

SECTION 15101 HVAC PIPING, VALVES, FITTINGS, SPECIALTIES

PART 1 – GENERAL

- 1.1 SCOPE: This Section details preferred product material and assembly requirements; system applications are described in other sections of this guide. It is recognized that deviations from the preferred materials and assemblies can occur responsive to special circumstances.
- 1.2 CODES & STANDARDS: HVAC systems shall be designed in compliance with all codes and standards as cited previously.

PART 2 – PRODUCTS

- 2.1 Piping
 - A. Heat Pump Closed Loop, Cooling Tower Condenser Water, Geothermal Ground-Loop
 1. 2" and Smaller: Aboveground, Type L hard drawn copper tubing with soldered joints or Schedule 40 steel pipe with threaded joints. Belowground, Type K soft copper tubing with brazed joints.
 2. 2-1/2" and Larger: Aboveground, Schedule 40 steel pipe with welded and flanged joints. Below ground, Sch. 80 CPVC.
 3. Cooling Tower Condenser Water: Sch. 80 CPVC
 4. Geothermal Ground-Loop: High Density Polyethylene
 - B. Heating Water: 2" and Smaller: Type L hard drawn copper tubing with soldered joints or Schedule 40 steel pipe with threaded joints. 2-1/2" and Larger: Schedule 40 steel pipe with welded and flanged joints.
 - C. Condensate Drain: Type L hard drawn copper tubing with soldered joints. Condensate drains for rooftop equipment discharging on roof may be Sch 40 PVC.
 - D. Refrigerant: Seamless Type L copper tube.
- 2.2 Valves: Acceptable manufacturers: American, Apollo, Combraco, Crane, Taco, Mueller, Nibco or Stockham.
 - A. Shut-Off: Full port ball
 - B. Balancing: Full port globe or ball with memory stop
 - C. Triple-Duty: Angle or in-line.
- 2.3 Fittings
 - A. Welded, flanged, screwed, soldered as applicable; victaulic grooved piping method shall not be used in HVAC applications unless approved by MCPS.
 - B. Dielectric: Flanges, couplings, or nipples. Dielectric unions not permitted.
 - C. Refrigerant Tubing: copper, brass, or bronze; flared.
- 2.4 Specialties
 - A. Air Control
 1. Air Separators: Tangential without strainers; Amtrol, Armstrong, B&G, Taco
 2. Expansion Tanks: Conventional, diaphragm, or bladder; Amtrol, Armstrong, B&G, Taco
 - a. Welded steel with factory taps for air control tank fitting, drain fitting, and sight glass; sight glass with dual manual shutoff valves and slotted-metal guard.

- b. Welded steel with flexible diaphragm or bladder securely sealed into tank. Include drain fitting and taps for pressure gage and air-charging fitting. Support vertical tanks with steel legs or base; support horizontal tanks with steel saddles.
 - 3. Air Vents: Manual and automatic
 - B. Thermometers / Gauges: Ranges shall be appropriate for the temperature and pressures of the medium being sensed.
 - 1. Thermometers shall be UV powered LED display (e.g. Weiss DVU-35).
 - 2. Gauges shall be dial type with syphon, snubber, and shut-off cocks.
 - 3. Pressure/temperature test plugs shall be equal to Peterson Equipment Pete's Plug and include test kit to be delivered to Owner.
 - C. Flexible Connectors: Stainless steel.
 - D. Balancing
 - 1. Auto Flow: Factory set to maintain constant flow with $\pm 5\%$ over system pressure fluctuations; equipped with identification tag attached by chain, factory marked with the valve number and flow rate. Acceptable manufacturers are Flow Design, Inc., Griswold Controls
 - 2. Readout Kits: Require furnishing of readout kit including flow meter, probes, hoses, flow charts, and carrying case for each type of balancing valves provided on project.
- 2.5 Insulation:
- A. Piping: Fiberglass with all-service jacket; prefabricated coverings for fittings, valves, elbows; and/or flexible elastomeric, field fabricated coverings for fittings, valves, elbows. Canvas jackets on exposed insulation in mechanical rooms; PVC or aluminum jackets on insulation exposed to outdoors.
 - B. Refrigerant Tubing: Armaflex, UV painted cover when exposed outdoors.
- 2.6 Heat Trace: Flat, flexible cable; self-regulating, thermostatically controlled to maintain fluid temperature of 40°F at 0°F outdoor air temperature. Approved manufacturers: Chromalox, Raychem, Markel.

PART 3 – EXECUTION

- 3.1 Piping
- A. Sleeves: Piping through floor slabs shall have sleeves extending 2" above floor.
 - B. Leak Test / Pressure Test: Require testing to be witnessed by Owner and/or commissioning authority.
 - C. Cleaning: Provide 3/4" by-pass tee with ball valve at each water source heat exchanger and heating/cooling coil to allow flushing of piping systems without passing thru the coil and/or control valve. Refer to Section 15103 for additional requirements.
 - D. Water Treatment: Refer to Section 15103 for water treatment equipment, installation, and procedures.
 - E. Piping shall be kept as high as possible in mechanical rooms.
- 3.2 Valves:
- A. Shutoff Valves: Provide at
 - 1. Each branch connection to mains
 - 2. Connections to equipment
 - 3. In mains such that building wings, floors, and other similar segments may have piping isolated for draining and service without having to drain down the entire building.
 - 4. Butterfly valves are not permitted for shut-off functions.
 - 5. 6" valves shall be used in 5" piping.

- B. Balancing: Provide at return connections to each piece of equipment downstream of control valve.
 - C. Additional manual shut off valve shall be provided at pumps when employing triple duty valves.
 - D. Extended valve stems shall be provided for all valves in insulated pipe.
- 3.3 Specialties
- A. Drains: Provide drains at low points in mains, risers, and branch lines consisting of a tee fitting, 3/4" ball valve, threaded nipple, and cap.
 - B. Strainers: Provide strainers on supply side of each control valve, pressure-reducing valve, pressure-regulating valve, solenoid valve, in-line pump. Provide blow-down drain connection for strainers 2" and larger consisting of a tee fitting, 3/4" ball valve, threaded nipple, and cap.
 - C. Air Vents: Provide manual air vents on equipment coils. Provide automatic air vents with shut-off valves at all high points in building.
- 3.5 Insulation:
- A. Insulation shall be continuous through hangers and supports, protected by shields.
 - B. Piping to be insulated:
 - 1. Heat pump water loop inside the building for geothermal systems; 1-1/2", vapor sealed (condensation control)
 - 2. Heating Hot Water; 1-1/2"
 - 3. Copper Condensate Piping; 1"
 - 4. Cooling Tower Water outside of building: 2"
 - 5. Refrigerant Tubing: 3/4"
- 3.6 Labeling / Painting: All exposed piping in mechanical rooms shall be painted; piping throughout the building is to be labeled (refer to Section 15002).
- 3.7 Heat Trace:
- A. Furnished and installed by Div. 15; power provided by Div. 16, assure coordination with electrical.
 - B. All water piping exposed to outdoors shall be equipped with heat trace.
- 3.8 Geothermal Vault: Provide temperature/pressure test plugs for each well circuit.

END OF SECTION