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.

B. Drawings and general provisions of Contract including General and Supplementary Conditions and all Division 1 specification sections.

C. Uniform Federal Accessibility Standards (UFAS).

D. Americans with Disabilities Act (ADA).

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 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, valves and equipment identification.
7. Firestopping.
8. Trapguards.

C. 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, Roof Drain Piping:

1. Below Grade: Schedule 40 PVC.

2. Above Grade: Sanitary and roof drain piping shall be Schedule 40 PVC. Vent piping shall be Schedule 40 PVC.

3. Sanitary piping in the Kitchen Area shall be No-Hub cast-iron (ONLY).

B. Domestic Water Piping:

1. Pipe sizes larger than 1”: Type L hard copper tubing and cast bronze or wrought copper solder fittings or "Flowguard Gold" Schedule 40 solvent-welded CPVC pipe and fittings. CPVC pipe and fittings shall be rated at 100 psig at 1800F 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.

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 180^0F 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. Gas Piping (above grade): Schedule 40 carbon steel with threaded joints.

E. Solder: Lead-free (ONLY), Englehard Silvabrite 100, 440^oF melting point, ASTM B32.

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^{o}F relief settings.

F. Fixture Service Stop Valves: Angle Loose Key Stop, ASME A112.18M.

1. Each plumbing fixture and item of equipment 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.

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^{o} wrap, Carpenter and Paterson Fig. 265P, Type H.

2.5 FIXTURES AND TRIM

A. (**P1**) ADA/UFAS Water Closet: Floor-mounted, flush valve, Toto Model CT705ELN, American-Standard, Kohler, Zurn, or approved equal, elongated bowl, white vitreous china, 17”H. 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, Church, or equal, 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 and UFAS.

3. Flush valve: Sloan “Solis” Model 8111, Delta, or equal, automatic electronic solar powered flushometer with battery back-up and active infrared technology. The flush valve shall have a manual override button. Additional features shall include a sentinel flush that operates every 72 hours after the last flush. Coordinate the flush valve rough-in height to provide the required clearances at grab bars.

B. (**P1A**) ADA Water Closet: Floor-mounted, two piece tank-type, Kohler Model K-3827, “Bancroft”, elongated bowl, white vitreous china, 16½”H. 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: Church, or equal, 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 and UFAS.

3. The water closet shall have Class 5 flushing technology.
4.

C. (**P2**) Lavatory, Countertop: Solid surface countertop with integral lavatory shall be furnished by the GC.

1. Faucet: Symmons Symmetrix Model S-20-2-FR , single lever mixing faucet, ADA compliant, 2.2 GPM flow aerator, polished chrome finish, back check valves.

2. Drain: pop-up drain assembly in Patient Rooms, perforated grid strainer with offset tailpiece and bright metal finish for ADA Patient Rooms, public restrooms and Spa.

3. Trap: Chrome-plated, cast copper alloy, 1-1/4" P-trap with cleanout plug. Adjustable with connected elbow and nipple to wall. For ADA Patient Rooms, public restrooms and Spa, insulate trap and supplies with Truebro Model 102 insulation kit with PVC cover.

4. ADA lavatories shall be installed at 34" above finished floor. Final installation of lavatory and accessories shall meet ADA guidelines and ANSI A117.1.

5. (T) indicates with a trap primer fitting.

D. (**P2A**) ADA Lavatory, Wall Hung: Toto LT307.4, 20"x18", Zurn, or equal, white vitreous china, concealed arm carrier, faucet holes on 4" centers.

1. Faucet: Symmons Symmetrix Model S-20-2-FR, single single lever mixing faucet, ADA compliant, 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.

E. (**P3**) ADA/UFAS Stainless Steel Sink, Single Bowl: Elkay LRAD2521, Just, or approved equal, stainless steel, 25"x21.25" overall size, 5” deep, 4 faucet holes on 4" centers, fully sound deadened.

1. Faucet: Symmons Symmetrix Model S-23-2-10 wrist operation handle, 10-7/8" swing spout, polished chrome finish, side spray, ceramic control cartridge, single lever with pull-out side spray.

2. Strainer: Removable basket and neoprene stopper.

3. Sink installation shall be in compliance with the ADA/UFAS guidelines.

4. Insulate exposed traps and supplies with Truebro Lavguard insulation.

F. (**P4**) ADA Roll-In Shower: Aqua-Bath Model C6536BF-1/2", right or left hand as required, Aqua-Glass or Aquarius, ADA / ANSI compliant, 65"x36" FRP (gelcoat) with 1/2" threshold, collapsible dam by KR Specialties, and stainless steel grab bars, fold down seat, weighted shower curtain and soap dish.

1. Leonard “Aquatrol” Model 4505 packaged unit, or Symmons, ADA-compliant meeting ASSE 1016 requirements. Pressure balanced, non-scald, mixing valve with lever handle, concealed screw check-stops, maximum limit stop. Furnish with institutional vandal-resistant, 1.8 GPM (maximum) Alsons, or equal, vandal-resistant showerhead and with a wall/hand-held shower, diverter, vacuum breaker, flexible metal hose and 24" slide bar. Provide a 2” shower drain. See Drawings. Mount controls on the back wall per ADA.

2. Shower valves shall be located in fire-rated boxes, FRPS Part # FN-Z-14-14-3,

one hour rated enclosure.

3. Installation of shower and accessories shall meet ADA guidelines and ANSI A117.1.

G. (**P5**) Salon Shampoo Sink: Jeffco Model 8900 shampoo bowl with 3-1/2" strainer, model #570 chrome lever handle faucet with vacuum breaker and spray head. Furnish with Jay R. Smith Model #8760-T hair interceptor.

H. (**P6**) ADA/UFAS Stainless Steel Sink, Double Bowl: Elkay LRAD3321, Just, or approved equal, stainless steel, 33"x21.25" overall size, 5" deep, 4 faucet holes on 4" centers, fully sound deadened, 18 ga.

1. Faucet: Symmons Symmetrix Model S-23-2-10 wrist operation handle, 10-7/8" swing spout, polished chrome finish, side spray, ceramic control cartridge, single lever with pull-out side spray.

2. Strainers: Removable basket and neoprene stopper.

3. Sink installation shall be in compliance with the ADA/UFAS guidelines.

4. Insulate exposed traps and supplies with Truebro Lavguard insulation.

I. (**P7**) Tub / Shower: Aqua-Bath Model AB6032TS, right or left hand as required, Aqua-Glass or Aquarius, 60"x32" acrylic or FRP (gelcoat), weighted shower curtain and soap dish.

1. Leonard "Aquatrol" Model 4505 packaged unit, or Symmons, tub-shower unit with fill spout and pop-up drain. The unit shall have a non-slip bottom. Pressure balanced, non-scald, mixing valve with lever handle, concealed screw check-stops, maximum limit stop. Furnish with institutional vandal-resistant, 1.8 GPM (maximum) Alsons, or equal, vandal-resistant showerhead. Provide a 2" shower drain. See Drawings.

2. Shower valves shall be located in fire-rated boxes, FRPS Part # FN-Z-14-14-3, one hour rated enclosure.

J. Provide stops on hot and cold water supplies to each fixture with key operators. Provide chrome-plated P-traps per Code. Caulk around all fixtures at the floor and wall with white silicone caulk.

2.6 MISCELLANEOUS EQUIPMENT

A. Floor Drains (FD): Floor Drains shall be Zurn Z-415SL, cast iron body with 2" or 3" bottom outlet, as indicated, combination invertible membrane clamp and adjustable collar. Strainer shall be 6" square, Zurn "Type SL", polished nickel-bronze. Floor drains shall have "deep seal" traps and Sureseal "Trapguards" OR Automatic Trap Primers to maintain the seal.

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. 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. 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

F. Electronic Trap Primer (**ETP**): Zurn or PPP with 24 hour timer and manifold, vacuum breaker and shut-off valve. Pipe with ½" PEX to each floor drain trap.

G. Ice Maker Connection (**I.M.**): Guy Gray Model 88164, or equal, stainless steel with ¼ turn shut-off valves and water hammer arrestors.

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 Engineer.

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 15000 "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.

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.

E. Paint exposed gas piping with two (2) coats of rust-inhibiting latex enamel paint (yellow).

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 on "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 *