

SECTION 23 21 16

HYDRONIC PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this and other Sections of Division 23.

1.2 SUMMARY

- A. Section includes special-duty valves and specialties for the following:
 1. Chilled-water piping.
 2. Condenser-water piping.
 3. Makeup-water piping.
 4. Condensate-drain piping.
 5. Blowdown-drain piping.
 6. Air-vent piping.
 7. Safety-valve-inlet and -outlet piping.

1.3 SUBMITTALS

- A. Compliance Review: In addition to the submittal requirements of this section, preorder bidders shall provide a Compliance Review of the Specifications and Addenda. The Compliance Review shall be a paragraph-by-paragraph review of the Specifications with the following information, "C", "D," or "E" marked in the margin of the original Specifications and any subsequent Addenda.
 1. "C": Comply with no exceptions.
 2. "D": Comply with deviations. For each and every deviation, provide a numbered footnote with reasons for the proposed deviation and how the intent of the Specification can be satisfied.
 3. "E": Exception, do not comply. For each and every exception, provide a numbered footnote with reasons and possible alternatives.
 4. Unless a deviation or exception is specifically noted in the Compliance Review, it is assumed that the Bidder is in complete compliance with the plans and Specifications. Deviations or exceptions taken in cover letters, subsidiary documents, by omission or by contradiction do not release the Bidder from being in complete compliance, unless the exception or deviation has been specifically noted in the Compliance Review submitted with the Bid.
- B. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories.

C. Warranty Information

1. Clearly state in the submittal the duration of the parts and labor warranty being provided directly by the manufacturer or manufacturer's representative, and indicate the warranty is applicable to the location where the equipment shall ultimately operate at.
2. Provide a generic copy of the manufacturer's warranty certificate as part of the initial submittal. Provide the actual warranty certificate as part of the project closeout phase.

- D. Installation Procedures: Provide step by step descriptions and details for the field installation of the equipment. Include fabrication details for anchorage and attachment to the structure and to support the equipment.

1.4 QUALITY ASSURANCE

- A. ASME Compliance: Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature unless otherwise indicated:
1. Chilled-Water Piping: 150 psig at 200 deg F.
 2. Condenser-Water Piping: 150 psig at 150 deg F.
 3. Makeup-Water Piping: 150 psig at 150 deg F.
 4. Condensate-Drain Piping: 150 deg F.
 5. Blowdown-Drain Piping: 150 deg F.
 6. Air-Vent Piping: 150 deg F.
 7. Safety-Valve-Inlet and -Outlet Piping: Equal to the pressure of the piping system to which it is attached.

2.2 AIR CONTROL DEVICES

A. Manual Air Vents:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Amtrol, Inc.
 - b. Armstrong Pumps, Inc.
 - c. Bell & Gossett Domestic Pump.
 - d. Nexus Valve, Inc.
 - e. Taco, Inc.

2. Body: Bronze.
 3. Internal Parts: Nonferrous.
 4. Operator: Screwdriver or thumbscrew.
 5. Inlet Connection: NPS 1/2 (DN 15).
 6. Discharge Connection: NPS 1/8 (DN 6).
 7. CWP Rating: 150 psig (1035 kPa) for chilled water system and 300 psig for condenser water and make-up water system(s).
 8. Maximum Operating Temperature: 225 deg F (107 deg C).
- B. Expansion Tanks:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Amtrol, Inc.
 - b. Armstrong Pumps, Inc.
 - c. Bell & Gossett Domestic Pump.
 - d. Taco, Inc.
 2. Tank: Welded steel, rated for 150-psig working pressure and 375 deg F maximum operating temperature for chilled water system(s) and 300-psig working pressure and 375 deg F maximum operating temperature for condenser water and make-up water systems, with taps in bottom of tank for tank fitting and taps in end of tank for gage glass. Tanks shall be factory tested after taps are fabricated and shall be labeled according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
 3. Air-Control Tank Fitting: Cast-iron body, copper-plated tube, brass vent tube plug, and stainless-steel ball check, 100-gallon unit only; sized for compression-tank diameter. Provide tank fittings for 150-psig working pressure and 250 deg F maximum operating temperature for chilled water system(s) and 300-psig working pressure and 250 deg F maximum operating temperature.
 4. Tank Drain Fitting: Brass body, nonferrous internal parts; 150-psig working pressure and 240 deg F maximum operating temperature for chilled water system(s) and 300-psig working pressure and 240 deg F maximum operating temperature for condenser water and make-up water system(s); constructed to admit air to compression tank, drain water, and close off system.
 5. Gage Glass: Full height with dual manual shutoff valves, 3/4-inch diameter gage glass, and slotted-metal glass guard.
- C. In-Line Air & Sediment Separator:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Spirotherm (basis of design)
 2. Components
 - a. The Air & Sediment Separator shall be designed, constructed, and stamped in accordance with Section VIII, Division I of the ASME Boiler

- and Pressure Vessel Code, and registered with the National Board of Boiler and Pressure Vessel Inspectors.
- b. The Air & Sediment Separator shall be rated for 150 psi maximum working pressure.
 - c. The Air & Sediment Separator shall have a maximum temperature rating of 270 deg F.
 - d. The Air & Sediment Separator body shall be made of carbon steel.
 - e. The Air & Sediment Separator body shall be two times the nominal inlet/outlet pipe diameter.
 - f. The Air & Sediment Separator shall have an internal coalescing medium consisting of copper tubes and wires with 1/4-inch gaps and 51% open area. The coalescing medium shall be made of 304 Stainless Steel.
 - g. Coalescing medium shall be removable to facilitate routine cleaning.
 - h. The Air & Sediment Separator should be supplied with a 3rd party test report certifying that the unit can remove 99% or more of dissolved air and 96% or more of total suspended particulate.
 - i. The Air & Sediment Separator shall include threaded blow down connection to allow for sediment to be regularly cleaned out of the unit.
 - j. The Air & Sediment Separator shall include a threaded air removal connection on top of the unit so an air vent or expansion/compression tank can be connected, allowing collected air to be removed from the unit.
 - k. The Air & Sediment Separator shall include a threaded skim valve connection on the side of the unit to allow floating sediment to be removed.
 - l. The Air & Sediment Separator shall be flanged end connections.
 - m. Flange end connections should be designed according to ANSI Standards.
3. Accessories:
- a. Blowdown Valve.
 - b. Skim Valve
 - c. Air Vent

2.3 HYDRONIC PIPING SPECIALTIES

A. Y-Pattern Strainers:

- 1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
- 2. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
- 3. Strainer Screen: Stainless-steel, 40-mesh strainer, or perforated stainless-steel basket.
- 4. CWP Rating: 150 psig for closed loop systems.
- 5. CWP Rating: 300 psig for open loop systems.

B. Stainless-Steel Bellow, Flexible Connectors:

1. Body: Stainless-steel bellows with woven, flexible, bronze, wire-reinforcing protective jacket.
2. End Connections: Threaded or flanged to match equipment connected.
3. Performance: Capable of 3/4-inch misalignment.
4. CWP Rating closed loop systems: 150 psig.
5. CWP Rating open loop systems: 300 psig
6. Maximum Operating Temperature: 250 deg F.
7. Expansion Fittings: Comply with requirements in Section 23 05 16 "Expansion Fittings and Loops for HVAC Piping".

PART 3 - EXECUTION

3.1 HYDRONIC SPECIALTIES INSTALLATION

- A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.
- B. Install in-line air separators in pump suction. Install drain valve on air separators NPS 2 and larger.
- C. Install expansion tanks above the air separator. Install tank fitting in tank bottom and charge tank. Use manual vent for initial fill to establish proper water level in tank.
 1. Install tank fittings that are shipped loose.
 2. Support tank from floor or structure above with sufficient strength to carry weight of tank, piping connections, fittings, plus tank full of water. Do not overload building components and structural members.
- D. Install expansion tanks on the floor. Vent and purge air from hydronic system, and ensure that tank is properly charged with air to suit system Project requirements.

END OF SECTION

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