

SECTION 22 00 00

PLUMBING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

- A. The drawings and the specifications including Section 23 05 00 "Supplemental General Mechanical Conditions" are hereby made a part of the work of this section.
- B. Drawings and general provisions of Contract including General and Supplementary Conditions and all Division 1 specification sections.
- C. Provision of waste management: Section 01 74 19, Construction Waste Management and Disposal.

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 Maine State Plumbing Code and applicable local ordinances.

1.3 SUBMITTALS

- A. Substitutions: Your attention is directed to Section 23 05 00-"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 23 05 00, Supplemental General Mechanical Requirements, apply are as follows:
 - 1. Piping materials.
 - 2. Valves.
 - 3. Pipe hangers.
 - 4. Fixtures and trim.
 - 5. Miscellaneous equipment.
 - 6. Water heating equipment.
 - 7. Piping, valves and equipment identification.
 - 8. Firestopping.
 - 9. Electronic trap primers.
- C. Section 01 33 00 - Submittal Procedures: Submittal procedures.
- D. Product Data: Submit data on product characteristics, performance criteria and limitations.
- E. Manufacturer's Installation Instructions: Submit procedure for preparation and installation.
- F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

PART 2 PRODUCTS

2.1 PIPING MATERIALS

- A. Soil and Waste (Sanitary) and Vent Piping:
 - 1. Below Grade: Cast iron with push-on joints or Sched. 40 PVC.
 - 2. Above Grade: Sanitary piping shall be cast iron "no Hub" (ONLY). Vent piping may be Sched. 40 PVC at contractor's option, cast iron (ONLY) thru roof.
 - B. Domestic Water Piping:
 - 1. Pipe sizes larger than 1": Type L hard copper tubing and cast bronze or wrought copper solder fittings.
 - 2. Pipe sizes 1" and smaller:
 - a. Uponor AquaPEX, NSF rated, 180°F at 100psi, red (HW), blue (CW) and white (RHW).
 - b. "Flowguard Gold" 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 Silvacore 100, 440°F melting point, ASTM B32.
 - E. Gas Piping: Schedule 40 black carbon steel with threaded joints and fittings.
- 2.2 NO HUB COUPLINGS
- A. For DWV piping, couplings shall be Clamp-All HI-TORQ125, shall maintain 15 PSI hydrostatic seal, constructed 304SS housing and ASTM C-564 neoprene gasket. Couplings shall meet FM 1680, IBC and local codes and requirements.
- 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.
- A. 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 Eco-Drake CST744EL, Zurn, or equal, elongated bowl, white vitreous china, low consumption (1.28 gpf). Color matched trip lever shall be mounted on the wide side of the stall. Fixture shall be suitable for 12" rough-in.
 - 1. Seat: Toto SoftClose Model SS114, heavy weight solid plastic, open front without cover, self sustaining check hinge, for elongated bowl, white color.
 - 2. Total installed height of front edge of seat shall be 17" to 19" above finished floor. Final installation shall meet ADA guidelines and ANSI A117.1.
- B. (P-2) ADA Lavatory, Wall Hung: Toto LT307.4, 20"x18", Zurn, or equal, 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: Perforated grid strainer with bright metal finish.
 - 3. Trap: 1-1/4" PVC P-trap with cleanout plug. Adjustable with connected elbow and nipple to wall.
 - 4. Lavatory shall be installed at 34" above finished floor (See Architectural drawings). 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 Stall Shower: Aquarius Bathware Model G 3636 BF / .50 / 3PC, Best Bath or equal, three-piece gelcoat, 39"L x 39.5"W x 77.5"H overall dimensions, ½" threshold, vertical and L-shaped ADA/ANSI grab bars and HDPE seat, collapsible dam, white curtain rod and weighted white anti-microbial liner. The shower shall comply with ADA and ANSI Z124.2 and NSI A117.1.
 - 1. Shower Controls: Symmons Temptrol packaged unit Model B-56-500-B30-L-V. Pressure-Balancing mixing valve with adjustable stop screw to limit handle turn. Levertrol diverter with integral volume control. Clear-Flo shower head (1.5 gpm)

- with arm and flange, wall/hand shower with in-line vacuum breaker, flexible 5' metal hose, wall connection and flange, 30" slide bar for hand shower mounting.
2. Installation of shower and accessories shall meet ADA guidelines and ANSI A117.1.
- D. (P-4) Exam Sink, ADA-compliant, Single Bowl: Advance Tabco 7-PS-91, Type 304 stainless steel, 17"x15" overall size, 5" deep bowl, wall-mounted, with backsplash and soap dispenser.
1. Faucet: Battery operated electronic infrared with mixing valve, gooseneck spout.
 2. Strainer: Furnish with basket strainer and chrome-plated P-trap.
- E. (P-5) Mop Service Sink: Powers-Fiat MSB-3624, terrazzo or molded stone, 36"x24"x12" 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 wall bracket with rubber grip.
 3. Caulk around sink at floor and walls with white silicone caulk.
 4. 24" high stainless steel wall protection guards.
- F. (P-6) Stainless Steel Counter Sink, ADA-compliant, Single Bowl: Elkay or Just, Type 304 stainless steel, 21"x19" overall size, 5" deep bowl, offset drain, counter-mounted.
1. Faucet: Moen Commercial, or equal, chrome-plated brass single handle mixing faucet with ceramic cartridge and hand-held spray.
 2. Strainer: Furnish with basket strainer and chrome-plated P-trap.

2.6 MISCELLANEOUS EQUIPMENT

- A. Floor Drain (FD): Zurn Z-415, cast iron body with 2" or 3" bottom outlet, as indicated, combination invertible membrane clamp and adjustable collar. Strainer shall be 6" diameter Zurn "Type B", polished nickel-bronze. Floor drains shall have "deep seal" traps and trap primer connection, connect to nearest plumbing fixture.
- B. 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.
- C. 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.
- D. Vacuum Breaker: Watts Model N36, 3/4" size, 20 CFM capacity.

E. 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.

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

2.7 WATER HEATING EQUIPMENT

A. Electric Water Heaters (**EWH**): AO Smith, State, or approved equal packaged unit of make, model, and performance as specified; UL listed with adjustable range thermostat. Set to provide 110°F water temperature. Hot and cold water connections shall be ¾" (minimum).

1. The rated working pressure shall be 150 psig.
2. The electric heating element shall be 4500W., 208V. Storage capacity shall be 40 gallons. Warranty shall be five (5) years against tank leakage.
3. Installation shall be in accordance with the manufacturer's recommendations.
4. Furnish each electric water heater with an auxiliary drain pan with piped drain and a wall support.

2.8 THERMOSTATIC MIXING VALVE

A. Thermostatic Mixing Valve (TMV): Shall be Leonard New Generation "Hi-Lo", Model as scheduled, or Symmons, capacities and performance as scheduled with swivel action check-stops at the hot and cold inlets, thermometer, shut-off on the discharge piping and removable cartridge with strainer. Controller shall consist of a liquid fill thermal motor with bellows mounted out of the water. Finish shall be rough bronze.

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 dielectric 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 23 05 00 "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.
- K. All vertical and horizontal penetrations through walls, floors and ceilings shall be sealed against air movement between spaces.

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/CPVC 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.

- F. Spring Isolators: All pipe 20' upstream and downstream of pumps.

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 four (4) hours. The time of instruction shall be arranged with the Owner.

3.9 FIRESTOPPING

- A. Firestopping shall be performed in accordance with Specification Section 07 84 00 "Firestopping". All penetrations of fire-rated assemblies including walls and floors by

mechanical system components (piping, ductwork, conduits, etc.) shall be firestopped as specified.

* END OF SECTION *