

SECTION 23 2114
HYDRONIC SPECIALTIES

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Compression tanks.
- B. Expansion tanks.
- C. Air vents.
- D. Air separators.
- E. Strainers.
- F. Suction diffusers.
- G. Combination pump discharge valves.
- H. Pressure-temperature test plugs.
- I. Balancing valves.
- J. Combination flow controls.
- K. Radiator valves.
- L. Relief valves.
- M. Pressure reducing valves.
- N. Glycol system.

1.02 RELATED REQUIREMENTS

- A. Section 23 2113 - Hydronic Piping.
- B. Section 23 2500 - HVAC Water Treatment: Pipe cleaning.

1.03 REFERENCE STANDARDS

- A. ASME BPVC-VIII-1 - Boiler and Pressure Vessel Code, Section VIII, Division 1 - Rules for Construction of Pressure Vessels; 2015.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product data for manufactured products and assemblies required for this project. Include component sizes, rough-in requirements, service sizes, and finishes. Include product description, model and dimensions.
- C. Certificates: Inspection certificates for pressure vessels from authority having jurisdiction.
- D. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.
- E. Project Record Documents: Record actual locations of flow controls.
- F. Maintenance Data: Include installation instructions, assembly views, lubrication instructions, and replacement parts list.
- G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
 - 1. See Section 01 6000 - Product Requirements, for additional provisions.
 - 2. Extra Glycol Solution: One container, 1 gallon size.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

- B. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
- C. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 EXPANSION TANKS

- A. Manufacturers:
 - 1. Amtrol Inc; _____: www.amtrol.com.
 - 2. ITT Bell & Gossett; _____: www.bellgossett.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Construction: Welded steel, tested and stamped in accordance with ASME BPVC-VIII-1; supplied with National Board Form U-1, rated for working pressure of 125 psi, with flexible EPDM diaphragm or bladder sealed into tank, and steel support stand.
- C. Accessories: Pressure gage and air-charging fitting, tank drain; precharge to 12 psi.
- D. Automatic Cold Water Fill Assembly: Pressure reducing valve, reduced pressure double check back flow preventer, test cocks, strainer, vacuum breaker, and valved by-pass.
- E. Size:
 - 1. Capacity: _____.
 - 2. Diameter: _____.
 - 3. Length: _____.

2.02 AIR VENTS

- A. Manufacturers:
 - 1. Armstrong International, Inc; _____: www.armstronginternational.com.
 - 2. ITT Bell & Gossett; _____: www.bellgossett.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Manual Type: Short vertical sections of 2 inch diameter pipe to form air chamber, with 1/8 inch brass needle valve at top of chamber.

2.03 AIR SEPARATORS

- A. Dip Tube Fitting (Where Not Provided By Boiler Manufacturer):
 - 1. Manufacturers:
 - a. ITT Bell & Gossett; _____: www.bellgossett.com.
 - b. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. For 125 psi operating pressure; to prevent free air collected in boiler from rising into system.
- B. In-line Air Separators:
 - 1. Manufacturers:
 - a. Armstrong International, Inc; _____: www.armstronginternational.com.
 - b. ITT Bell & Gossett; _____: www.bellgossett.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Cast iron for sizes 1-1/2 inch and smaller, or steel for sizes 2 inch and larger; tested and stamped in accordance with ASME BPVC-VIII-1; for 125 psi operating pressure.
- C. Centrifugal Air Separators/Strainers:
 - 1. Manufacturers:
 - a. Armstrong International, Inc; _____: www.armstronginternational.com.
 - b. ITT Bell & Gossett; _____: www.bellgossett.com.
 - c. Substitutions: See Section 01 6000 - Product Requirements.
 - 2. Steel, tested and stamped in accordance with ASME BPVC-VIII-1; for 125 psi operating pressure, with integral bronze strainer, tangential inlet and outlet connections, and internal stainless steel air collector tube.

2.04 STRAINERS

- A. Manufacturers:
 - 1. Armstrong International, Inc: www.armstronginternational.com.
 - 2. Grinnell Products, a Tyco Business: www.grinnell.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Size 2 inch and Under:
 - 1. Screwed brass or iron body for 175 psi working pressure, Y pattern with 1/32 inch stainless steel perforated screen.
- C. Size 2-1/2 inch to 4 inch:
 - 1. Provide flanged or grooved iron body for 175 psi working pressure, Y pattern with 1/16 inch, or 3/64 inch stainless steel perforated screen.
- D. Size 5 inch and Larger:
 - 1. Provide flanged or grooved iron body for 175 psi working pressure, basket pattern with 1/8 inch stainless steel perforated screen.

2.05 SUCTION DIFFUSERS

- A. Manufacturers:
 - 1. Anvil International, Inc; _____: www.anvilintl.com.
 - 2. Grinnell Products, a Tyco Business; _____: www.grinnell.com.
 - 3. ITT Bell & Gossett; _____: www.bellgossett.com.
 - 4. Victaulic Company of America; _____: www.victaulic.com.
 - 5. Substitutions: See Section 01 6000 - Product Requirements.
- B. Fitting: Angle pattern, cast-iron body, threaded for 2 inch and smaller, flanged for 2-1/2 inch and larger, rated for 175 psi working pressure, with inlet vanes, cylinder strainer with 3/16 inch diameter openings, disposable 5/32 inch mesh strainer to fit over cylinder strainer, 20 mesh start up screen, and permanent magnet located in flow stream and removable for cleaning.
- C. Accessories: Adjustable foot support, blowdown tapping in bottom, gage tapping in side.

2.06 COMBINATION PUMP DISCHARGE VALVES

- A. Manufacturers:
 - 1. Crane Co.; _____: www.craneco.com.
 - 2. Victaulic Company of America; _____: www.victaulic.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Valves: Straight or angle pattern, flanged cast-iron valve body with bolt-on bonnet for 175 psi operating pressure, non-slam check valve with spring-loaded bronze disc and seat, stainless steel stem, and calibrated adjustment permitting flow regulation.

2.07 PRESSURE-TEMPERATURE TEST PLUGS

- A. Manufacturers:
 - 1. Ferguson Enterprises Inc; _____: www.fnw.com.
 - 2. Peterson Equipment Company Inc; _____: www.petesplug.com.
 - 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Construction: Brass body designed to receive temperature or pressure probe with removable protective cap, and Neoprene rated for minimum 200 degrees F.
- C. Application: Use extended length plugs to clear insulated piping.

2.08 BALANCING VALVES

- A. Manufacturers:
 - 1. Armstrong International, Inc; _____: www.armstronginternational.com.
 - 2. ITT Bell & Gossett; _____: www.bellgossett.com.
 - 3. Taco, Inc; _____: www.taco-hvac.com.
 - 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Size 2 inch and Smaller:

1. Provide ball or globe style with flow balancing, flow measurement, and shut-off capabilities, memory stops, minimum of two metering ports and NPT threaded, soldered, or grooved connections.
 2. Metal construction materials consist of bronze or brass.
 3. Non-metal construction materials consist of Teflon, EPDM, or engineered resin.
- C. Size 2.5 inch and Larger:
1. Provide ball, globe, or butterfly style with flow balancing, flow measurement, and shut-off capabilities, memory stops, minimum of two metering ports and flanged, grooved, or weld end connections.
 2. Valve body construction materials consist of cast iron, carbon steel, or ductile iron.
 3. Internal components construction materials consist of brass, aluminum bronze, bronze, Teflon, EPDM, NORYL, or engineered resin.

2.09 COMBINATION FLOW CONTROLS

- A. Manufacturers:
1. Armstrong International; _____: www.armstronginternational.com
 2. ITT Bell & Gossett; _____: www.bellgossett.com.
 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Construction: Brass or bronze body with union on inlet and outlet, temperature and pressure test plug on inlet and outlet with blowdown/backflush drain.
- C. Calibration: Control flow within 5 percent of selected rating, over operating pressure range of 10 times minimum pressure required for control, maximum minimum pressure 3.5 psi.
- D. Control Mechanism: Stainless steel or nickel plated brass piston or regulator cup, operating against stainless steel helical or wave formed spring.
1. Accessories: In-line strainer on inlet and ball valve on outlet.

2.10 RADIATOR VALVES

- A. Manufacturers:
1. Armstrong International, Inc; _____: www.armstronginternational.com.
 2. ITT Bell & Gossett; _____: www.bellgossett.com.
 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Angle or straight pattern, rising stem, inside screw globe valve for 125 psi working pressure, with bronze body and integral union for screwed connections, renewable composition disc, plastic wheel handle for shut-off service, and lockshield key cap and set screw memory bonnet for balancing service.

2.11 RELIEF VALVES

- A. Manufacturers:
1. Armstrong International, Inc; _____: www.armstronginternational.com.
 2. ITT Bell & Gossett; _____: www.bellgossett.com.
 3. Conbraco Industries; _____: www.apollovalves.com.
 4. Substitutions: See Section 01 6000 - Product Requirements.
- B. Bronze body, teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, capacities ASME certified and labelled.

2.12 PRESSURE REDUCING VALVES

- A. Manufacturers:
1. Armstrong International, Inc; _____: www.armstronginternational.com.
 2. ITT Bell & Gossett; _____: www.bellgossett.com.
 3. Substitutions: See Section 01 6000 - Product Requirements.
- B. Operation: Automatically feeds make-up water to the hydronic system whenever pressure in the system drops below the pressure setting of the valve. Refer to Section 23 2113.
- C. Materials of Construction:
1. Valve Body: Constructed of bronze, cast iron, brass, iron, or _____.

2. Internal Components: Construct of stainless steel, brass, or _____ and engineered plastics, composition material, or _____.
- D. Connections:
 1. NPT threaded: 0.50 inch, 0.75 inch, or ____ inch.
 2. Soldered: 0.50 inch, or ____ inch.
 - E. Provide integral check valve and strainer.
 - F. Maximum Inlet Pressure: 100 psi.
 - G. Maximum Fluid Temperature: 180 degrees F.
 - H. Operating Pressure Range: Between 10 psi and 25 psi.

2.13 GLYCOL SYSTEM

- A. Mixing Tank: 55 gallon steel drum with fittings suitable for filling and hand pump for charging, rubber hose for connection of hand pump to system.
- B. Storage Tank: Closed type, welded steel constructed, tested and stamped in accordance with ASME BPVC-VIII-1; 100 psi rating; cleaned, prime coated, and supplied with steel support saddles. Construct with tappings for installation of accessories.
- C. Expansion Tank: Diaphragm type with vent fitting with air separator, and automatic air vent.
- D. Air Pressure Reducing Station: Pressure reducing valve with shut-off valves, strainer, check valve and needle valve bypass.
- E. Glycol Solution:
 1. Inhibited ethylene glycol and water solution mixed 50 percent glycol - 50 percent water, suitable for operating temperatures from minus 40 degrees F to 250 degrees F.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install specialties in accordance with manufacturer's instructions.
- B. Where large air quantities can accumulate, provide enlarged air collection standpipes.
- C. Provide manual air vents at system high points and as indicated.
- D. For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.
- E. Provide air separator on suction side of system circulation pump and connect to expansion tank.
- F. Provide valved drain and hose connection on strainer blow down connection.
- G. Provide pump suction fitting on suction side of base mounted centrifugal pumps where indicated. Remove temporary strainers after cleaning systems.
- H. Provide combination pump discharge valve on discharge side of base mounted centrifugal pumps where indicated.
- I. Support pump fittings with floor mounted pipe and flange supports.
- J. Provide radiator valves on water inlet to terminal heating units such as radiation, unit heaters, and fan coil units.
- K. Provide radiator balancing valves on water outlet from terminal heating units such as radiation, unit heaters, and fan coil units.
- L. Provide relief valves on pressure tanks, low pressure side of reducing valves, heat exchangers, and expansion tanks.
- M. Select system relief valve capacity so that it is greater than make-up pressure reducing valve capacity. Select equipment relief valve capacity to exceed rating of connected equipment.
- N. Pipe relief valve outlet to nearest floor drain.
- O. Where one line vents several relief valves, make cross sectional area equal to sum of individual vent areas.

- P. Clean and flush glycol system before adding glycol solution. Refer to Section 23 2500.
- Q. Feed glycol solution to system through make-up line with pressure regulator, venting system high points.
- R. Perform tests determining strength of glycol and water solution and submit written test results.

3.02 EXPANSION TANK SCHEDULE

END OF SECTION 23 2114