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SECTION 22 00 00 – PLUMBING

GENERAL

1.1 GENERAL REQUIREMENTS

- A. Conditions of the Contract and Division 1, General Requirements, shall be made part of this Section.
- B. Refer to the drawings for further definition of location, extend, and details of the work described herein.
- C. Cooperate and coordinate with all trades in execution of the work described in this Section and so as to provide clearance for equipment maintenance operation.
- D. Where referred to, standard specifications of technical Societies, Manufacturer's Associations, and Federal Agencies shall include all amendments current as the date of issue of these Specifications.
- E. It is intended, for the guidance of the bidders, that the Manufacturer's name used first throughout this Section of the Specification, is that used in the design of the PLUMBING system. All material submitted shall be equal in all respects to that used in the design.
- F. The Subcontractor for work of this Section shall become familiar with other Sections of the Specifications to determine the type and extent of work there under which affects the work of this trade, whether or not such work is specifically mentioned in this Section.

1.2 WORK INCLUDED

- A. The scope of the work under this Division, without limiting the generality thereof, consists of furnishing all labor, material, equipment, scaffolding, power, tools and rigging, except as otherwise specified, and performing all work as necessary to fully complete the Plumbing work indicated. Note that the Drawings and the Specifications are complementary. Provide work drawn, but not specified, and work specified, but not drawn, as if explicitly indicated in both ways.
- B. Examine all Drawings and other Divisions of the Specifications for requirements affecting work under this Division.
- C. The Plumbing work shall include but not be limited to the following:
 - 1. Selective Demolition
 - 2. Cleaning and painting of exterior gas piping.
 - 3. Submittals and coordination drawings.

1.3 RELATED WORK

- A. Examine all other divisions of the Specifications and all drawings for the relationship of the work under this Division and the work of other trades. Cooperate with all trades and coordinate all work under this division therewith. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Divisions, apply to this Division.

- B. The following related items are included under divisions listed below:
 - 1. Painting of all exposed gas piping not having enameled surfaces, stainless steel or chromed finishes. DIVISION 9 - PAINTING

1.4 EXAMINATION

- A. Before submitting bid, visit and examine the site where work is to be carried out and become familiar with all features and characteristics which affect the work of this SECTION.
- B. Examine the Specifications and Drawings, including the Specifications and Drawings of other DIVISIONS before bid.
- C. Report in writing, any discrepancies or deficiencies which may adversely affect the work, at least six days prior to close of bid.
- D. No allowance will be made for any difficulties encountered due to any features of the building, site or surrounding public and private property which existed up to the time of bid.

1.5 REFERENCES

- A. All material and workmanship shall comply with all applicable codes, local and state ordinances, industry standards, and utility company regulations.
- B. All materials, equipment and apparatus shall be Underwriters Listed or Labeled for all components where such listing or label is available. Items which are not UL Listed or Labeled are not acceptable if labeled or listed equipment can be obtained from another acceptable manufacturer. Assemblies or components not labeled or listed shall be furnished with certification by the manufacturer that the wiring complies with UL safety requirements.
- C. CODES and ORDINANCES: Conform with the provisions of the latest editions of the following:
 - 1. Massachusetts State Building Code, 780 CMR, 9th Edition
 - 2. Massachusetts State Plumbing Code, 248 CMR
 - 3. Massachusetts State Fuel and Gas Code, 248 CMR
 - 4. Worcester, MA fire protection codes and / or ordinances

1.6 RECORD DRAWINGS

- A. Refer to DIVISION 1 – GENERAL REQUIREMENTS and DIVISION 1 - PROJECT CLOSEOUT.
- B. All costs for Record Drawings shall be borne by the Plumbing Subcontractor.
- C. Purchase and maintain at the job site at all times, a complete set of blackline prints of the Plumbing drawings. As the work progresses, mark all changes made, whether resulting from addenda, formal change orders or other instructions issued by the Architect. Color in the various piping, equipment, apparatus and associated appurtenances exactly as they are erected.
- D. The accurate location, depth, size and type of all concealed items shall be recorded before concealment to ensure accurate and direct future access doors and panels. Show inverts of all services at key points within the building, or buried items, and entering and leaving the building. Show dimensions from building grid lines.

- E. The record drawings will be reviewed at regular intervals by the Architect and will be taken into consideration when reviewing the monthly applications for payment submitted by the Plumbing Subcontractor.
- F. When this procedure has been accomplished to the satisfaction of the Architect, the Record Drawing information shall be transferred to reproducible drawings by this Subcontractor and submitted to the Architect, as directed in DIVISION 1, PROJECT CLOSEOUT.

1.7 OPERATION AND MAINTENANCE DATA

- A. Refer to DIVISION 1 - PROJECT CLOSEOUT
- B. Assemble three copies of indexed hard cover manuals entitled "Operating and Maintenance Instructions for Plumbing System".
- C. Submit one copy for review at least two months before instructions to Owner are commenced. Instruct the Owner for one week (40 hours) as to the Operation-Maintenance of the System. This, and all instructional sessions, shall be videotaped and three (3) copies made and submitted to the Architect. Refer to DIVISION 1, PROJECT CLOSEOUT.
- D. Ensure that the terminology used in various sections of the manual is consistent.
- E. Each manual shall contain the following information:
 - 1. Description of each system, with description of each major component of the system.
 - 2. Complete sets of approved page-size equipment shop drawings.
 - 3. A lubrication schedule of all specified equipment.
 - 4. Spare parts list.
 - 5. Equipment identification list with serial numbers.
 - 6. Page-size valve tag schedule and flow diagrams.
 - 7. Names and telephone numbers of all equipment parts suppliers.

1.8 SUBMITTALS

- A. Refer to DIVISION 1 - SUBMITTAL PROCEDURES and specifications for submittal requirements. Without limiting the generality thereof, the Plumbing Subcontractor shall also submit the additional information noted herein.
- B. Present, not later than three (3) weeks after award of the Contract, a list of submittals to be submitted with the name of each manufacturer and supplier. Failure to submit this list will result in the necessity for the Contractor to use that equipment which is scheduled.
- C. Submittals for equipment furnished under this Section shall include, but not be limited to all items listed in DIVISION 22 – Plumbing Article - WORK INCLUDED and listed within this specification. Refer to each article of this section for additional specific submittal requirements.
- D. Do not manufacture, deliver or install equipment and materials until final review of Shop Drawings has been completed.
- E. Submit electronically copies of certified submittals of all equipment, materials, equipment wiring, diagrams, motors, starters, controls and schedules. Ensure that submittals have adequate clear space for all stamps. When requested, resubmit promptly. Provide email notification to ftconadmin@f-t.com with submittal file(s) attached in industry standard ".pdf" file format. If the

submittal file(s) are too large for email transfer, provide hyperlink to files allowing both download and upload of files over internet connection without requiring use of usernames or passwords.

- F. Identification: In addition to the information required by DIVISION 1 - SUBMITTAL PROCEDURES indicate:
1. Name and address of supplier.
 2. Name of manufacturer.
 3. Reference specification section number, article number, article name and page number (e.g. 22 00 00 - 2.18 - CLEANOUTS – Page 22 00 00 - 22)
 4. Identify if submittal is a resubmission of previous reviewed equipment.
 5. Distribution list of all Trade subcontractors and manufacturers who will receive the Engineer's reviewed comments.
- G. Do not manufacture, deliver or install equipment and materials until final review of Submittals has been completed.
- H. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Dimensions and Required clearances
 - e. Equipment Shipping and Operating weights and Structural Loads.
 - f. Components required for field installation.
 - g. Method of field assembly, components, and location and size of each field connection.
 - h. Notation of coordination requirements.
 - i. Material gages and finishes.
 - j. Standard color charts.
 - k. Manufacturer's catalog cuts.
 - l. All available specialties, options and accessories. Clearly indicated furnished specialties, options and accessories.
 - m. Standard product operation and maintenance manuals.
 - n. Notation of coordination requirements.
- I. Compliance with specified standards. Be responsible for presenting the processing of submittals to suit manufacturing schedule of equipment and construction schedule of building.
- J. Be responsible for the accuracy of equipment dimensions relative to available space, the performance and the electrical characteristics. When required, submit a complete comparison between accepted alternative equipment and materials, and that which is specified.
- K. Each submittal shall indicate clearly the correct name and address of the project, the intended use and location of the equipment, and the specified and/or scheduled designation tag/number.
- L. Upon receipt of approved Submittals, distribute copies to all trades and manufacturers affected. Submit approved Submittals to authorities having jurisdiction when requested.
- M. Keep one set of reviewed Submittals on the site at all times.
- N. CLOSEOUT SUBMITTALS

1. Bind one set of the corrected, reviewed and approved Submittals in each Operation and Maintenance Instructions Manual. Refer to DIVISION 1 - SUBMITTALS, DIVISION 1 - PROJECT CLOSEOUT and DIVISION 22 - Plumbing article – OPERATION AND MAINTENANCE DATA.
 2. Submit Inspection and test reports.
 3. Valve Tag Charts
 4. Field quality control test reports.
 5. Water sample test reports.
 6. Warrantee information.
 7. Permits and Licenses:
 - a. Submit copies of all applicable paid and approved permits and licensing forms in connection with the installation of waste treatment equipment as required by the Local Sewer Authority.
- O. Prior to submission of Submittals, the Plumbing Subcontractor shall thoroughly check each shop drawing to ascertain that it complies with the Contract requirements; that the electrical characteristics are correct; and that the dimensions of work submitted fit the available space. Any deviations from the Contract requirements shall be clearly noted on the submittals. The Plumbing Subcontractor shall stamp each submittal with his firm's name, date and approval, thereby representing that the above has been complied with. Shop Drawings not so checked and stamped, shall be returned without being examined. Review of the Shop Drawings shall not relieve the Plumbing Subcontractor from the responsibility for departures from the Contract Documents. Errors in shop drawings shall be the sole responsibility of the Plumbing Subcontractor whether the drawings are reviewed or not.
- P. The Plumbing Subcontractor shall submit to the General Contractor, for transmittal to the Owner, any samples requested by the Owner. Submittal, review, and approval of samples shall be in accordance with the Conditions of the Contract.
- Q. Drawings not stamped by the General Contractor shall be returned without being examined.
- 1.9 REQUESTS FOR INTERPRETATION (RFIS)
- A. Prepare Requests for Interpretation (RFIs) in accordance to Division 1 and, in addition, adhere to the following:
- B. RFIs shall originate with the Contractor. RFIs submitted directly by sub-contractors will be returned with no response. RFIs sent directly to engineer will be returned with no response. Incomplete RFIs will not be reviewed and will be returned for additional information.
- C. If email RFI submissions are allowed by Division 1 then the RFI and Attachment(s) shall be in Adobe Acrobat PDF format.
- D. Submit RFIs in format specified and in addition include:
1. Specification Division number and title and related paragraphs, as appropriate.
 2. Drawing number, room name, structural grid coordinates and detail references, as appropriate.
 3. Field dimensions and conditions, as appropriate.
 4. Contractor's suggested solution(s). If Contractor's solution(s) impact the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
 5. Attachments: Include 8 ½" x 11" copies of construction documents highlighting areas requiring interpretation. Include drawings, descriptions, measurements, photos, Product Data, Shop Drawings, and other information necessary to fully describe items needing interpretation and suggested solution(s).

6. Supplementary drawings prepared by Contractor shall be to scale and shall include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments.

PART 2 – PRODUCTS

2.1 FUEL GAS PIPING

- A. Pipe: Black steel, ASTM A53, Schedule 40.
- B. Nipples: Steel, ASTM A733, schedule 40.
- C. FITTINGS:
 1. Steel Welded: Schedule 40
 - a. Up to 4 inch, ANSI B16.11, Socket welded.
 - b. Over 4 inch, ANSI B16.9, Butt welded.
 2. Malleable Iron, Threaded: ANSI B16.3. for up to 4”.
- D. Joints: Provide welded or threaded joints.
- E. MECHANICAL PRESS PIPING PRODUCTS
 1. Basis of Design: Viega Megapress G Fittings
 2. General Requirements: Mechanical press piping products shall be considered equal to the other products as described in this paragraph “PIPE AND FITTINGS”. These products shall only be used on fuel gas piping sizes 2” and under.
 3. Zinc/Nickel coated steel alloy press fittings shall conform to material requirements of ANSI LC4. Sealing elements for press fittings shall be HBNR, 420 stainless steel grip ring and 304 stainless steel separator ring. Sealing elements shall be factory installed. Press ends shall have feature designed to assure leakage of liquids and/or gases from inside the system past the sealing element of an unpressed connection.
 4. Installer shall be a qualified installer, licensed within the jurisdiction, and familiar with the installation of steel press joint systems.
 5. Steel press connections shall be made in accordance with the manufacturer’s installation instructions. The tubing shall be fully inserted in the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joints shall be pressed using the tool(s) approved by the manufacturer.

EXECUTION

3.1 GENERAL REQUIREMENTS

- A. Unless otherwise noted, equipment and systems scheduled on the drawings and specified herein shall be installed according to the manufacturer’s recommendations and in keeping with the most up-to-date accepted standards and guidelines, including with respect to safety, maintenance and clearance.
- B. Be responsible for the care and protection of all work included in this section until it has been tested and accepted.
- C. Test pressure piping in accordance with ASME B 31.

- D. The extent of the demolition work is shown on the drawings or described in this specification.
- E. The owner shall be permitted trial usage of systems or parts of systems for the purpose of testing and learning operational procedures.
- F. Thoroughly instruct the owner's authorized representative in the safe operation of the systems and equipment. Arrange and pay for the services of qualified manufacturer's representatives to instruct owner on specialized portions of the installation.