

SECTION 220000 - PLUMBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. The drawings and the specifications including Section 230500 “Supplemental General Mechanical Conditions” are hereby made a part of the work of this section.

1.2 DESCRIPTION

- A. The work covered by this Section of the specifications includes the furnishing of labor, materials, equipment, transportation, permits, inspections, and incidentals and the performing of operations required to provide a complete and functional plumbing system.
- B. Work shall be in accordance with the current edition of the IBC and Maine State Plumbing Code and applicable local ordinances.

1.3 SUBMITTALS

- A. Substitutions: Your attention is directed to Section 230500-"Substitutions", relative to competition and the (ONLY) notation. Familiarity with this section shall be achieved before reading the PRODUCTS section of this specification.
- B. The items for which the submittals paragraph in Section 230500, Supplemental General Mechanical Requirements, apply are as follows:
 - 1. Piping materials.
 - 2. Valves.
 - 3. Pipe hangers.
 - 4. Fixtures and trim.
 - 5. Miscellaneous equipment.
 - 6. Piping and valves identification.
 - 7. Gas piping systems

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

- A. Soil and Waste (Sanitary) and Vent Piping: Schedule 40 PVC.
- B. Domestic Water Piping: Type L hard copper tubing and cast bronze or wrought copper solder fittings, or "Flowguard Gold" or Watts "SeaTech" Quick-Connect type, Schedule 40 solvent-welded CPVC pipe and fittings. CPVC pipe and fittings shall be rated at 100 psig at 180°F and shall meet or exceed the requirements of ASTM D2846, the IBC, and be certified by the ANSI/NSF for potable water applications. Installation, including supports, shall be per the manufacturer's recommendations.
- C. Exposed Water and Waste Piping at Fixtures: I.P.S. copper with cast brass fittings chrome plated finish, with deep one piece escutcheon plates at traverse points.

- D. Solder: Lead-free (ONLY), Englehard Silvabrite 100, 440°F melting point, ASTM B32.
- E. Gas piping (aboveground): Schedule 40 carbon steel with malleable threaded fittings.

2.2 GAS PIPING SYSTEM

- A. Ball Valves for Gas Service: Copper alloy with chromium plated floating ball per Federal Specification WW-V-35B, Type II, Class 3. Blowout-proof stem, reinforced teflon seats, threaded ends, quarter turn on-off, 600 WOG rating, 250 psi rating for natural gas, UL-listed as an natural gas shutoff valve, Apollo Model 80-100 series.

2.3 VALVES

- A. Ball Valves: Copper alloy with stationary seat ring and chromium plated or stainless steel floating ball per Federal Specification WW-V-35B. Blowout proof stem, reinforced PTFE seal. Sizes 2" and larger shall have threaded ends. Provide lever handle with stem extension as required to allow operation without interfering with pipe insulation.
- B. Check Valves: Horizontal Swing, MSS SP-80, Type 3, Class 125.
- C. Drain Valves: Provide ball valves with 3/4" hose connection and brass cap.
- D. Fixture Service Stop Valves: Angle Wheel Handle Stop, ASME A112.18M.
 - 1. Each plumbing fixture shall have individual stop valves in the hot and cold supplies.
 - 2. Service stop valves exposed in finished areas shall be chrome-plated brass; in non-finished areas, ball valves shall be used in lieu of chromed supplies.
- E. Temperature and Pressure Relief Valves: Bronze body, tested under ANSI Z21.22, AGA and ASME rated, 125 psig/210°F relief settings.

2.4 PIPE HANGERS

- A. Adjustable Swivel Hangers:
 - 1. Pipe sizes 2" and less: Carpenter and Paterson Fig. 800, oversize for insulated piping systems.
 - 2. Pipe sizes larger than 2": Carpenter and Paterson Fig. 100, oversize for insulated piping systems.
- B. Riser Clamp: Carpenter and Paterson Fig. 126 CT copper plated for copper piping, Fig. 126 for iron and PVC piping.
- C. Insulation Shields: 18 ga. galvanized steel, 180° wrap, Carpenter and Paterson Fig. 265P, Type H.

2.5 FIXTURES AND TRIM

- A. (P-1) ADA Water Closet: Floor-mounted, tank-type, Toto Drake, elongated bowl, white vitreous china, low consumption (1.6 gpf).
1. Seat: Toto or Church Model 9500C, heavy weight solid plastic, open front, external check hinges, for elongated bowl, white color.
 2. Final installation shall meet ADA guidelines and ANSI A117.1.
- B. (P-2) ADA Lavatory, Wall Hung: TOTO LT307.4, 21"x18", self-rimming, white vitreous china, faucet holes on 4" centers.
1. Faucet: Symmons Symmetrix Model S-20-2-FR single handle, 0.5 GPM flow aerator, polished chrome finish, ceramic control cartridge.
 2. Drain: Pop-up drain assembly with bright metal finish.
 3. Trap: Chrome-plated, cast copper alloy, 1-1/4" P-trap with cleanout plug. Adjustable with connected elbow and nipple to wall.
 4. Lavatory shall be installed at 34" above finished floor. Final installation of lavatory and accessories shall meet ADA guidelines and ANSI A117.1. Insulate exposed traps and supplies with Truebro Lavguard.
- C. (P-3) ADA Kitchen Sink, Single Bowl: Elkay model LRAD1720 stainless steel, 17"x22" overall size, 14"x14"x6.5" deep bowl, 4 faucet holes on 4" centers, fully sound deadened. Drain shall be located in upper left or right corner of bowl.
1. Faucet: Symmons Symmetrix Model S-26 single lever handle, pull-out spout, polished chrome finish, ceramic control cartridge.
 2. Strainer: Dayton Model D-1125 with removable basket and neoprene stopper.
 3. Sink installation shall be in compliance with the ADA guidelines.
- D. (P-4) Mop Basin: Powers-Fiat MSB-2424, molded stone, 24"x24"x10" with 1" wide shoulders; 3" stainless steel drain with combination dome strainer and lint basket.
1. Faucet: Powers-Fiat Service Faucet #830-AA, chrome-plated with vacuum breaker, integral stops, adjustable wall brace, pail hook, and 3/4" hose thread on spout.
 2. Hose and Hose Bracket: Powers-Fiat #832-AA, 30" long heavy duty, 5/8" size, cloth reinforced, rubber hose with 3/4" chrome coupling at one end; 5"x3", 18 gauge, stainless steel bracket with rubber grip.
 3. Caulk around sink at floor and walls with white silicone caulk.
- E.. (P-5) Water Cooler: ADA Bi-Level Water Cooler: Elkay BiLevel Fountain, EZ Series, or Halsey-Taylor, stainless steel finish, front push bar, lead free, ADA compliant,

wheelchair accessible. ADA compliant fountain shall be at the right or left of the unit, as indicated on the Architectural drawings, non-ADA fountain on the opposite side of the unit. The unit shall be capable of cooling 8.0 GPH of 80°F. water to 50°F. with 90°F. ambient. Motor shall be 1/5 hp., 120v. The bubbler shall be "Flexi-Guard".

2.6 MISCELLANEOUS EQUIPMENT

- A. Floor/Yard Cleanout (FCO/YCO): Zurn Z-1400 adjustable floor cleanout, cast iron body, with gas and watertight ABS tapered thread plug. Provide size equal to piping served with maximum size of 4".
1. Concrete floor finishes: Scoriated round polished bronze top.
 2. Sheet tile finishes: Scoriated square polished bronze top recessed to receive tile.
 3. Carpeted finishes: Scoriated round polished bronze top and carpet marker.
- B. Wall Cleanout (WCO): Sanitary tee with threaded raised nut or countersunk-nut cleanout plug located behind Zurn Z-1468 round stainless steel wall access cover.
- C. Vacuum Breaker: Watts Model N36, 3/4" size, 20 CFM capacity.
- D. Strainer: Watts Series 777, MIL-S-16293, bronze body wye-type, 200 WOG rating, screwed end connections, 20 mesh stainless steel, monel, or bronze screen.
- E. Thermometers: Terrice Series V80445 or Ashcroft Series 600A-04, vapor actuated, adjustable angle, 4-1/2" diameter face, cast aluminum case, stainless steel ring, glass window, white background dial with black figures, black finished stainless steel pointer, brass movement with bronze bearings, phosphor bronze bourdon tube. Accuracy shall be to within one scale division.
1. Thermowell: Provide with brass thermometer wells projecting a minimum of 2" into the pipe with extension to face of insulation. Provide with heat transfer fluid to fill interstitial space between bulb and well.
 2. Range: 30°F to 240°F for domestic hot water systems.
- F. Water Hammer Arrestor (Shock Absorber): Plumbing and Drainage Institute listed.

Schedule:

"A" - Size #100 PDI - 0-11 Fixture Units

"B" - Size #200 PDI - 12-32 Fixture Units

"C" - Size #300 PDI - 33-60 Fixture Units

- G. Vacuum Breaker: Watts Model N36, 3/4" size, 15 CFM capacity.
- H. Strainer: Watts Series 777, MIL-S-16293, bronze body wye-type, 200 WOG rating, screwed end connections, 20 mesh stainless steel, monel, or bronze screen.

- I. Automatic Trap Primers: Zurn Model Z-1022, MIFAB or Smith, "Sani-Guard" Trap Primer, all-bronze body with integral vacuum breaker, union connection and supply manifold as required to serve floor drain traps. Trap primers shall comply with ANSI/ASSE Standard 1018. Connect to each floor drain trap and to nearest plumbing fixture.

2.7 WATER HEATING EQUIPMENT

- A. Electric Water Heater (EWH): State Water Heaters "Select", 10-gallon capacity, glass lined tank, non-simultaneous dual heating element (1650W), 120V/1PH, thermostat and high limit control. Provide with temperature and pressure-relief valve. Set water heater to provide 110°F water.

2.8 PIPING, VALVE IDENTIFICATION

- A. Piping identification: Provide plastic "wrap-around" identification markers indicating flow and fluid flowing for the following:
 1. Domestic Hot Water
 2. Domestic Cold Water
 3. Vent Piping
 4. Sanitary Drain Piping
- B. Markers shall be placed 30-50 ft. apart for piping in accessible areas.
- C. Markers shall be placed outside the pipe insulation and in the most obvious location for viewing.
- D. Valve Tags:
 1. Attach to each valve a 1-1/2" round or octagonal brass tag with 1/2" indented numerals filled with a durable black compound. In addition to the valve numbers, each tag shall identify the system it controls. Service stop valves exposed in finished areas need not be tagged.
 2. Tags shall be securely attached to stems of valves with copper or brass "S" hooks, or chains.
 3. Valve charts shall be provided for each piping system and shall consist of schematic drawings of piping layouts, showing and identifying each valve and describing its function. Upon completion of the work, one (1) copy of each chart, sealed to rigid backboard with clear lacquer placed under glass and framed, shall be hung where directed. Two (2) additional unmounted copies shall be delivered to the Architect.
 4. Tags and charts shall be coordinated with Section 230000 HVAC System and when completed this work shall have been done sequentially.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection:

1. Prior to work of this Section, carefully inspect the installed work of other trades and verify that such work is complete to the point where this installation may properly commence.
2. Verify that plumbing may be installed in strict accordance with pertinent codes and regulations and the reviewed Shop Drawings.

3.2 INSTALLATION OF PIPING

- A. Provide and erect in accordance with the best practice of the trade piping shown on the drawings and as required to complete the intended installation. Make offsets as shown or required to place piping in proper position to avoid other work and to allow the application of insulation and finish painting to the satisfaction of the Architect.
- B. The size and general arrangements, as well as the methods of connecting piping, valves, and equipment, shall be as indicated, or so as to meet the requirements of the Architect.
- C. Piping shall be erected so as to provide for the easy and noiseless passage of fluids under working conditions.
- D. Install unions to facilitate removal of equipment.
- E. Copper pipe shall be reamed to remove burrs.
- F. Connections between copper and steel piping shall be made with brass fittings.
- G. Solder joints shall be made with lead free solder. Clean surfaces to be soldered and use a paste flux. Wash joints with sodium bicarbonate and water to remove corrosive effects of heated solder paste. Caution: Lead-bearing solder is not permitted.
- H. Pipe penetrations through walls, floors and ceilings shall be in accordance with Section 230500 "Supplemental General Mechanical Requirements". Traverse points of piping shall be escutcheoned with split chrome floor and ceiling plates and spring anchors, where visible to occupancy.
- I. Provide a cleanout in the vertical position at the base of each sanitary and roof drain drop.
- J. Sanitary and vent piping shall be sized and installed at 1/4" per foot slope or as indicated and in no case less than 1/8" per foot.

3.3 PIPE HANGERS

- A. Impact driven studs are prohibited.

- B. Copper Tubing: supported at intervals with rod sizes as follows, double nuts on hangers and on beam clips.

Copper Size	Hanger Intervals	Rod Sizes
1/2"	5'	3/8"
3/4"	6'	3/8"
1"	6'	3/8"
1-1/4"	8'	3/8"
1-1/2"	8'	3/8"
2"	10'	3/8"

- C. Cast Iron Pipe: Supported at intervals with rod sizes as follows, double nuts on hangers and on beam clips.

Cast Iron Size	Hanger Intervals	Rod Sizes
1-1/2"	5'	3/8"
2"	5'	3/8"
2-1/2"	5'	1/2"
3"	6'	1/2"
4"	7'	5/8"

- D. PVC Pipe: Supported at 4-foot intervals.
- E. Verticals: Supported by use of clamp hangers at every story height, and at not more than 6 feet intervals for copper piping 1-1/4" and smaller size.

3.4 CLOSING IN UNINSPECTED WORK

- A. General: Cover up or enclose work after it has been properly and completely reviewed.
- B. If any of the work is covered or enclosed prior to required inspections and review, uncover the work as required for the test and review. After review, tests and acceptance, repairs and replacements shall be made by the appropriate trades with such materials as necessary for the acceptance by the Architect and at no additional cost to the Owner.

3.5 CLEANUP AND CORROSION PREVENTION

- A. Upon completion of the work thoroughly clean and flush piping systems to the sewer with water.
- B. Fixtures, piping and equipment shall be thoroughly cleaned. Dirt, dust, and debris shall be removed and the premises left in a clean and neat condition.
- C. Caulk around fixtures at floor and wall.
- D. Before covering is applied to piping systems, clips, rods, clevises and other hanger attachments, and before uncovered piping is permitted to be concealed, corrosion and rust shall be wire brushed and cleaned and in the case of iron products, a coat of approved protective paint applied to these surfaces. When corrosion is from the effects of hot solder paste, the areas shall be cleaned and polished and a wash of bicarbonate of soda and water used to neutralize the acid condition.

3.6 DISINFECTING

- A. After the entire potable water system is completed, cleaned and tested, and just before the building is ready to be occupied, disinfect the system as follows: After flushing the mains, introduce a water and chlorine solution for a period of not less than three hours before final flushing of the system.

3.7 TESTS

- A. Sanitary soil, waste and vent piping: Fill with water to top of vents, and test as required by Code.
- B. Water piping shall be tested to a pressure of 100 lbs. per square inch for at least 30 minutes. Pressure drop in this period shall not exceed two pounds per square inch. Leaks shall be repaired and system retested. Notify Architect 24 hours before test is to be performed.

3.8 INSTRUCTIONS

- A. On completion of the project, provide a competent technician to thoroughly instruct the Owner's representative in the care and operation of the system. The total period of instruction shall not exceed one (1) hour. The time of instruction shall be arranged with the Owner.

* END OF SECTION *