

# COLOR ME MINE TENANT FIT-UP

## SECTION 22 00 00 - PLUMBING

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. The drawings and the specifications including Section 23 05 00 "Common Work Results for HVAC" 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 Maine Internal Plumbing Rules 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 "Common Work Results for HVAC", 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. Piping insulation and vapor barrier coating.
  - 9. Firestopping materials and methods.
  - 10. Insulation kits for ADA-compliant sinks.

### PART 2 - PRODUCTS

#### 2.1 PIPING MATERIALS

- A. Soil and Waste (Sanitary), Condensate Drains and Vent Piping: Schedule 40 PVC or service weight cast iron with push-on joints below grade. Above grade, vent piping may be Schedule 40 PVC or service weight cast iron "no Hub" above grade. Above grade sanitary and waste and roof drain piping shall be service weight cast-iron, "No-Hub". "Vents thru roof" shall be service weight cast iron.
- B. Domestic Water Piping and Condensate Drain Piping: Type L hard copper tubing and cast bronze or wrought copper solder fittings, lead-free solder, "Permalynx" push-to-connect fittings by Victaulic, "Installation-Ready" grooved joint couplings by Victaulic,

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- 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. Push-to-Connect Fittings: ASME B16.22 wrought copper or ASME B16.18 cast bronze, with stainless steel internal components and EPDM seals, rated to maximum +230 degrees F at 200 psig operating pressure. Victaulic "Permalynx".
- E. Grooved Joint Couplings and Fittings: ASME B16.22 wrought copper or ASME B16.18 cast bronze, copper-tube dimensioned fittings, with Installation-Ready couplings, for direct stab installation without field disassembly or loose parts, cast with offsetting angle-pattern bolt pads for joint rigidity. Gaskets shall be grade EHP, UL classified in accordance with ANSI/NSF-61 for potable water service. Victaulic Style 607.
- F. Solder: Lead-free (ONLY), Englehard Silvabrite 100, 440°F melting point, ASTM B32.
- G. Piping located in masonry (CMU) construction: Piping shall be protected from contact with concrete (masonry) by use of pipe sleeves or other methods approved by the local plumbing inspector.

### 2.2 NO HUB COUPLINGS

- A. For above grade DWV piping, couplings shall be Clamp-All HI-TORQ125, shall maintain 15 PSI hydrostatic seal, constructed with a 304SS housing and ASTM C-564 neoprene gasket. Couplings shall meet FM 1680, IBC and local codes and requirements.

### 2.3 VALVES AND ACCESSORIES

- A. General Service Ball Valves: Apollo Model 77-100 (threaded) or 77-200 (solder), Victaulic PL-300 (push-to-connect), bronze full port, or Nibco, 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 or tee handle with stem extension as required to allow operation without interfering with pipe insulation. For CPVC piping systems (ONLY), ball valves shall be Hayward, or approved equal, "True Union Ball Valves", full port design, Corzan PVC construction with Viton or EPDM seals and tee handle.
- B. Butterfly Valves: Victaulic Series 608 with copper-tube dimensioned grooved ends, cast bronze body per ASTM B584, with elastomer coated ductile iron disc with integrally cast stem. Valve rated to 300 psig CWP, with disc coating UL classified in accordance with ANSI/NSF-61 for potable water service.
- C. Check Valves: Horizontal Swing, MSS SP-80, Type 3, Class 125.
- D. Drain Valves: Provide ball valves with 3/4" hose connection and brass cap and chain.
- E. 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.

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### 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 Kitchen Sink, Double Bowl: Elkay LRAD3722, stainless steel, 33"x22" overall size, 5 faucet holes on 4" centers (with blank for center hole), fully sound deadened. Provide Zurn Model Z-1180 solids interceptors at each sink.
  - 1. Faucet: Chicago #8950GN8AE3VPAABCP, deck mounted faucet on 4" centers, chrome plated brass construction with 8" gooseneck swing spout, 2-3/8" lever handles with quarter turn ceramic cartridges. ADA and NSF/ANSI 61 certified.
  - 2. Strainer: Removable basket and neoprene stopper.
  - 3. Sink installation shall be in compliance with the ADA guidelines.
  - 4. Exposed traps and supplies with Truebro Lavguard.
- B. **(P-2)** Utility Sink: Fiat Model FL-1, composite molded stone material, 23"x22"x10" with backsplash, baked enameled angle legs, stainless steel drain with stopper. Provide Zurn Model Z-1180 solids interceptors at each sink.
  - 1. Faucet: Fiat deck faucet model A-1, chrome-plated with brass with swivel spout and lever handles.
- C. Acceptable fixture / trim / brass manufacturers are as follows: Zurn, Sloan, Toto, American-Standard, Eljer, Just, Elkay, Kohler, and Moen (Commercial).

### 2.6 MISCELLANEOUS EQUIPMENT

- A. Water Hammer Arrestors (Shock Absorbers): Plumbing and Drainage Institute listed, Zurn or Josam.

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

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- B. Vacuum Breaker: Watts Model N36, 3/4" size, 20 CFM capacity.
- C. Thermometers: Weiss Instruments Model DVU35, solar-operated, Tel-Tru, Terrice or Ashcroft, adjustable angle, plastic or Type 304 stainless steel case. The digital display shall include 3/8" high (minimum) LCD digits. The thermometer display shall be in <sup>0</sup>F. Accuracy shall be +/- 1% of the displayed value or 1<sup>0</sup>, whichever is greater. Furnish with brass thermowells and provide with heat transfer fluid to fill the sealed interstitial space between bulb and well. Evidence of the transfer fluid leaking shall be cause for refilling and sealing the well.
  - 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<sup>0</sup>F to 240<sup>0</sup>F for domestic hot water systems.
- D. Pressure Gauges: Tel-Tru or Ashcroft Type 1005, Grade B, 3-1/2" dial, ANSI B40.1, drawn steel case, white background dial with black figures, clear glass window, brass movement, beryllium copper bourdon tube, 0 to 100 PSI range, accuracy shall be within 2% over middle half of scale and 3% over the remainder. Provide with shut off petcock and restrictor.

### 2.7 WATER HEATING EQUIPMENT (EWH)

- A. Electric Water Heaters (EWH): AO Smith, State, Bradford-White, or approved equal packaged unit of make, model, and performance as specified; UL listed with adjustable range thermostat. Set to provide 140<sup>0</sup>F water temperature. Hot and cold water connections shall be 3/4" (minimum).
  - 1. The rated working pressure shall be 150 psig.
  - 2. The electric heating element shall be dual 4500W., 208V, wired for simultaneous operation. 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.

### 2.8 PIPING, VALVE, AND EQUIPMENT 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
- 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:

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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 23 00 00 HVAC and when completed this work shall have been done sequentially.
- E. Equipment Identification: Provide laminated plastic nameplates for equipment, pumps, mixing valves, backflow preventers, and balancing valves. Nameplates shall be laminated 0.125-inch thick melamine plastic conforming to Fed. Spec. L-P-387, black with white center core. Surface shall be a matte finish, corners shall be square. Accurately align lettering and engrave into the white core. Minimum size of nameplates shall be 1.0 inch by 2.5 inches. Lettering shall be minimum of 0.25-inch high normal block lettering.

## 2.9 PIPING INSULATION

- A. Fiberglass: Heavy density preformed fiberglass with thermal conductivity of 0.29 Btu-in/hr-ft<sup>2</sup>-°F at 150°F mean temperature. Insulation shall conform to ASTM C547 Class I and shall be suitable for 450°F service. Fitting insulation shall be of same material used for pipe.
1. Insulation Jacket: All service (ASJ) type conforming to Fed. Spec. HH-B-100B Type I. Jacket permeability shall not exceed 0.02 perms (ASTM E96). Pipe fitting jacket shall be factory premolded, one-piece, PVC covers with pressure sensitive taped joints. Jackets in exposed locations shall have a white surface suitable for field painting. Provide vapor barrier as required by service.
- B. Flexible Unicellular: Flexible unicellular with thermal conductivity of 0.27 Btu-in/hr-ft<sup>2</sup>-°F at 75°F mean temperature. Insulation shall conform to ASTM C534, Type I, Tubular and shall be suitable for 200°F service. Fitting insulation shall be of same material used for pipe. Permeability shall not exceed 0.10 perms (ASTM E96). Insulation adhesive shall conform to Mil. Spec. MIL-A-24179A, Type II, Class 1.
- C. Fittings, Flanges, and Valves: Provide insulation for fittings, flanges, and valves premolded, precut, or job fabricated of the same thickness and conductivity as used on adjacent piping.
- D. Insulation Kit: Insulate exposed supply and waste piping at handicapped accessible sinks with fully molded insulation kit. McGuire Products ProWrap, 3/16" thick closed vinyl with anti-microbial additive, 1.02 Btu-in/hr-F<sup>2</sup>-°F thermal conductivity, white color.

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### 2.10 VAPOR BARRIER COATING

- A. Raw (cut) ends of fiberglass pipe insulation shall be finished (protected) with the application of a suitable vapor barrier coating or finishing cement (mastic) to maintain the continuous visual and functional integrity of the insulation jacket. Mastic shall be Childers "Chil-Perm" CP-30, elastomeric resin, or approved equal, applied in accordance with the manufacturer's recommendations.

### 2.11 THERMOSTATIC MIXING VALVE

- A. Thermostatic Mixing Valve (TMV): Shall be Leonard, 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.
  - 1. Unions are not required in installations using grooved mechanical joint couplings. (The couplings shall serve as unions and disconnect points.)
- E. Copper pipe shall be reamed to remove burrs.
- F. Connections between copper and steel piping shall be made with brass fittings.

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- 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. Push-to-Connect Joints: Install Permalynx joints in accordance with the manufacturer's latest published installation instructions. Prepare and mark tubing ends using a tool supplied by the manufacturer and in accordance with the manufacturer's instructions.
- J. Pipe penetrations through walls, floors and ceilings shall have pipe sleeves and shall be in accordance with Section 23 05 00 "Common Work Results for HVAC". Traverse points of piping shall be escutcheoned with split chrome floor and ceiling plates and spring anchors, where visible to occupancy.
- K. Provide a cleanout in the vertical position at the base of each sanitary and storm (roof) drain riser. Locate "Vent-thru-Roof" terminations a minimum distance of thirty (30) feet from outside air intakes.
- L. 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"

- 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 PIPING INSULATION

- A. Pipe Insulation (Fiberglass): Place sections of insulation around the pipe and joints, tightly butt into place. Draw jacket laps tight and smooth. Secure jacket with fire resistant adhesive, or factory applied self sealing lap. Cover circumferential joints with butt strips, not less than 3-inches wide, of material identical to the jacket material. Overlap longitudinal

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laps of jacket material not less than 1-1/2 inches. Adhesive used to secure the butt strip shall be the same as used to secure the jacket laps.

- B. Flanges, Unions, Valves and Fittings Insulation (Fiberglass): Factory fabricated removable and reusable insulation covers. Place factory pre-molded, precut or field-fabricated segmented insulation of the same thickness and conductivity as the adjoining pipe insulation around the flange, union, valve, and fitting abutting the adjoining pipe insulation. Install factory premolded one-piece PVC fitting covers over the insulation and secure by stapling or with metal or plastic tacks made for securing PVC fitting covers and secure with PVC vapor barrier tape.
- C. Pipe Insulation (Flexible Unicellular): Bond cuts, butt joints, ends, and longitudinal joints with adhesive. Miter 90-degree turns and elbows, tees, and valve insulation. Insulate flanges, unions, valves, and fittings.
- D. Where penetrating roofs and exterior walls, insulate piping to a point flush with the underside of the deck or wall and seal with a vapor barrier coating.
- E. Hangers and Anchors: Pipe insulation shall be continuous through pipe hangers. Where pipe is supported by the insulation, provide MSS SP-58, Type 40 galvanized steel shields (16 gage maximum). For fiberglass insulation systems on pipe sizes 2 inches through 3", provide insulation inserts at points of hangers and supports. Insulation inserts shall be of molded glass fiber (minimum 12 pcf). Insulation inserts shall cover the bottom half of the pipe circumference, 180 degrees, and be not less than 4" long. Vapor-barrier facing of the insert shall be of the same material as the facing on the adjacent insulation. Seal inserts into the insulation. Insulation inserts for pipe sizes 4" and larger shall be welded pipe saddles. Install insulation in void area of saddle of same material used on adjacent insulation. For pipe sizes 2" and smaller, insulation inserts for flexible unicellular insulation systems shall be wooden doweling set on end of length equal to insulation thickness. Seal dowel to insulation with adhesive.
- F. PVC or Metal Jackets: Provide over insulation. Machine cut jacket to smooth edge of circumferential joints. Overlap metal jacket not less than 2 inches at longitudinal and circumferential joints and secure with metal bands at not more than 9 inch centers. Overlap longitudinal joints down to shed water. Seal circumferential joints with a coating recommended by insulation manufacturer for weatherproofing. Solvent weld PVC jacket system to provide continuous watertight seal.

3.5 INSULATION APPLICATION SCHEDULE

<u>SERVICE</u>	<u>THICKNESS</u>	<u>MATERIAL/JACKET</u>
PIPING:		
Domestic Cold Water Piping	1/2"	Fiberglass w/ASJ or Flexible Unicellular
Domestic Hot Water Piping	1"	Fiberglass w/ASJ or Flexible Unicellular
Water and Drain Piping Under Handicap Accessible Fixtures		ADA Insulation Kit



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### 3.6 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.

### 3.7 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.

### 3.8 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.

### 3.9 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.

### 3.10 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.

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3.11 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 \*