

SECTION 15400PLUMBING - GENERALPART 1 - GENERAL1.1 DESCRIPTION

- A. Description: Furnish all labor and materials required to completely install the plumbing systems as shown on the Drawings, specified in the appropriate Sections and as required for complete systems.
- B. Work Included: The plumbing work shall include, but not be limited to the following (when applicable):
 - 1. Building sanitary waste and vent system to a point 8 feet outside building.
 - 2. Building rainwater system to a point 8 feet outside building.
 - 3. Building domestic hot and cold water supply system to a point 8 feet outside building.
 - 4. Plumbing fixtures and trim.
 - 5. Water, waste, and vent connections to equipment when furnished by others.
 - 6. Fire extinguishers and cabinets.
 - 7. Special piping and process systems shown on the Drawings.
- C. Related Work Specified Elsewhere (When Applicable):
 - 1. Project cleaning is specified in Division 1.
 - 2. Excavation and backfill is specified in Division 2.
 - 3. Concrete is specified in Division 3.
 - 4. Calking and flashing are specified in Division 7.
 - 5. Painting is specified in Division 9.
 - 6. Piping, pipe fittings, valves, insulation, fixtures, equipment, and accessories are specified in the appropriate Sections of this Division.
 - 7. Electrical is specified in Division 16.
- D. Drawings and Measurements:
 - 1. The Drawings show the general arrangement, direction, and sizes of pipes. They are not intended to show every offset, valve, and fitting, and every structural difficulty that may be encountered.
 - 2. All measurements shall be verified at the job site.

1.2 QUALITY ASSURANCE

- A. Materials and Workmanship: All materials and workmanship shall be suitable for the respective work and the type of service encountered.
- B. Equipment: All equipment shall be constructed to operate safely without water hammer and undue wear.
- C. Local Codes: Perform all work in accordance with applicable state and local plumbing codes, except where requirements of this Contract are more stringent.
- D. Permits: Arrange for all permits, inspections, and tests required by codes at no additional cost to the Owner.

E. Standards: When standards are referred to, the latest issue shall apply.

1.3 JOB CONDITIONS

A. Scheduling Work: Install and test all plumbing to be cast into or buried under concrete floor slabs prior to the placement of concrete.

1.4 SUBMITTALS TO THE ENGINEER

A. Prior to ordering fixtures, equipment and appurtenances, submit shop drawings for approval in accordance with the General Conditions and Section 01340 of the Construction Contract.

B. Submit to the Engineer: Copies of manufacturer's installation, maintenance and operating instructions including parts lists for all equipment furnished as specified in the General Conditions of the Construction Contract.

C. Submit a list of local supply houses for replacement parts for all equipment furnished.

1.5 DELIVERY, STORAGE & HANDLING

A. Exercise care during loading, transporting, unloading and handling to prevent damage of any nature to interior and exterior surfaces of equipment, fixtures, pipe and fittings.

B. Do not drop equipment and fixtures.

C. Store materials on the project site in enclosures or under protective coverings.

D. Assure that all materials are kept clean and dry.

E. Do not store materials directly on the ground.

F. Exercise care so as not to damage, crack, mar finish and to prevent damage of any nature to fixtures.

G. Remove damaged fixtures from project and replace at no additional cost to the Owner.

H. Protect fixtures after installation by wrapping or covering to prevent use and damage.

1.6 JOB CONDITIONS

A. Scheduling Work: Install and test all plumbing to be cast into or buried under concrete floor slabs prior to the placement of concrete.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Provide materials that are new, suitable for intended use, and of type, style, and quality specified and as shown on the Drawings.

B. Provide pipe, fittings, and devices that meet requirements of local plumbing codes and be in accordance with applicable ASTM, ANSI, and Commercial Standard (CS) standards.

PART 3 - EXECUTION3.1 INSTALLATION

- A. Install all plumbing in a neat workmanlike manner.
- B. Lines and Grades:
 - 1. Unless otherwise shown on the Drawings, install all piping parallel to the building walls wherever possible.
 - 2. Install all piping to accurate lines and grades.
- C. Supports: Support piping as specified in the "Pipe Hangers & Supports" Section in this Division.
- D. Expansion: Provide suitable provisions for expansion of pipelines wherever necessary.
- E. Do not provide nor install close nipples.
- F. Do not install piping through, directly over, or in front of electrical switchgears and power panels, except where drip pans are provided and installed.
- G. Calk the spaces between the pipe and walls, ceilings, and floors gas-tight where shown on the Drawings.
- H. Fittings for Dismantling Piping: Provide a sufficient number of unions to allow the dismantling of all piping.
- I. Pitch:
 - 1. Pitch sanitary and drainage piping 1/4 inch per foot, whenever possible, but never less than 1/8 inch per foot.
 - 2. Pitch all other piping toward low points and install valved drains at the low points.
- J. Provide conspicuous, easily read, durable metal or plastic signs at all non-potable and process water outlets labeled "Do Not Drink".

3.2 TESTING

- A. When the installation is complete, test all pipelines in the presence of the Engineer and the Plumbing or Building Inspector in accordance with the requirements of the local and state plumbing codes, at no additional cost to the Owner. Provide all necessary equipment and utilities.
- B. Test underground piping prior to backfilling.
- C. Test piping prior to application of paint and insulation.
- D. Separately test portions of piping which will be concealed before completion.
- E. Procedure:
 - 1. Piping Which Carries Water or Liquid Under Pressure: Fill pipes with water and subject them to 100 psig. or 1-1/2 times the normal working pressure, whichever is greater, for two (2) hours with no loss in test pressure.
 - 2. Soil, Vent, Waste and Drain Piping:
 - a. Plug all outlets and fill pipes with water to the top of the highest vent stack above the roof, or with not less than 10 feet of water at all points in section.

- b. The piping shall hold this water for a period of 30 minutes without showing a drop in water level.
 3. Fuel Gas Piping: Test with compressed air at 15 psi for 30 minutes with no loss in pressure at test gauge. Bubble test all fittings and joints with a soap/water solution.
 4. Remove any equipment that cannot withstand test pressures prior to any testing.
 5. Do not test plastic piping with compressed air or other gases.
- F. Repairs:
1. Should leaks be found, repair as required even to the extent of disassembling and remaking the joints, or replacing sections of pipe.
 2. Calking of threads or the use of chemical compounds to correct leaks will not be permitted.
 3. Replace defective pipe and fittings and repeat tests until the testing results are approved by the Engineer.

3.3 DISINFECTION

- A. Disinfect all pipes installed to carry potable water. Perform the work in accordance with the procedure outlined in AWWA Designation 0601.
- B. Use a dosage which will produce not less than 50 ppm. available chlorine throughout the entire system and not less than 10.0 ppm chlorine residual after a contact period of not less than 24 hours. Repeat disinfection if chlorine residual is less than 10 ppm after 24 hour contact period.
- C. During the disinfection period, exercise care to prevent the contamination of water in the existing community, town, or city water main.
- D. After the disinfection period, flush the piping with clean potable water until the chlorine residual does not exceed 0.2 ppm.

3.4 IDENTIFICATION

- A. All plumbing piping shall be identified by this Contractor through the use of vinyl pressure sensitive markers.
- B. Markers shall indicate system, using abbreviations supplied by Engineer. Each system shall use a different color marker.
- C. Flow arrows shall indicate direction of fluid flow.
- D. Labels and arrows shall be provided at twenty foot intervals and in or above each room.
- E. Equipment Identification: Provide identification labels for all equipment such as pumps, water heaters, and similar items.
- F. Labels shall be equal to Seton Nameplate Co. or W.H. Brady Co.

END OF SECTION