systems//
f. //Water Systems//
g. //Compressed Air and Piping Systems//
h. //Carpet Care, Flooring and Cleaning//
i. //Battery Systems//
j. //Any machinery or equipment installed as part of this contract//

2. REFERENCES: The publications listed below form a part of this specification to the extent referenced. The publications are referred to within the text by the basic designation only.

ASTM E 1557 Standard Classification for Building Elements and Related Sitework – UNIFORMAT II

3. SUBMITTALS: Submit hard copy prints and electronic MS-Excel files of Equipment Enrollment Form (EEF) for Contracting Officer acceptance upon completion of the contract for each Real Property asset that has equipment to be enrolled as part of the FPMP.

3.1 Equipment Enrollment Form (EEF) Requirements:

3.1.1 Form Fields: The following fields are listed on the form and shall be completely filled out except where otherwise noted on the Equipment Enrollment Form. The actual equipment attribute list below may change slightly prior to the actual start of this enrollment task.

a. UNIFORMAT II Level IV Classification
b. Component Type (Assigned from USCG Approved Equipment Enrollment Catalog (column D))
c. Physical Location, broken down by Floor, and Room #.
d. Manufacturer Name
e. Model Number

f. Serial #
g. Installation Date
h. Purchase Price (Cost of equipment, labor, shipping)
i. Replacement Costs (Cost of equipment only)
j. Warranty Expiration Date
k. Equipment Attributes (Name Plate information typically indicating Size, Flow, Volume, Pressure, etc.)

3.1.2 Only equipment from a single building and/or structure is allowed per Equipment Enrollment Form (EEF).

3.1.3 Equipment identified for maintenance by O&M manuals but not listed in the USCG Approved Equipment Enrollment Catalog shall also be cataloged per ASTM E 1557 and listed on the Equipment Enrollment Form. If the equipment is not listed in ASTM E1557, consult the Coast Guard for the proper naming convention.

LIST OF SUBMITTALS

SECT.	PAR.	ITEM	STATUS	COMMENTS
01 14 14	1	Pre-Con Site Condition Photographs		
	2	Dig Request	NA	
01 32 16	1.1	Construction Schedule		
	1.2	Schedule of Values		
	2.1	Progress Schedule		
01 35 29	3	Safety Plan		
01 51 13	1	Lockout/Tagout Plan		
01 54 30	1	Confined Space Entry Plan	NA	
01 57 23	1.1	State Implementation Documentation		
	1.2	Notarized Letter		
01 66 13	4	Hazardous Waste Documents		
01 66 16	1	Safety Data Sheet		
	3	Protective Measures		
01 78 00	5	As-Built Drawings		
01 78 23	1	Operating Instructions		
	2	Verification of Training		
01 80 00	3	Equipment Enrollment Form(s)		
02 41 00	1.2.B	Demolition Schedule		
03 30 10	1.5	Concrete Mix, Design Data		
	2.4	Reinforcement, Product Data		
07 62 00	1.3.A	Product Data		
22 11 00	1.6.B.1	Product Data		
	1.6.B.2	Product Data		
	1.6.B.3	Product Data		
	1.6.B.4	Product Data		
	1.6.B.5	Product Data		
	1.7.B	Project Record Documents		
	1.7.C	Operation and Maintenance Data		
22 35 00	1.3.B	Product Data		
	1.3.C	Manufacturer's Installation Instructions		
	1.3.D	Manufacturer's Certificate		
	1.4.A	Operation and Maintenance Data		
	1.9	Warranty		
23 05 53	1.3.B	Product Data		
23 07 00	2.1	Insulation, Product Data		
	2.1	Insulation, Jackets, Product Data		
	2.1	Insulation, Accessories, Product Data		
26 05 19	2.1	Building Wire, Product Data		
26 05 29	2.1	Conduit Supports, Product Data		
26 05 33	2.1	Electrical Metallic Tubing, Product Data		

Status Abbreviation Guide: AC-Accepted; AC w/CMT-Accepted with Comment; R-Resubmit; NA-Not Applicable

SECT.	PAR.	ITEM	STATUS	COMMENTS
	2.2	Flexible Metal Conduit, Product Data		

Status Abbreviation Guide: AC-Accepted; AC w/CMT-Accepted with Comment; R-Resubmit; NA-Not Applicable

DHS-USCG TRAINING CENTER CAPE MAY, NJ	CONTRACT ITEM ACCEPTANCE REQUEST			
Contract Number		Submittal Number	Submittal New Re-submittal	Date
Project Number			CONTRACTOR MARK IF DEVIATION FROM SPECIFICATIONS	FOR GOVERNMENT USE ONLY

Item No.	Specification Sect. & Para.	DESCRIPTION OF MATERIAL (Include Type, Model No., Catalog No., Mfg., etc.)	**Deviation**	**Status**

Contractor	By: (Signature and Date)

Request as indicated above was received in this office on _____

Recommend Acceptance or Resubmit as indicated above and subject to any applicable comments.

Name and Grade	Signature	Date

Acceptance or Resubmit as indicated above and subject to any applicable comments.

Name and Grade	Signature	Date

Status Abbreviation Guide: AC-Accepted; AC w/CMT-Accepted with Comment; R-Resubmit

DIVISION 02 – SELECTIVE STRUCTURE DEMOLITION
SECTION 02 41 19
SELECTIVE STRUCTURE DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Demolishing designated equipment and fixtures.
2. Demolishing designated construction.
3. Cutting and alterations for completion of the Work.
4. Removing designated items for reuse and Government's retention.
5. Protecting items designated to remain.
6. Removing demolished materials.

1.2 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Requirements for submittals.

B. Demolition Schedule: Indicate overall schedule, dumpster locations, placement and interruptions required for utility and building services.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with contract documents

1.4 SCHEDULING

A. Schedule Work to coincide with construction.

B. Cooperate with Government in scheduling noisy operations and waste removal that may impact Governments operations.

C. Coordinate utility and building service interruptions with COR and building manager.

1.5 PROJECT CONDITIONS

A. Conduct demolition to minimize interference with adjacent areas.

B. Cease operations immediately if structure appears to be in danger and notify COR. Do not resume operations until directed.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 PREPARATION

A. Notify affected utility companies before starting work and comply with their requirements.

B. Mark location and termination of utilities.

C. Erect, and maintain temporary barriers and security devices, including warning signs and lights, and similar measures, for protection of the Government and existing improvements indicated to remain.

D. Prevent movement of structure; provide temporary bracing and shoring required to ensure safety of existing structure.

E. Do not close or obstruct egress path.

F. Do not disable or disrupt building fire or life safety systems.

3.2 SALVAGE REQUIREMENTS

A. Coordinate with Government to identify building components and equipment required to be removed and delivered to COR.

B. Tag components and equipment COR designates for salvage.

C. Protect designated salvage items from demolition operations until items can be removed.

D. Carefully remove building components and equipment indicated to be salvaged.

E. Disassemble as required to permit removal from building.

F. Package small and loose parts to avoid loss.

G. Mark equipment and packaged parts to permit identification and consolidation of components of each salvaged item.

H. Prepare assembly instructions consistent with disassembled parts. Package assembly instructions in protective envelope and securely attach to each disassembled salvaged item.

I. Deliver salvaged items to Government. Obtain signed receipt from COR.

3.3 DEMOLITION

A. Conduct demolition to minimize interference with adjacent areas.

B. Maintain protected egress from and access to piers at all times.

C. Cease operations immediately when structure appears to be in danger and notify Contracting Officer.

D. Disconnect and remove designated utilities within demolition areas.

E. Cap and identify abandoned utilities at termination points when utility is not completely removed. Annotate Record Drawings indicating location and type of service for capped utilities remaining after demolition.

F. Demolish in orderly and careful manner. Protect existing improvements.

G. Carefully remove system components indicated to be reused.
1. Disassemble components as required to permit removal.
2. Package small and loose parts to avoid loss.
3. Mark components and packaged parts to permit reinstallation.
4. Store components, protected from construction operations, until reinstalled.

H. Remove demolished materials from site except where specifically noted otherwise. Do not burn or bury materials on site.

I. Remove materials as Work progresses. Upon completion of Work, leave areas in clean condition.

J. Remove temporary Work.

END OF SECTION

DIVISION 03 - CONCRETE

SECTION 03 30 10
CAST-IN-PLACE CONCRETE

PART 1 GENERAL

1.1 SUMMARY

A. Section includes cast-in-place concrete for the following:
   1. Slabs on Grade.

1.2 REFERENCES

A. American Concrete Institute:
   1. ACI 301 - Specifications for Structural Concrete.
   2. ACI 318 - Building Code Requirements for Structural Concrete.

B. ASTM International:
   1. ASTM A1064 – Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete
   2. ASTM C31/C31M - Standard Practice for Making and Curing Concrete Test Specimens in the Field.
   3. ASTM C33 - Standard Specification for Concrete Aggregates.
   4. ASTM C39 - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens.
   5. ASTM C150 - Standard Specification for Portland Cement.
   6. ASTM C172 - Standard Practice for Sampling Freshly Mixed Concrete.
   7. ASTM C260 - Standard Specification for Air-Entraining Admixtures for Concrete.
   8. ASTM C496 – Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens.
   9. ASTM C920 – Standard Specification for Elastomeric Joint Sealants.
   10. ASTM D994 - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type).
   11. ASTM D1751 - Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types).

C. Concrete Reinforcing Steel Institute
   1. CRSI – Manual of Standard Practices

1.3 SYSTEM DESCRIPTION

A. Cast-in-place concrete for footings, foundations, curbing, gutter, sidewalk and paving, including formwork and reinforcement, where shown on the Contract Drawings, as specified herein and as needed to meet the requirements of the construction shown in the

Contract Documents. Furnish all materials, equipment, transportation, labor and all other incidentals necessary to complete the work.

1.4 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures for overall submittal procedures and specific requirements associated with each type of submittal listed below.

B. Types of submittals required for this Section:
   1. Design Data
   2. Product Data
   3. Laboratory Test Report

C. Refer to the List of Submittals document at the end of Division I for a detailed list of every submittal required for the products and workmanship covered under this Section.

1.5 DESIGN DATA

A. Submit concrete mix design for each concrete strength. Submit separate mix designs when admixtures are required for the following:

B. Hot and cold weather concrete work.

C. Air entrained concrete work.

D. Identify mix ingredients and proportions, including admixtures.

E. Identify chloride content of admixtures and whether or not chloride was added during manufacture.

1.6 QUALITY ASSURANCE

A. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

B. Use equipment adequate in size, capacity, and numbers to accomplish the work of this Section in a timely manner.

C. Comply with "Specifications for Structural Concrete for Buildings," ACI 301, except as may be modified herein.

D. Material and execution shall comply with New Jersey Department of Transportation Standard Specifications for Road and Bridge Construction, 2001, with revisions, hereon referred to at the NJDOT Specifications.

E. No placement of concrete shall be started until the mix designs have been reviewed and approved by the Contracting Officer and until copies of the approved mix designs are at the job site and the batch plant.

F. Perform sampling and testing during concrete placement, as follows:
   1. Sampling: ASTM C 172
   2. Slump: ASTM C 143, one test for each load at point of discharge.

PART 2 PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: ASTM C150, Type I or II, low alkali

B. Normal Weight Aggregates: ASTM C33.
   1. Aggregate, general: ASTM C33, uniformly graded and clean, do not use aggregate known to cause excessive shrinkage.
   2. Aggregate, Coarse: Crushed rock or washed gravel with minimum size between 3/4" and 1-1/2", and with a maximum size number 4.
   3. Aggregate, fine: Natural washed sand of hard and durable particles varying from fine to particles passing a 3/8" screen, of which at least 12% shall pass a 50-mesh screen.

C. Water: ACI 318; clean and potable, without deleterious amounts of chloride ions.

2.2 ADMIXTURES

A. Air Entrainment: ASTM C260, providing not less than 4% or more than 8% entrained air for concrete.

2.3 MOISTURE BARRIER

A. Where a new concrete slab is cast on grade or fill, provide either type of moisture barrier consisting of:
   1. Plastic Sheeting, 6 mil thick, with all joints taped and sealed;
   2. Liquid applied sealant that is approved by ACI so as to provide a vapor barrier that is not deleterious to the new concrete.

2.4 REINFORCEMENT

A. The contractor shall comply with the following as a minimum requirement:
   1. Bars shall be ASTM A615, grade 60 unless otherwise shown on the Contracting Drawings, using deformed bars for number 3 and larger;
   2. Welded wire fabric shall conform to ASTM A1064;
   3. Bending shall conform to ACI 318.

B. Fabricate reinforcement to the required shapes and dimensions, within fabrication tolerances stated in the CRSI "Manual of Standard Practices."

C. Contractor shall not use reinforcement having any of the following defects:
   1. Bar lengths, depths, or bends exceeding the specified fabricating tolerances;
   2. Bends or kinks not indicated on the Contract Drawings or required for this work;

3. Bars with cross-section reduced due to excessive rust or other causes.

D. Reinforcing supports shall consist of metal chairs, runners, bolsters, hanger and spacers.

2.5 JOINT FILLER AND SEALANT MATERIALS

A. Joint Filler: ASTM D1751; Asphalt impregnated fiberboard or felt, 1/2 inch thick; tongue and groove profile.

2.6 BONDING AGENTS

A. Anti-Corrosion. microsilica-enhanced epoxy, acrylic-based bonding agent. Suitable for providing cementitious coating as a bonding agent for concrete repair and corrosion treatment for reinforcing steel and embedded metals that are exposed in the concrete.

1. The two-component epoxy, acrylic-based bonding agent shall contain:
   a. Component A: A precise blend of Portland cement and microsilica.
   b. Component B: Epoxy and acrylic resins.

2. Performance properties
   a. The mixed bonding and anti-corrosion agent material shall be two component sprayable bonding agent with a working time of 90 minutes and an open time of 24 hours.
   b. Properties of the cured bonding and anti-corrosion Agent material shall meet or exceed the following:

Report	Method	Criteria	Result
Pot Life (minutes)	None	None	90
Open Time (hours)	None	None	24
Bond Strength (psi)	ASTM C882 Plastic to Hardened Concrete	2 hours open 8 hours open 16 hours open 24 hours open	1,800 2,100 2,100 2,100
Tensile Strength (psi)	ASTM C496	28 days	600
Flexural Strength (psi)	ASTM C78	28 days	2,000
Rapid Chloride Permeability (Coulombs)	ASTM C1202	28 days	<150

Note: Typical values for material cured at 73 degrees F and 50 % relative humidity.

2.7 OTHER MATERIALS

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Contracting Officer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine the areas and conditions under which work of this Section will be performed. Do not proceed until unsatisfactory conditions are corrected.

B. Verify requirements for concrete cover over reinforcement.

C. Verify anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with placing concrete.

3.2 PREPARATION

A. Prepare previously placed concrete by cleaning with steel brush and applying bonding agent. Remove laitance, coatings, and unsound materials.

B. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

C. Remove debris and ice from formwork, reinforcement, and concrete substrates.

D. Remove water from areas receiving concrete before concrete is placed.

E. Rigidly close openings left in the formwork.

F. Wet wood forms sufficiently to tighten up cracks. Wet other material sufficiently to maintain workability of the concrete.

G. Use only clean tools.

3.3 FORMS

A. Design, erect, brace and maintain formwork so as it will safely support vertical and lateral loads which might be applied until such loads can be supported safely by the concrete structure.

B. Construct forms to the exact sizes, shapes lines and dimensions shown, and as required to obtain accurate alignment, location, grades, and level and plumb work in the finished structure.

3.4 REINFORCING

A. Comply with the following, as the specified standards, for details and methods of reinforcing placement and supports.
   1. Clean reinforcement and remove loose dust and mill scale, earth, and other materials which reduce bond or destroy bond with concrete.
   2. Position, support, and secure reinforcement against displacement by forms, construction, and the concrete placement operation. Concrete reinforcement, including WWF shall be located and supported with metal chairs, runners, bolsters, hangers and spacers as required. Wire ties shall be set so ends are directed down into concrete, not toward exposed concrete surfaces. Use of concrete or brick for support will not be permitted.
   3. Place reinforcement to obtain the required coverage for concrete protection.
   4. Install welded wire fabric in as long lengths as practicable, lapping adjoining pieces one full mesh minimum.
   5. Unless otherwise shown on the Contract Drawings, lap bars 24 diameters minimum.

3.5 MIXING CONCRETE

A. Transit mix the concrete in accordance with provisions of ASTM C94. Maximum slump of concrete shall be 4 inches.

B. Mixing water:
   1. At the batch plant, withhold 2-1/2 gal of water per cu. yd. of concrete.
   2. Upon arrival at the job site, add all or part of the withheld water (as required for proper slump) before the concrete is discharged from the mixer.
   3. Mix not less than five minutes after the withheld water has been added, and not less than one minute of that time immediately prior to discharge of the batch.
   4. Unless otherwise directed, provide 15 minutes total mixing time per batch after first addition of water.

C. Do not use concrete that has stood for over 30 minutes after leaving the mixer, or concrete that is not placed within 60 minutes after water is first introduced into the mix.

3.6 PLACING CONCRETE

A. Place concrete in accordance with ACI 301.

B. Notify testing laboratory and Contracting Officer's Representative (COR) minimum 24 hours prior to commencement of operations.

C. Ensure reinforcement, inserts, embedded parts, formed expansion and contraction joints are not disturbed during concrete placement.

D. Perform concrete placing at such a rate that concrete which is being integrated with fresh concrete is still plastic.

E. Deposit concrete as nearly as practicable in its final location so as to avoid separation due to rehandling and flowing.

F. Do not use concrete which becomes non-plastic and unworkable, or does not meet required quality control limits, or has been contaminated by foreign materials.

G. Remove rejected concrete from the job site.

H. Install vapor retarder under interior slabs on grade in accordance with ASTM E1643. Lap joints minimum 6 inches and seal watertight by taping edges and ends.

I. Repair vapor retarder damaged during placement of concrete reinforcing. Repair with vapor retarder material; lap over damaged areas minimum 6 inches and seal watertight.

J. Place concrete in continuous operation for each panel or section determined by predetermined joints.

K. Consolidate concrete.

L. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

M. Place concrete continuously between predetermined expansion, control, and construction joints.

N. Do not interrupt successive placement; do not permit cold joints to occur.

O. Placing concrete in forms:
1. Deposit concrete in horizontal layers not deeper than 24", and avoid incline construction joints.
2. Remove temporary spreaders in forms when concrete has reached the elevation of the spreaders.

P. Placing concrete slabs:
1. Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
2. Bring slab surfaces to the correct level with a straightedge, and then strike off.
3. Use bullfloats or darbies to smooth the surface, leaving the surface free from bumps and hollows.
4. Do not sprinkle water on the plastic surface. Do not disturb the slab surface prior to start of finishing operations.

3.7 CONSOLIDATION:

A. General:
1. Consolidate each layer of concrete immediately after placing, by use of internal concrete vibrators supplemented by hand spading, rodding, or tamping.
2. Do not vibrate forms or reinforcement.
3. Do not use vibrators to transport concrete inside the forms.

3.8 JOINTS

A. Construction joints:
   1. Do not use horizontal construction joints except as may be shown on the Contract Drawings.

B. Expansion joints:
   1. Do not permit reinforcement or other embedded metal items that are being bonded with concrete (except dowels in floors bonded on only one side of the joints) to extend continuously through any expansion joint.
   2. Fill expansion joints full depth with expansion joint material.

3.9 CONCRETE FINISHING

A. Except as may be shown otherwise on the Contracting Drawings, provide the following finishes at the indicated locations.
   1. Scratch Finishes: Apply to monolithic slab surfaces that are to receive concrete floor topping or mortar setting bed.
   2. Float Finishes: Apply to monolithic slab surfaces that are to receive trowel finishes and other finishes specified hereinafter, and to slab surfaces which are to be covered with insulation.
   3. Trowel Finishes: Apply to monolithic slab surfaces that are to be exposed to view, unless otherwise shown, and to slab surfaces that are to be covered with resilient flooring, carpeting, paint, or other thin-film finish coating system.
   4. Non-slip Broom Finish: Apply to walks, stairs, drives, ramps, electrical equipment pads, and similar pedestrian and vehicular areas.

3.10 CURING AND PROTECTION

A. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

3.11 FIELD QUALITY CONTROL

A. Perform field inspection and testing in accordance with ACI 318.

B. Concrete Inspections:
   1. Continuous Placement Inspection: Inspect for proper installation procedures.
   2. Periodic Curing Inspection: Inspect for specified curing temperature and procedures.

C. Strength Test Samples:
   1. Sampling Procedures: ASTM C172.
   2. Cylinder Molding and Curing Procedures: ASTM C31/C31M, cylinder specimens, field cured.

3. Sample concrete and make one set of three cylinders for every 75 cu yds or less of each class of concrete placed each day and for every 5,000 sf of surface area for slabs and walls.
4. When volume of concrete for any class of concrete would provide less than 5 sets of cylinders, take samples from five randomly selected batches, or from every batch when less than 5 batches are used.
5. Make one additional cylinder during cold weather concreting, and field cure.

D. Field Testing:
1. Slump Test Method: ASTM C143/C143M.
2. Measure slump and temperature for each compressive strength concrete sample.

E. Cylinder Compressive Strength Testing:
1. Test Method: ASTM C39.
2. Test Acceptance: In accordance with ACI 318.
3. Test one cylinder at 7 days.
4. Test two cylinders at 28 days.
5. Retain one cylinder for 90 days for testing when requested by COR.
6. Dispose remaining cylinders when testing is not required.

F. Maintain records of concrete placement. Record date, location, quantity, air temperature and test samples taken.

3.12 PATCHING

A. Allow COR to inspect concrete surfaces immediately upon removal of forms.

B. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify COR upon discovery.

C. Patch imperfections as directed by COR in accordance with ACI 301.

3.13 DEFECTIVE CONCRETE

A. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

B. Repair or replacement of defective concrete will be determined by COR. Repair or replace defective concrete at no additional cost to the Coast Guard.

C. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of COR for each individual area.

3.14 SCHEDULE, CONCRETE MIX

A. Provide concrete with the minimum compressive strength @ 28 days shown on the Contract Drawings. When such strengths are not shown on the Contract Drawings, provide the following as minimums:
1. Footings & Pads 4000 psi

END OF SECTION

DIVISION 07 – THERMAL & MOISTURE PROTECTION
SECTION 07 90 00
JOINT PROTECTION

PART 1 GENERAL

1.1 SUMMARY

A. Section includes sealants and joint backing.

1.2 SUBMITTALS

A. Product Data: Submit data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.

1.3 ENVIRONMENTAL REQUIREMENTS

A. Maintain temperature and humidity recommended by sealant manufacturer during and after installation.

PART 2 PRODUCTS

2.1 JOINT SEALERS

A. Product Description:
   1. High Performance General Purpose Exterior (Nontraffic) Sealant: Silicone; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single or multi component.
      a. Color: Standard colors matching finished surfaces.
      b. Applications: Use for:
         1) Control, expansion, and soft joints in masonry.
         2) Joints between concrete and other materials.
         3) Joints between metal frames and other materials.
         4) Other exterior nontraffic joints for which no other sealant is indicated.
   2. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, non-drying, non-skinning, non-curing.
      a. Applications: Use for concealed sealant bead in sheet metal work.
   3. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, single component, paintable.
      a. Color: Standard colors matching finished surfaces.
      b. Applications: Use for interior wall and ceiling control joints, joints between door and window frames and wall surfaces, and other interior joints for which no other type of sealant is indicated.

c. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.

4. Tile Sealant: White silicone; ASTM C920, Uses M and A; single component, mildew resistant.
   a. Applications: Use for joints between plumbing fixtures and floor and wall surfaces, and joints between toilet room counter tops and wall surfaces.
   b. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.

2.2 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
   1. Interior Sealants and Sealant Primers: Maximum volatile organic compound content in accordance with SCAQMD Rule 1168.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Joint Backing: Round foam rod compatible with sealant; ASTM D1056, sponge or expanded rubber.

D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify substrate surfaces and joint openings are ready to receive work.

B. Verify joint backing and release tapes are compatible with sealant.

3.2 PREPARATION

A. Remove loose materials and foreign matter impairing adhesion of sealant.

B. Clean and prime joints.

C. Perform preparation in accordance with ASTM C1193.

3.3 INSTALLATION

A. Perform installation in accordance with ASTM C1193.

B. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer [, except where specific dimensions are indicated].

C. Install bond breaker where joint backing is not used.

D. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

E. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

END OF SECTION

DIVISION 22 – PLUMBING
SECTION 22 11 00
FACILITIES WATER DISTRIBUTION AND HYDRONIC PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Domestic water piping.
2. Hot water heating piping.
3. Unions and flanges.
4. Valves.
5. Pipe hangers and supports.
6. Firestoping.
7. Firestopping accessories
8. Pressure gage taps..
9. Pressure stems.
10. Stem type thermometers.
11. Pipe hangers and supports.
12. Strainers
13. Hose bibs.
14. Water Pressure Reducing valves.

B. Related Sections:
1. Section 23 07 00 – HVAC &Plumbing Insulation: Product and execution requirements for pipe insulation.

1.2 REFERENCES

A. American Society of Mechanical Engineers:
1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
3. ASME B31.9 - Building Services Piping.

B. American Society of Sanitary Engineering:
1. ASSE 1011 - Performance Requirements for Hose Connection Vacuum Breakers.
2. ASSE 1019 - Performance Requirements for Vacuum Breaker Wall Hydrants, Freeze Resistant, Automatic Draining Type.

C. ASTM International:
1. ASTM B88 - Standard Specification for Seamless Copper Water Tube.

2. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
3. ASTM D2464 - Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
4. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
5. ASTM D2467 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
6. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
7. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
8. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.

D. Manufacturers Standardization Society of the Valve and Fittings Industry:
1. MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
2. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
3. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

E. Underwriters Laboratories Inc.:
1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
2. UL 1479 - Fire Tests of Through-Penetration Firestops.

1.3 DEFINITIONS

A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 SYSTEM DESCRIPTION

A. Firestopping Materials: UL 1479 to achieve fire ratings as noted on Drawings for adjacent construction, but not less than 1 hour fire rating.

B. Surface Burning: UL 723 with maximum flame spread / smoke developed rating of 25/450.

C. Firestop interruptions to fire rated assemblies, materials, and components.

1.5 PERFORMANCE REQUIREMENTS

A. Firestopping: Conform to applicable code for fire resistance ratings and surface burning characteristics.

1.6 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data:
   1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturer's catalog information.
   2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
   3. Hangers and Supports: Submit manufacturers catalog information including load capacity.
   4. Firestopping: Submit data on product characteristics, performance and limitation criteria.
   5. Domestic Water Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.

1.7 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of valves and equipment.

B. Operation and Maintenance Data: Submit spare parts list, exploded assembly views and recommended maintenance intervals.

1.8 QUALITY ASSURANCE

A. Perform work in accordance with the International Plumbing Code, latest edition.

1.9 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

B. Installer: Company specializing in performing Work of this section with minimum three years experience.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Section 01 60 00 - Product Requirements: Product storage and handling requirements.

B. Accept valves and equipment on site in shipping containers with labeling in place. Inspect for damage.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.11 ENVIRONMENTAL REQUIREMENTS

A. Do not apply firestopping materials when temperature of substrate material and ambient air is below 60 degrees F.

1.12 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 DOMESTIC WATER AND HOT WATER HEATING, PIPING ABOVE GRADE

1. Copper Tubing: Drawn-Temper Copper Tubing: ASTM B 88, Type L (ASTM B 88M, Type B) .
2. Fittings:
   a. ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   b. Copper or Bronze Pressure-Seal Fittings:
      1) Housing: Copper.
      2) O-Rings and Pipe Stops: EPDM.
      3) Tools: Manufacturer's special tools.
      4) Minimum 200-psig (1379-kPa) working-pressure rating at 250 deg F (121 deg C).
      5) Press-Joint Fittings: Copper and copper alloy press fittings shall conform to material requirements of ASME B16.18 or ASME B 16.22 and performance criteria of IAPMO PS 117. Fittings shall be designed such that sealing elements stays properly in its groove and does not roll out when inserting tube. Sealing elements shall be factory installed or an alternative supplied by fitting manufacturer. Press ends shall have a feature that assures leakage of liquids and/or gases from inside the system past the sealing element of an unpressed connection. The function of this feature is to provide the installer quick and easy identification of connections which have not been pressed prior to putting the system into operation.

B. JOINING MATERIALS

a. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents. Maximum operating temperature of 250 deg F.

1) ASME B16.21, nonmetallic, flat, asbestos free, 1/8-inch (3.2-mm) maximum thickness unless otherwise indicated.
   a) Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
   b) Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.

b. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

c. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.

d. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for joining copper with copper; or BAg-1, silver alloy for joining copper with bronze or steel.

e. Welding Filler Metals: Comply with AWS D10.12M/D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

C. DIELECTRIC FITTINGS

a. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

b. Dielectric Unions: shall not be used.

c. Dielectric Flanges:
   1) Description:
      a) Standard: ASSE 1079.
      b) Factory-fabricated, bolted, companion-flange assembly.
      c) Pressure Rating: 300 psig (2070 kPa) .
      d) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

d. Dielectric-Flange Insulating Kits:
   1) Description:
      a) Nonconducting materials for field assembly of companion flanges.
      b) Pressure Rating: 150 psig (1035 kPa) .
      c) Gasket: Neoprene or phenolic.
      d) Bolt Sleeves: Phenolic or polyethylene.
      e) Washers: Phenolic with steel backing washers.

e. Nipples in "Dielectric Nipples" Paragraph below are available in NPS 1/2 to NPS 4 (DN 15 to DN 100)Dielectric Nipples:
   1) Description:
      a) Standard: IAPMO PS 66.

b) Electroplated steel nipple, complying with ASTM F 1545.
c) Pressure Rating: 300 psig (2070 kPa) at 250 deg F (107 deg C) .
d) End Connections: Male threaded or grooved.
e) Lining: Inert and noncorrosive, propylene.

2.2 UNIONS AND FLANGES

A. Unions for Pipe 2 inches and Smaller:
1. Ferrous Piping: Class 150, malleable iron, threaded.
2. Copper Piping: Class 150, bronze unions with soldered.
3. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

B. Flanges for Pipe 2-1/2 inches and Larger:
1. Ferrous Piping: Class 150, forged steel, slip-on flanges.
2. Copper Piping: Class 150, slip-on bronze flanges.
3. PVC Piping: PVC flanges.
4. Gaskets: 1/16 inch thick preformed neoprene gaskets.

2.3 BALL VALVES

A. 2 inches and Smaller: MSS SP 110, Class 125, bronze, two piece body, 316 stainless steel ball, full port, teflon seats, blow-out proof stem, solder or threaded ends, lever handle.

B. 2-1/2 inches (65 mm) and Larger: MSS SP 70, Class 125, cast iron body, bronze trim, bolted bonnet, rising stem, hand-wheel, outside screw and yoke, solid wedge disc with bronze seat rings, flanged ends. Furnish chain-wheel operators for valves 6 inches (150 mm) and larger mounted over 8 feet (2400 mm) above floor.

2.4 CHECK VALVES

A. 2 inches (50 mm) and Smaller: MSS SP 80, Class 150, bronze body and cap, bronze seat, Buna-N disc, solder or threaded ends.

B. 2-1/2 inches (65 mm) and Larger: MSS SP 71, Class 125, cast iron body, bolted cap, bronze or cast iron disc, renewable disc seal and seat, flanged ends.

2.5 PRESSURE GAGES

A.

B. Gage: ASME B40.1, UL 404 with bourdon tube, rotary brass movement, brass socket, front calibration adjustment, black scale on white background.
   1. Case: Steel.
   2. Bourdon Tube: Brass Type 316 stainless steel].
   3. Dial Size: 3-1/2 inch (89 mm) diameter.
   4. Mid-Scale Accuracy: two percent.
   5. Scale: Both psi and kPa.

2.6 PRESSURE GAGE TAPS

A. Needle Valve: Brass or Steel, 1/4 inch (6 mm) NPT for minimum 300 psi (2070 kPa).

B. Ball Valve: Brass 1/8 inch (3 mm) NPT for 250 psi (1720 kPa).

C. Pulsation Damper: Pressure snubber, brass with 1/4 inch (6 mm) NPT connections.

2.7 STEM TYPE THERMOMETERS

A. Thermometer: ASTM E1, adjustable angle, red appearing mercury, lens front tube, cast aluminum case with enamel finish, cast aluminum adjustable joint with positive locking device.
   1. Size: 7-inch (178 mm) scale.
   2. Window: Clear Lexan.
   3. Stem: Brass, 3/4 inch (20 mm) NPT, 3-1/2 inch (89 mm) long.
   4. Accuracy: ASTM E77 2 percent.
   5. Calibration: Both degrees F and degrees C.

2.8 STRAINERS

A. 2 inch (50 mm) and Smaller: Class 150, threaded bronze body 300 psi (2070 kPa) CWP, Y pattern with 1/32 inch (0.8 mm) stainless steel perforated screen.

B. 1-1/2 inch (40 mm) to 4 inch (100 mm): Class 125, flanged iron body, Y pattern with 1/16-inch (1.6 mm) stainless steel perforated screen.

C. 5 inch (125 mm) and Larger: Class 125, flanged iron body, basket pattern with 1/8 inch (2 mm) stainless steel perforated screen.

2.9 HOSE BIBS

A. Interior: Bronze or brass with integral mounting flange, replaceable hexagonal disc, hose thread spout, chrome plated where exposed with lock shield and removable key, integral vacuum breaker in conformance with ASSE 1011.

B. Interior Mixing: Bronze or brass, wall mounted, double service faucet with hose thread spout, integral stops, chrome plated where exposed with hand wheels, and vacuum breaker in conformance with ASSE 1011.

2.10 PIPE HANGERS AND SUPPORTS

A. Plumbing Piping: Conform to MSS SP 58, MSS SP 69 & MSS SP 89].

B. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Galvanized steel, adjustable swivel, split ring.

C. Hangers for Cold Pipe Sizes 2 inches and Larger: Galvanized steel, adjustable, clevis.

D. Hangers for Hot Pipe, Sizes 2 and Larger: Galvanized steel, adjustable, clevis.

E. Multiple or Trapeze Hangers: Galvanized steel channels with welded supports or spacers and hanger rods.

F. Wall Support for Pipe Sizes 3 inches and Smaller: Galvanized steel hooks.

G. Wall Support for Pipe Sizes 4 inches and Larger: Welded galvanized steel bracket and galvanized steel clamps.

H. Vertical Support: Galvanized steel riser clamp.

2.11 FIRESTOPPING

A. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
   1. Silicone Firestopping Elastomeric Firestopping: Single or multiple component silicone elastomeric compound and compatible silicone sealant.
   2. Foam Firestopping Compounds: Single or multiple component foam compound.
   3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
   4. Fiber Stuffing and Sealant Firestopping: Composite of mineral or ceramic fiber stuffing insulation with silicone elastomer for smoke stopping.

2.12 FIRESTOPPING ACCESSORIES

A. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.

B. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

C. General:
   1. Furnish UL listed products.
   2. Select products with rating not less than rating of wall or floor being penetrated.

D. Non-Rated Surfaces:
   1. Stamped steel, chrome plated, hinged, split ring escutcheons or floor plates or ceiling plates for covering openings in occupied areas where conduit is exposed.

2.13 WATER PRESSURE REDUCING VALVES

A. 2 inches (50 mm) and Smaller: MSS SP 80, bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, strainer, [threaded] [and single union] [double union] ends.

B. 2 inches (50 mm) and Larger: MSS SP 85, cast iron body, bronze fitted, elastomeric diaphragm and seat disc, flanged.

2.14 THERMOSTATIC MIXING VALVES

A. Valve: Chrome plated cast brass body, stainless steel or copper alloy bellows, integral temperature adjustment.

B. Capacity:60 gpm at 45 psi differential.

C. Accessories:
   1. Check valve on inlets.
   2. Volume control shut-off valve on outlet.
   3. Stem thermometer on outlet.
   4. Strainer stop checks on inlets.

D. Cabinet: 16 gage (1.5 mm) enameled for surface mounting with keyed lock.

2.15 RELIEF VALVES

A. Pressure Relief:
   1. Bronze body, Teflon seat, steel stem and springs, automatic, direct pressure actuated at maximum 60 psi (400 kPa), UL listed for fuel oil, capacities ASME certified and labeled.

A. Temperature and Pressure Relief:

1. ANSI Z21.22 certified, bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210 degrees F (98.9 degrees C), capacity ASME certified and labeled.

2.16

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify excavations are to required grade, dry, and not over-excavated.

B. Verify openings are ready to receive firestopping.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Remove scale and dirt, on inside and outside, before assembly.

C. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.

3.3 INSTALLATION - HANGERS AND SUPPORTS

A. Inserts:
1. Provide inserts for placement in concrete forms.
2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe 4 inches and larger.
4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

B. Pipe Hangers and Supports:
1. Install in accordance with ASTM F708.
2. Support horizontal piping as schedule.
3. Install hangers to provide minimum 1/2 inch space between finished covering and adjacent work.
4. Place hangers within 12 inches of each horizontal elbow.
5. Use hangers with 1-1/2 inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
6. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.

7. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.

3.4 INSTALLATION - FIRESTOPPING

A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.

B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.

C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating.

D. Compress fibered material to maximum 40 percent of its uncompressed size.

E. Place foamed material in layers to ensure homogenous density, filling cavities and spaces. Place sealant to completely seal junctions with adjacent dissimilar materials.

F. Fire Rated Surface:
1. Where conduit penetrates fire rated surface, install firestopping product in accordance with manufacturer's instructions.

G. Non-Rated Surfaces:
1. Install escutcheons, floor plates or ceiling plates where conduit, penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.
2. Interior partitions: Apply sealant to both sides of penetration to completely fill annular space around sleeve and/or conduit.

3.5 INSTALLATION - ABOVE GROUND PIPING

A. Install non-conducting dielectric connections wherever jointing dissimilar metals.

B. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.

C. Install piping to maintain headroom without interfering with use of space or taking more space than necessary.

D. Group piping whenever practical at common elevations.

E. Slope piping and arrange systems to drain at low points.

F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

H. Provide access where valves and fittings are not accessible.

I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.

J. Provide support for utility meters in accordance with requirements of utility companies.

K. Install domestic water piping in accordance with ASME B31.9.

L. Sleeve pipes passing through partitions, walls and floors.

M. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping.

N. Install unions downstream of valves and at equipment or apparatus connections.

O. Install valves with stems upright or horizontal, not inverted.

P. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

Q. Install ball valves for shut-off and to isolate equipment, part of system, or vertical risers unless gate valves are specified on the contract drawings.

R. Install globe valves for throttling, bypass, or manual flow control services.

3.6 INSTALLATION - THERMOMETERS AND GAGES

A. Install one pressure gage for each pump, locate taps before strainers and on suction and discharge of pump; pipe to gage.

B. Install gage taps in piping.

C. Install pressure gages with pulsation dampers. Provide [needle valve] [or] [ball valve] to isolate each gage.

D. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inches (65 mm) for installation of thermometer sockets. Allow clearance from insulation.

E. Provide instruments with scale ranges selected according to service with largest appropriate scale.

F. Install gages and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.

G. Adjust gages and thermometers to final angle, clean windows and lenses, and calibrate to zero.

3.7 FIELD QUALITY CONTROL

A. Section 01 40 00 - Quality Requirements: Field inspecting, testing, adjusting, and balancing.

B. Test domestic water piping system in accordance with applicable code.

C. Inspect installed firestopping for compliance with specifications and submitted schedule.

END OF SECTION

DIVISION 22 – PLUMBING

SECTION 22 35 00
DOMESTIC WATER HEAT EXCHANGERS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Domestic hot water storage tanks.

B. Related Sections:
1. Section 22 07 00 – lumbing Insulation: Field applied insulation for domestic water heaters.
2. Section: 22 11 00 - Facility Water Distribution: Supply connections to domestic water heaters.

1.2 REFERENCES

A. American Society of Mechanical Engineers:
1. ASME PTC 25 - Pressure Relief Devices.
2. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit dimensioned drawings of water heaters indicating components and connections to other equipment and piping. Indicate pump type, capacity and power requirements.

C. Manufacturer's Installation Instructions: Submit mounting and support requirements.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit replacement part numbers and availability.

1.5 QUALITY ASSURANCE

A. Conform to ASME Section IV for construction of heat exchangers. Provide exchangers and boilers registered with National Board of Boiler and Pressure Vessel Inspectors.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

B. Installer: Company specializing in performing Work of this section with minimum three years documented experience approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect heat exchangers and tanks with temporary inlet and outlet caps. Maintain caps in place until installation.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.9 WARRANTY

A. Furnish five year manufacturer warranty for WATER storage tanks.

PART 2 PRODUCTS

2.1 DOMESTIC WATER HEAT EXCHANGERS

A. Tubes: U-tube type with 3/4 inch (19 mm) diameter seamless double wall copper tubes suitable for 125 psi (860 kPa) working pressure.

B. Heads: Cast iron or steel, with steel tube sheets, threaded or flanged for piping connections.

C. Water Chamber and Tube Bundle: Removable for inspection and cleaning.

D. Coating: Exterior prime coat.

E. Code: ASME Section VIII for service pressures, ASME "U" symbol stamped on heat exchanger.

F. Shell and Tube Type: Steel shell, with threaded or flanged piping connections and necessary taps, steel saddle and attaching U-bolts, designed for heating fluid in shell and heated fluid in tubes.

G. Accessories:
1. Wells for temperature regulator sensor at heated water outlet.
2. ASME rated pressure and temperature relief valve on heated water discharge.
3. ASME rated pressure relief valves from taps on heated waterside, set at 120 psig (820 kPa).
4. ASME rated pressure relief valve on water inlet on downstream side of control valve.
5. Thermometers and pressure gauge taps on water inlets and outlets.

2.2 DOMESTIC HOT WATER STORAGE TANKS

A. Tank: Welded steel, ASME labeled for working pressure of 125 psig (870 kPa), steel support saddles, taps for accessories, threaded connections of stainless steel, access manhole at the location opposite from the Piping connections. the interior of the storage tank shall be cement lined to provide protection against corrosion. The storage tank shall be constructed in accordance with the ASME Boiler and Pressure Vessel Code requirements, stamped and registered with the National Board of Boiler and Pressure Vessel Inspectors. The storage tank shall have a 125 psi working pressure and be supplied with an ASME temperature and pressure relief valve. The storage tank shall be bare tank furnished with a factory installed flange connections. The STORAGE TANK shall require field installation of a high-density insulation to meet the energy efficiency requirements of the latest edition of the ASHRAE 90.1 Standard. See specification section 230700 for more info. The tank shall be furnished with the following connections: two 3" NPT circulating connections, one 2" NPT hot water outlet, one 1-1/4" NPT relief valve connection, one 3/4" NPT aquastat opening and one 1" NPT drain connection

B. Lining:
1. Corrosion-resistant concrete approximately 3/4 inch (20 mm) thick.

C. Accessories: Tank drain, water inlet and outlet, thermometer range of 40 to 200 degrees F (4 to 93 degrees C), ASME pressure relief valve suitable for maximum working pressure.

D. Vertical storage tanks:
1. Overall Length: 100 inches (2540 mm).
2. Diameter: 36 inches (135 mm) diameter.
3. Nominal capacity: 423 gal (1601 L).
4. Support: Manufacturer’s factory’s

E. Insulation: Field installed 2” thick

PART 3 EXECUTION

3.1 INSTALLATION

A. Maintain manufacturer's recommended clearances around and over water heaters.

B. Install water heater on existing concrete housekeeping pad. Re-connect domestic hot and cold old water piping to supply and return water heater connections.

C. Install the following piping accessories. Refer to Section 22 11 00.
   1. On supply:
      a. Thermometer well and thermometer.
      b. Strainer.
      c. Pressure gage.
      d. Shutoff valve.
      e. Check valve
   2. On return:
      a. Thermometer well and thermometer.
      b. Pressure gage.
      c. Shutoff valve.
      d. Check valve

D. Install discharge piping from relief valves and drain valves to nearest floor drain.

E. Install water heater trim and accessories furnished loose for field mounting.

F. Domestic Water Heat Exchangers:
   1. Install domestic water storage tanks with adequate clearance for manhole access for maintenance without disturbing other installed equipment or piping.
   2. Support unit on existing concrete pad and filed apply insulation.
   3. Pipe relief valves and drains to nearest floor drain.

G. Domestic Hot Water Storage Tanks:
   1. Clean and flush after installation Seal until pipe connections are made.

END OF SECTION

DIVISION 23 - HVAC
SECTION 23 05 53
IDENTIFICATION FOR PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Nameplates.
   2. Tags.
   3. Pipe markers.
   4. Labels.
   5. Equipment identification.

1.2 REFERENCES

A. American Society of Mechanical Engineers:
   1. ASME A13.1 - Scheme for the Identification of Piping Systems.

1.3 SUBMITTALS

A. Section 01 33 00 - Submittal Procedures: Submittal procedures.

B. Product Data: Submit manufacturers catalog literature for each product required.

PART 2 PRODUCTS

2.1 NAMEPLATES

A. Product Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

2.2 TAGS

A. Plastic Tags:
   1. Laminated three-layer plastic with engraved letters on light contrasting background color. Tag size minimum 1-1/2 inches (38 mm) diameter.

B. Metal Tags:
   1. Brass with stamped letters; tag size minimum 1-1/2 inches (38 mm) diameter with finished edges.

C. Information Tags:
   1. Clear plastic with printed "Danger," "Caution," or "Warning" and message; size 3-1/4 x 5-5/8 inches (83 x 143 mm) with grommet and self-locking nylon ties.

2.3 PIPE MARKERS

A. Color and Lettering: Conform to ASME A13.1.
   1. Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.
   2. Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.

B. Plumbing pipe markers:
   1. Label pipes with all-vinyl, self-sticking labels or letters. For pipe covering sizes up to and including 3/4-inch outside diameter, select labels with 1/2-inch letters. For sizes from 3/4- to 2-inch outside diameter, 3/4-inch letters; above 2 inches outside diameter, 2-inch letters. The pipe markers shall be identified and color coded as follows with black directional arrows.
   2. Grease waste is considered as all piping from concessions space up to the point of connection to an exterior grease interceptor, regardless of whether a point of use interceptor is installed.

SERVICE	**PIPE MARKER**	**BACKGROUND COLOR**
Nonpotable Cold Water	"NONPOTABLE COLD WATER DANGER-UNSAFE WATER"	Yellow
Nonpotable Hot Water	"NONPOTABLE HOT WATER DANGER-UNSAFE WATER"	Yellow
Cold Water	"DOMESTIC COLD WATER"*	Green
Tempered Water	"TEMPERED WATER"*	Yellow
Hot Water	"DOMESTIC HOT WATER SUPPLY" *	Yellow
	"DOMESTIC HOT WATER RETURN" *	Yellow
Natural Gas	"NATURAL GAS"	Yellow
Sanitary Waste	"SANITARY WASTE"	Green
Storm Drain	"STORM DRAIN"	Green
Overflow Drain	"OVERFLOW DRAIN"	Green
Vent	"VENT"	Green
Local Vent	"LOCAL VENT"	Green
Gas Vent	"GAS VENT"	Yellow
Grease Waste	"GREASE WASTE"	Green
Vacuum Grease Waste	"VACUUM GREASE WASTE"	Green

Liquefied Grease Waste	"LIQUEFIED GREASE WASTE"	Green

* Directional arrow applied adjacent to pipe marker indicating direction of flow.

C. HVAC pipe markers:

1. Label pipes with all-vinyl, self-sticking labels or letters. For pipe covering sizes up to and including 3/4-inch outside diameter, select labels with 1/2-inch letters. For sizes from 3/4- to 2-inch outside diameter, 3/4-inch letters; above 2 inches outside diameter, 2-inch letters. The pipe markers shall be identified and color coded as follows with black directional arrows. Labels with green background shall use white letters and arrows.

SERVICE	**PIPE MARKER**	**BACKGROUND COLOR**
Chilled Water	"CHILLED WATER SUPPLY"*	Green
	"CHILLED WATER RETURN"*	Green
Condensate From Air Cooling Equipment	"CONDENSATE"	Green
Condenser Water	"CONDENSER WATER SUPPLY"	Green
	"CONDENSER WATER RETURN"	
Heating Water	"HEATING WATER SUPPLY"*	Yellow
	"HEATING WATER RETURN"	Yellow
Refrigerant Suction	"REFRIGERANT SUCTION"*	Yellow
Refrigerant Liquid	"REFRIGERANT LIQUID"	Green
Non-Potable Water	"NON-POTABLE WATER"	Yellow
High Pressure Steam	"HIGH PRESSURE STEAM"	Yellow
Low Pressure Steam	"CONDENSATE"	Yellow
Steam Condensate	"LOW PRESSURE RETURN"	Yellow
Pumped Condensate	"PUMPED CONDENSATE"	Yellow
Drain	"DRAIN"	Green
Vent To Atmosphere	"(COMMODITY) VENT"	Yellow

* Directional arrow applied adjacent to pipe marker indicating direction of flow.

2.4 LABELS

A. Description: Polyester, size 1.9 x 0.75 inches (48 x 19 mm), adhesive backed with printed identification .

2.5 EQUIPMENT IDENTIFICATION

A. Nameplates:

1. Tag all pumps, air supply units, fans, converters, and miscellaneous items of mechanical equipment with engraved nameplates. Nameplates shall be 1/16-inch-thick, 3 x 5 laminated 3-ply plastic, center ply white, outer ply black. Form letters by exposing center ply.
2. Identify unit with code number as shown on drawings and area served.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install identifying devices after completion of coverings and painting.

B. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.

C. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer. For unfinished canvas covering, apply paint primer before applying labels.

D. Install tags using corrosion resistant chain. Number tags consecutively by location.

E. Identify air handling units, pumps, heat transfer equipment, tanks, and water treatment devices with [plastic nameplates] [stencil painting]. Identify in-line pumps and other small devices with tags.

F. Identify control panels and major control components outside panels with plastic nameplates.

G. Identify piping, concealed or exposed, with plastic tape pipe markers. Use tags on piping 3/4 inch (20 mm) diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet (6 m) on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

H. Identify ductwork with plastic nameplates. Identify with air handling unit identification number and area served. Locate identification at air handling unit, at each side of penetration of structure or enclosure, and at each obstruction.

I. Provide ceiling tacks to locate valves or dampers above T-bar type panel ceilings. Locate in corner of panel closest to equipment.

J. PIPING MARKERS

a. Unless recommendations of ANSI A13.1 are more stringent, apply labels or letters after completion of pipe cleaning, insulation, painting, or other similar work, as follows:

1) Every 20 feet along continuous exposed lines.
2) Every 10 feet along continuous concealed lines.
3) Adjacent to each valve and stubout for future.
4) Where pipe passes through a wall, into and out of concealed spaces.
5) On each riser.
6) On each leg of a "T."
7) Locate conspicuously where visible.

b. Further, apply labels or letters to lower quarters of the pipe on horizontal runs where view is not obstructed or on the upper quarters when pipe is normally viewed from above. Apply arrow labels indicating direction of flow.

c. Spray a protective coating of clear epoxy over markers and arrows in corrosive atmosphere areas.

K. EQUIPMENT IDENTIFICATION

a. Nameplates: Attach to prominent area of equipment, either with sheet metal screws, brass chain, or contact cement as applicable.

b. Nameplate Directory: Post final copy in operation and maintenance manual.

c. HVAC Equipment Installed Above T-Bar Ceiling: Label T-bar grid with mechanical equipment identifier as shown on the drawings. Use label maker with peel and stick labels, white background, and black lettering.

END OF SECTION

DIVISION 23
SECTION 23 07 00
HVAC & PLUMBING INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. HVAC piping insulation, jackets and accessories.
2. DHW Generator's domestic water side piping insulation and accessories.

1.2 REFERENCES

A. ASTM International:
1. ASTM C450 - Standard Practice for Prefabrication and Field Fabrication of Thermal Insulating Fitting Covers for NPS Piping, Vessel Lagging, and Dished Head Segments.
2. ASTM C547 - Standard Specification for Mineral Fiber Pipe Insulation.
3. ASTM C585 - Standard Practice for Inner and Outer Diameters of Rigid Thermal Insulation for Nominal Sizes of Pipe and Tubing (NPS System).
4. ASTM C921 - Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.
5. ASTM C1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
6. ASTM C1290 - Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts.
7. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
8. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
9. ASTM E96 - Standard Test Methods for Water Vapor Transmission of Materials.

B. National Fire Protection Association:
1. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures for overall submittal procedures and specific requirements associated with each type of submittal listed below.

B. Types of submittals required for this Section:

1. Product Data

C. Refer to the List of Submittals document at the end of Division I for a detailed list of every submittal required for the products and workmanship covered under this Section.

1.4 QUALITY ASSURANCE

A. Test pipe insulation for maximum flame spread index of 25 and maximum smoke developed index of not exceeding 450 in accordance with ASTM E84 and NFPA 255.

B. Pipe insulation manufactured in accordance with ASTM C585 for inner and outer diameters.

C. Factory fabricated fitting covers manufactured in accordance with ASTM C450.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

B. Applicator: Company specializing in performing Work of this section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and damage, by storing in original wrapping.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.

B. Maintain temperature before, during, and after installation for minimum period of 24 hours.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 PIPE INSULATION

A. TYPE P-1: ASTM C547, molded glass fiber pipe insulation.
1. Thermal Conductivity: 0.23 at 75 degrees F.
2. Operating Temperature Range: 0 to 850 degrees F.
3. Vapor Barrier Jacket: ASTM C1136, Type I, factory applied reinforced foil kraft with self-sealing adhesive joints.
4. Jacket Temperature Limit: minus 20 to 150 degrees F.

2.2 PIPE INSULATION JACKETS

A. Vapor Retarder Jacket:
1. ASTM C921, white Kraft paper with glass fiber yarn, bonded to aluminized film.
2. Moisture vapor transmission: ASTM E96; 0.02 perm-inches.

B. PVC Plastic Pipe Jacket:
1. Product Description: ASTM D1784, One piece molded type fitting covers and sheet material, off-white color.
2. Thickness: [10] [15] [30] mil.
3. Connections: Brush on welding adhesive or pressure sensitive color matching vinyl tape.

2.3 PIPE INSULATION ACCESSORIES

A. Vapor Retarder Lap Adhesive: Compatible with insulation.

B. Covering Adhesive Mastic: Compatible with insulation.

C. Galvanized steel insulation protection shield. MSS SP-69, Type 40. Length: Based on pipe size and insulation thickness.

2.4 EQUIPMENT INSULATION

A. TYPE E-1: ASTM C612; glass fiber, semi-rigid board, noncombustible.
1. Thermal Conductivity: 0.23 at 75 degrees F (0.033 at 24 degrees C).
2. Maximum Operating Temperature: 850 degrees F (450 degrees C).
3. Density: 3.0 pound per cubic foot (48 kilogram per cubic meter).

2.5 EQUIPMENT INSULATION JACKETS

A. Canvas Equipment Jacket: UL listed, 6 oz/sq yd (220 g/sq m), plain weave cotton fabric with fire retardant lagging adhesive compatible with insulation.

B. Vapor Retarder Jacket:
   1. ASTM C921, white Kraft paper with glass fiber yarn, bonded to aluminized film.
   2. Moisture vapor transmission: ASTM E96; 0.02 perm-inches.

C. Field Applied Glass Fiber Fabric Jacket System:
   1. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.
   2. Glass Fiber Fabric:
      a. Cloth: Untreated; 9 oz/sq yd (305 g/sq m) weight.
      b. Blanket: 1.0 lb/cu ft (16 kg/cu m) density.
      c. Weave:10 x 10.
   3. Indoor Vapor Retarder Finish:
      a. Cloth: Untreated; 9 oz/sq yd (305 g/sq m) weight.
      b. Vinyl emulsion type acrylic, compatible with insulation,white color.

2.6 EQUIPMENT INSULATION ACCESSORIES

A. Vapor Retarder Lap Adhesive: Compatible with insulation.

B. Covering Adhesive Mastic: Compatible with insulation.

C. Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch (300 mm) centers.

D. Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement: ASTM C449/C449M.

E. Adhesives: Compatible with insulation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 - Administrative Requirements: Coordination and project conditions.

B. Verify piping and ductwork has been tested before applying insulation materials.

C. Verify surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION - PIPING SYSTEMS

A. Piping Exposed to View in Finished Spaces: Locate insulation and cover seams in least visible locations.

B. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to Section 07 84 00 for penetrations of assemblies with fire resistance rating greater than one hour.

C. Piping Systems Conveying Fluids Below Ambient Temperature:
   1. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
   2. Furnish factory-applied or field-applied vapor retarder jackets. Secure factory-applied jackets with pressure sensitive adhesive self-sealing longitudinal laps and butt strips. Secure field-applied jackets with outward clinch expanding staples and seal staple penetrations with vapor retarder mastic.
   3. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor retarder adhesive or PVC fitting covers.

D. Hot Piping Systems:
   1. Furnish factory-applied or field-applied standard jackets. Secure with outward clinch expanding staples or pressure sensitive adhesive system on standard factory-applied jacket and butt strips or both.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
   3. Insulate flanges and unions at equipment.

E. Inserts and Shields:
   1. Piping 1-1/2 inches Diameter and Smaller: Install galvanized steel shield between pipe hanger and insulation.
   2. Piping 2 inches Diameter and Larger: Install insert between support shield and piping and under finish jacket.
      a. Insert Configuration: Minimum 6 inches long, of thickness and contour matching adjoining insulation; may be factory fabricated.
      b. Insert Material: Compression resistant insulating material suitable for planned temperature range and service.
   3. Piping Supported by Roller Type Pipe Hangers: Install galvanized steel shield between roller and inserts.

F. Insulation Terminating Points:

1. Coil Branch Piping 1 inch and Smaller: Terminate hot water piping at union upstream of the coil control valve.
2. Chilled Water Coil Branch Piping: Insulate chilled water piping and associated components up to coil connection.
3. Condensate Piping: Insulate entire piping system and components to prevent condensation.

G. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces: Finish with PVC jacket and fitting covers.

3.3 INSTALLATION - EQUIPMENT

A. Factory Insulated Equipment: Do not insulate.

B. Exposed Equipment: Locate insulation and cover seams in least visible locations.

C. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor retarder cement.

D. Equipment Containing Fluids Below Ambient Temperature:
1. Insulate entire equipment surfaces.
2. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires, or bands.
3. Furnish factory-applied or field-applied vapor retarder jackets. Secure factory-applied jackets with pressure sensitive adhesive self-sealing longitudinal laps and butt strips. Secure field-applied jackets with outward clinch expanding staples and seal staple penetrations with vapor retarder mastic.
4. Finish insulation at supports, protrusions, and interruptions.

E. Equipment Containing Fluids 140 degrees F (60 degrees C) Or Less:
1. Do not insulate flanges and unions, but bevel and seal ends of insulation.
2. Install insulation with factory-applied or field applied jackets, with or without vapor barrier. Finish with glass cloth and adhesive.
3. Finish insulation at supports, protrusions, and interruptions.

F. Equipment Containing Fluids 140 (60 degrees C) degrees and over:
1. Insulate flanges and unions with removable sections and jackets.
2. Install insulation with factory-applied or field applied jackets, with or without vapor barrier. Finish with glass cloth and adhesive.
3. Finish insulation at supports, protrusions, and interruptions.

G. Equipment in Mechanical Equipment Rooms or Finished Spaces: Finish with canvas jacket.

H. Cover glass fiber with metal mesh and finish with heavy coat of insulating cement

I. Nameplates and ASME Stamps: Bevel and seal insulation around; do not cover with insulation.

J. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation for easy removal and replacement without damage.

3.4 SCHEDULES

A. Plumbing Piping side of DHW Storage Water Tank Insulation Schedule:

PIPING SYSTEM	INSULATION TYPE	PIPE SIZE	INSULATION THICKNESS inches
Domestic Hot Water Supply and Recirculation	P-1	1-1/4 inches (32 mm) and smaller 1-1/2 inches (40 mm) and larger	0.5 (13) 1.0 (25)
Domestic Hot Water Supply and Recirculation	P-1	1-1/4 inches (32 mm) and smaller 1-1/2 inches (40 mm) and larger	0.5 (13) 1.0 (25)

B. Heating Services Piping Insulation Schedule:

PIPING SYSTEM	INSULATION TYPE	PIPE SIZE	INSULATION THICKNESS inches
Hot Water Heater Supply and Return	P-1	3 inches and smaller 4 inches and larger	1.0 1.5

C. Domestic Hot water storage Tank Schedule:

EQUIPMENT	INSULATION TYPE	INSULATION THICKNESS inches (mm)
Hot Thermal Storage Tanks	E-1	2 (55)

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 26 05 19
LOW-VOLTAGE CONDUCTORS AND CABLES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes building wire and wiring connectors and connections.

B. Related Sections:
   1. Section 26 05 33 – Raceway & Boxes

1.2 REFERENCES

A. National Fire Protection Association:
   1. NFPA 70 - National Electrical Code.
   2. NFPA 262 - Standard Method of Test for Flame Travel and Smoke of Wires and Cables for Use in Air-Handling Spaces.

1.3 SYSTEM DESCRIPTION

A. Product Requirements: Provide products as follows:
   1. Solid conductor for feeders and branch circuits 10 AWG and smaller.
   2. Stranded conductors for control circuits.
   3. Conductor not smaller than 12 AWG for power and lighting circuits.
   4. Conductor not smaller than 14 AWG for control circuits.
   5. Increase wire size in branch circuits to limit voltage drop to a maximum of 3 percent.

B. Wiring Methods: Provide the following wiring methods unless specifically noted otherwise on the Contract Drawings:
   1. Exposed Dry Interior Locations: Use building wire, Type THHN/THWN insulation, in raceway.

1.4 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures for overall submittal procedures and specific requirements associated with each type of submittal listed below.

B. Types of submittals required for this Section:
   1. Product Data

C. Refer to the List of Submittals document at the end of Division I for a detailed list of every submittal required for the products and workmanship covered under this Section.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years experience.

PART 2 PRODUCTS

2.1 BUILDING WIRE

A. Product Description: Single conductor insulated wire.

B. Conductor: Copper.

C. Insulation Voltage Rating: 600 volts.

D. Insulation Temperature Rating: 90 degrees C.

E. Insulation Material: Thermoplastic or Thermosetting, as indicated above.

2.2 TERMINAL LUGS

A. Terminal Lugs for Wires 6 AWG and Smaller: Solderless, compression type copper.

B. Lugs for Wires 4 AWG and Larger: Color keyed, compression type copper, with insulating sealing collars.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify interior of building has been protected from weather.

B. Verify mechanical work likely to damage wire and cable has been completed.

C. Verify raceway installation is complete and supported.

3.2 COORDINATION

A. Where wire and cable destination is indicated and routing is not shown, determine routing and lengths required.

B. Wire and cable routing indicated is approximate unless dimensioned.

3.3 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.4 EXISTING WORK

A. Remove exposed abandoned wire and cable, including abandoned wire and cable above accessible ceiling finishes. Patch surfaces where removed cables pass through building finishes.

B. Disconnect abandoned circuits and remove circuit wire and cable. Remove abandoned boxes when wire and cable servicing boxes is abandoned and removed. Install blank cover for abandoned boxes not removed.

C. Provide access to existing wiring connections remaining active and requiring access. Modify installation or install access panel.

D. Extend existing circuits using materials and methods as specified.

E. Clean and repair existing wire and cable remaining or wire and cable to be reinstalled.

3.5 INSTALLATION

A. Route wire and cable to meet Project conditions.

B. Neatly train and lace wiring inside boxes, equipment, and panelboards.

C. Color Code wire and cable as stated herein.

D. Equipment Grounding Conductor: Install separate, insulated copper conductor with each feeder and branch circuit. Terminate each end on suitable lug, bus, or bushing.

E. Special Techniques--Building Wire in Raceway:
   1. Pull conductors into raceway at same time.

F. Special Techniques - Wiring Connections:
   1. Clean conductor surfaces before installing lugs and connectors.
   2. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
   3. Install insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.

3.6 WIRE COLOR

A. General:
   1. For wire sizes 10 AWG and smaller, install wire colors in accordance with the following:
      a. Black, red, and blue for circuits at 120/208 volts single or three phase.

B. Neutral Conductors: White.

C. Branch Circuit Conductors: Install three or four wire home runs with each phase uniquely color coded.

D. Feeder Circuit Conductors: Uniquely color code each phase.

E. Ground Conductors:
   1. For 6 AWG and smaller: Green.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 26 05 29
HANGERS AND SUPPORTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Conduit supports.
2. Firestopping relating to electrical work.

1.2 REFERENCES

A. National Fire Protection Association:
1. NFPA 70 - National Electrical Code.

B. Underwriters Laboratories Inc.:
1. UL 723 - Tests for Surface Burning Characteristics of Building Materials.
2. UL 1479 - Fire Tests of Through-Penetration Firestops.

1.3 DEFINITIONS

A. Firestopping (Through-Penetration Protection System): Sealing or stuffing material or assembly placed in spaces between and penetrations through building materials to arrest movement of fire, smoke, heat, and hot gases through fire rated construction.

1.4 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures for overall submittal procedures and specific requirements associated with each type of submittal listed below.

B. Types of submittals required for this Section:
1. Product Data

C. Refer to the List of Submittals document at the end of Division I for a detailed list of every submittal required for the products and workmanship covered under this Section.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this section with minimum three years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification.

B. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Do not apply firestopping materials when temperature of substrate material and ambient air is below 60 degrees F.

PART 2 PRODUCTS

2.1 CONDUIT SUPPORTS

A. Hanger Rods: Threaded high tensile strength galvanized carbon steel with free running threads.

B. Beam Clamps: Galvanized steel, with tapered hole in base and back to accept either bolt or hanger rod. Set screw: hardened steel.

C. Conduit clamps for trapeze hangers: Galvanized steel, notched to fit trapeze with single bolt to tighten.

D. Conduit clamps - general purpose: One hole galvanized steel for surface mounted conduits.

2.2 FIRESTOPPING

A. Product Description: Different types of products by multiple manufacturers are acceptable as required to meet specified system description and performance requirements; provide only one type for each similar application.
   1. Silicone Firestopping Elastomeric Firestopping: Single or multiple component silicone elastomeric compound and compatible silicone sealant.
   2. Foam Firestopping Compounds: Single or multiple component foam compound.
   3. Formulated Firestopping Compound of Incombustible Fibers: Formulated compound mixed with incombustible non-asbestos fibers.
   4. Fiber Stuffing and Sealant Firestopping: Composite of mineral or ceramic fiber stuffing insulation with silicone elastomer for smoke stopping.

B. Firestopping Materials: UL 1479 to achieve fire ratings as noted on Drawings for adjacent construction, but not less than 1 hour fire rating.

C. Accessories:
   1. Primer: Type recommended by firestopping manufacturer for specific substrate surfaces and suitable for required fire ratings.
   2. Installation Accessories: Provide clips, collars, fasteners, temporary stops or dams, and other devices required to position and retain materials in place.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.

B. Remove incompatible materials affecting bond.

3.2 INSTALLATION - HANGERS AND SUPPORTS

A. Anchors and Fasteners:
   1. Concrete Structural Elements: Provide precast inserts, expansion anchors, powder actuated anchors or preset inserts.
   2. Steel Structural Elements: Provide beam clamps, spring steel clips, or steel ramset fasteners.
   3. Concrete Surfaces: Provide expansion anchors.
   4. Hollow Masonry, Plaster, and Gypsum Board Partitions: Provide toggle bolts or hollow wall fasteners.
   5. Solid Masonry Walls: Provide expansion anchors or preset inserts.
   6. Sheet Metal: Provide sheet metal screws.
   7. Wood Elements: Provide wood screws.

B. Inserts:
   1. Install inserts for placement in concrete forms.
   2. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
   3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
   4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

C. Install conduit and raceway support and spacing in accordance with NEC.

D. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.

E. Supports:
   1. Fabricate supports from structural steel or formed steel channel. Install hexagon head bolts to present neat appearance with adequate strength and rigidity. Install spring lock washers under nuts.
   2. Install surface mounted cabinets and panelboards with minimum of four anchors.
   3. In wet and damp locations install steel channel supports to stand cabinets and panelboards 1 inch off wall.
   4. Support vertical conduit at every floor.

3.3 INSTALLATION - FIRESTOPPING

A. Install material at fire rated construction perimeters and openings containing penetrating sleeves, piping, ductwork, conduit and other items, requiring firestopping.

B. Apply primer where recommended by manufacturer for type of firestopping material and substrate involved, and as required for compliance with required fire ratings.

C. Apply firestopping material in sufficient thickness to achieve required fire and smoke rating.

D. Compress fibered material to maximum 40 percent of its uncompressed size.

E. Place foamed material in layers to ensure homogenous density, filling cavities and spaces. Place sealant to completely seal junctions with adjacent dissimilar materials.

F. Fire Rated Surface:
   1. Where conduit penetrates fire rated surface, install firestopping product in accordance with manufacturer's instructions.

G. Non-Rated Surfaces:
   1. Install escutcheons, floor plates or ceiling plates where conduit, penetrates non-fire rated surfaces in occupied spaces. Occupied spaces include rooms with finished ceilings and where penetration occurs below finished ceiling.
   2. Interior partitions: Apply sealant to both sides of penetration to completely fill annular space around sleeve and/or conduit.

3.4 INSTALLATION - EQUIPMENT BASES AND SUPPORTS

A. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.

3.5 FIELD QUALITY CONTROL

A. Inspect installed firestopping for compliance with specifications and submitted schedule.

3.6 CLEANING

A. Clean adjacent surfaces of firestopping materials.

END OF SECTION

DIVISION 26 – ELECTRICAL

SECTION 26 05 33
RACEWAY AND BOXES

PART 1 GENERAL

1.1 SUMMARY

A. Section includes conduit, tubing and boxes.

B. Related Sections:
1. Section 26 05 19 – Low-Voltage Electrical Power Conductors and Cables.
2. Section 26 05 29 - Hangers and Supports for Electrical Systems.

1.2 REFERENCES

A. American National Standards Institute:
1. ANSI C80.3 - Specification for Electrical Metallic Tubing, Zinc Coated.

B. National Electrical Manufacturers Association:
1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
2. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
3. NEMA OS 1 - Sheet Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.

1.3 SYSTEM DESCRIPTION

A. Raceway and boxes located as indicated on Drawings, and at other locations required for splices, taps, wire pulling, equipment connections, and compliance with regulatory requirements. Raceway and boxes are shown in approximate locations unless dimensioned. Provide raceways for the entire wiring system unless Metal Clad (MC) cable is specifically allowed as an alternative for the specified location.

B. Exposed Dry Locations: Provide electrical metallic tubing unless surface raceway is specifically called for on the Contract Drawings. Provide sheet-metal boxes. Provide hinged enclosure for large pull boxes. Where a flexible connection is required, provide flexible metal conduit.

1.4 DESIGN REQUIREMENTS

A. Minimum Raceway Size: 3/4 inch unless otherwise specified.

1.5 SUBMITTALS

A. Refer to Section 01 33 00 - Submittal Procedures for overall submittal procedures and specific requirements associated with each type of submittal listed below.

B. Types of submittals required for this Section:
   1. Product Data

C. Refer to the List of Submittals document at the end of Division I for a detailed list of every submittal required for the products and workmanship covered under this Section.

1.6 COORDINATION

A. Coordinate mounting heights, orientation and locations of outlets mounted above counters, benches, and backsplashes.

PART 2 PRODUCTS

2.1 ELECTRICAL METALLIC TUBING (EMT)

A. Product Description: ANSI C80.3; galvanized tubing.

B. Fittings and Conduit Bodies: NEMA FB 1; galvanized steel, compression or set screw type. Provide insulated throat type connectors. Provide raintight fittings where installed in damp locations.

2.2 FLEXIBLE METAL CONDUIT

A. Product Description: Interlocked, galvanized steel construction.

B. Fittings: NEMA FB 1. Provide insulated throat type connectors.

2.3 BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
   1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; furnish 1/2 inch male fixture studs where required.
   2. Wall / Cover Plates:
      a. Surface Mount Box: Galvanized steel, Raised cover with rounded edges. Mud rings are not acceptable.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify outlet locations and routing and termination locations of raceway prior to rough-in.

3.2 EXISTING WORK

A. Remove exposed abandoned raceway, including abandoned raceway above accessible ceiling finishes. Cut raceway flush with walls and floors, and patch surfaces.

B. Disconnect abandoned outlets and remove devices. Remove abandoned boxes when raceway is abandoned and removed. Install blank cover for abandoned boxes not removed.

C. Maintain access to existing boxes and other installations remaining active and requiring access. Modify installation or provide access panel.

D. Extend existing raceway and box installations using materials and methods as specified.

E. Clean and repair existing raceway and boxes to remain or to be reinstalled.

3.3 INSTALLATION

A. Ground and bond raceway and boxes.

B. Fasten raceway and box supports to structure and finishes in accordance with Section 26 05 29.

C. Arrange raceway and boxes to maintain headroom and present neat appearance.

3.4 INSTALLATION - RACEWAY

A. Raceway routing is shown in approximate locations unless dimensioned. Route to complete wiring system.

B. Arrange raceway supports to prevent misalignment during wiring installation.

C. Support raceway using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.

D. Do not support raceway with wire or perforated pipe straps. Remove wire used for temporary supports

E. Do not attach raceway to ceiling support wires or other piping systems.

F. Route exposed raceway parallel and perpendicular to walls.

G. Maintain clearance between raceway and piping for maintenance purposes.

H. Maintain 12 inch clearance between raceway and surfaces with temperatures exceeding 104 degrees F.

I. Cut conduit square using saw or pipe cutter; de-burr cut ends.

J. Bring conduit to shoulder of fittings; fasten securely.

K. Install sealing locknuts to fasten conduit to sheet metal boxes in damp locations. Utilize conduit hubs to fasten threaded conduit to cast boxes in wet locations.

L. Install no more than equivalent of three 90 degree bends between boxes. Install conduit bodies to make sharp changes in direction, as around beams. Install factory elbows for bends in metal conduit larger than 2 inch size.

M. Avoid moisture traps; install junction box with drain fitting at low points in conduit system.

N. Install suitable caps to protect installed conduit against entrance of dirt and moisture.

3.5 INSTALLATION - BOXES

A. Install wall mounted boxes at elevations to accommodate mounting heights specified in section for outlet device.

B. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.

C. Do not fasten boxes to ceiling support wires or other piping systems.

D. Support boxes independently of conduit.

E. Install gang box where more than one device is mounted together. Do not use sectional box.

3.6 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements.

3.7 CLEANING

A. Clean interior of boxes to remove dust, debris, and other material.

B. Clean exposed surfaces and restore finish.

IEND OF SPECIFICATIONS