

SECTION 15181 - HYDRONIC PIPING

PART 1 - GENERAL

SUMMARY

This Section includes piping, special-duty valves, and hydronic specialties for hot-water heating.

See Division 15 Section "Hydronic Pumps" for pumps, motors, and accessories for hydronic piping.

See Division 15 Section "HVAC Instrumentation and Controls" for temperature-control valves and sensors.

COORDINATION

Coordinate pipe sleeve installations for foundation wall penetrations.

Coordinate pipe fitting pressure classes with products specified in related Sections.

PART 2 - PRODUCTS

PIPES, TUBES, AND FITTINGS

General: Refer to Part 3 "Piping Applications" Article for applications of pipe and fitting materials.

Copper Tube and Fittings:

Drawn-Temper Copper Tubing: ASTM B 88, Type M (ASTM B 88M Type C).

Annealed-Temper Copper Tubing: ASTM B 88, Type K (ASTM B 88M, Type A).

Wrought-Copper Fittings: ASME B16.22.

Wrought-Copper Unions: ASME B16.22.

Solder Filler Metals: ASTM B 32, 95-5 tin antimony.

Brazing Filler Metals: AWS A5.8, Classification BAg-1 (silver).

VALVES

Calibrated Balancing Valves, NPS 2 (DN 50) and Smaller: Bronze body, ball type, 125-psig (860-kPa) working pressure, 250 deg F (121 deg C) maximum operating temperature, and having threaded ends. Valves shall have calibrated orifice or venturi, connections for portable differential pressure meter with integral seals, and be equipped with a memory stop to retain set position.

HYDRONIC SPECIALTIES

Manual Air Vent: Bronze body and nonferrous internal parts; 150-psig (1035-kPa) working pressure; 225 deg F (107 deg C) operating temperature; manually operated with screwdriver or thumbscrew; with NPS 1/8 (DN 6) discharge connection and NPS 1/2 (DN 15) inlet connection.

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Automatic Air Vent: Designed to vent automatically with float principle; bronze body and nonferrous internal parts; 150-psig (1035-kPa) working pressure; 240 deg F (116 deg C) operating temperature; with NPS 1/4 (DN 8) discharge connection and NPS 1/2 (DN 15) inlet connection.

Diverting Fittings: 125-psig (860-kPa) working pressure; 250 deg F (121 deg C) maximum operating temperature; cast-iron body with threaded ends, or wrought copper with soldered ends. Indicate flow direction on fitting.

PART 3 - EXECUTION

PIPING APPLICATIONS

Hot and Chilled Water: Aboveground, use Type L (Type B) drawn-temper copper tubing with soldered joints

VALVE APPLICATIONS

Unless otherwise indicated, use the following general-duty valve types for applications indicated:

Shutoff Duty: Gate, ball, and butterfly valves.

Install shutoff duty valves at each branch connection to supply mains, at supply connection to each piece of equipment, unless only one piece of equipment is connected in the branch line. Install flow control check valves at each pump discharge and elsewhere as required to control flow direction.

Unless otherwise indicated, use the following special-duty valve types for applications indicated:

Install calibrated balancing valves in the return water line of each heating or cooling element and elsewhere as required to facilitate system balancing.

PIPING INSTALLATIONS

Install drains, consisting of a tee fitting, NPS 3/4 (DN 20) ball valve, and short NPS 3/4 (DN 20) threaded nipple with cap, at low points in piping system mains and elsewhere as required for system drainage.

Install piping at a uniform grade of 0.2 percent upward in direction of flow.

Reduce pipe sizes using eccentric reducer fitting installed with level side up.

Unless otherwise indicated, install branch connections to mains using tee fittings in main pipe, with the takeoff coming out the bottom of the main pipe. For up-feed risers, install the takeoff coming out the top of the main pipe.

Install strainers on supply side of each control valve, pressure-reducing valve, solenoid valve, in-line pump, and elsewhere as indicated. Install NPS 3/4 (DN 20) nipple and ball valve in blowdown connection of strainers NPS 2 (DN 50) and larger. Match size of strainer blowoff connection for strainers smaller than NPS 2 (DN 50).

Anchor piping for proper direction of expansion and contraction.

HANGERS AND SUPPORTS

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Comply with requirements below for maximum spacing of supports. Install the following pipe attachments:

Adjustable steel clevis hangers for individual horizontal piping less than 20 feet (6 m) long.

Install hangers for drawn-temper copper piping with the following maximum spacing and minimum rod sizes:

NPS 3/4 (DN 20): Maximum span, 5 feet (1.5 m); minimum rod size, 1/4 inch (6.4 mm).

NPS 1 (DN 25): Maximum span, 6 feet (1.8 m); minimum rod size, 1/4 inch (6.4 mm).

NPS 1-1/2 (DN 40): Maximum span, 8 feet (2.4 m); minimum rod size, 3/8 inch (10 mm).

HYDRONIC SPECIALTIES INSTALLATION

Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.

TERMINAL EQUIPMENT CONNECTIONS

Size for supply and return piping connections shall be same as for equipment connections.

Install control valves in accessible locations close to connected equipment.

Install bypass piping with globe valve around control valve. If multiple, parallel control valves are installed, only one bypass is required.

FIELD QUALITY CONTROL

Prepare hydronic piping and perform testing according to ASME B31.9. Prepare written report of testing.

ADJUSTING

Perform these adjustments before operating the system:

Open valves to fully open position. Close coil bypass valves.

Check pump for proper direction of rotation.

Set automatic fill valves for required system pressure.

Check air vents at high points of system and determine if all are installed and operating freely (automatic type), or bleed air completely (manual type).

Set temperature controls so all coils are calling for full flow.

CLEANING

Flush hydronic piping systems with clean water. Remove and clean or replace strainer screens. After cleaning and flushing hydronic piping systems, but before balancing, remove disposable fine-mesh strainers in pump suction diffusers.

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