

The School District of Palm Beach County

Project Name:

SDPBC Project No.:

**SECTION 23 21 16  
HYDRONIC SPECIALTIES**

**PART 1 GENERAL**

**1.1 SECTION INCLUDES**

- A. Expansion tanks
- B. Air vents
- C. Air separators
- D. Strainers
- E. Pump suction fittings
- F. Combination fittings
- G. Relief valves
- H. Air eliminator
- I. Flexible Pipe Connectors
- J. Pipe Wells
- K. Vibration Isolation
- L. Backflow preventers

**1.2 REFERENCES**

- A. ASME - Boiler and Pressure Vessel Code

**1.3 REGULATORY REQUIREMENTS**

- A. Conform to ASME Boiler and Pressure Vessel Code for manufacture of tanks.

**1.4 QUALITY ASSURANCE**

- A. Manufacturer: For each product specified, provide components by same manufacturer throughout.

**1.5 SUBMITTALS**

- A. Submit shop drawings and product data under provisions of Section 01 33 00.
- B. Submit shop drawings and product data for manufactured products and assemblies required for this project.
- C. Include component sizes, rough-in requirements, clearances, service sizes, and finishes.
  - 1. Include product description, model, and dimensions.
- D. Submit inspection certificates for pressure vessels.
- E. Submit manufacturer's installation instructions under provisions of Section 01 33 00.

**1.6 OPERATION AND MAINTENANCE DATA**

- A. Submit operation and maintenance data under provisions of Section 01 77 00.
- B. Include installation instruction, assembly views, lubrication instructions, and replacement parts list.

**1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site under provisions of Section 01 60 00.
- B. Store and protect products under provisions of Section 01 60 00.

**PART 2 PRODUCTS**

**2.1 EXPANSION TANKS**

- A. Construction: Full acceptance bladder expansion tank; closed, welded steel, tested and stamped in accordance with ASME Boiler and Pressure Vessels Code; 125 psi working pressure rating; cleaned, prime coated, and supplied with steel support saddles or legs to elevate the tank, with tapings for installation of accessories.

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- B. Quick Connect Air Inlet: Provide for automotive tire Schrader valve type, manual air vent, tank drain, and pressure relief valve.
- C. Chilled Water System: Set the expansion tank pressure-relief valve at 75-psi maximum and pressure reducing valve at 15 psi.

## 2.2 AIR ELIMINATOR/VENTS

- A. Manual Type Air Vent: Provide 3/8" or 1/2" threaded brass nipple extending up from highest point in chilled water piping within mechanical room, chiller plant topped with ball valve. When supply and return piping are the same elevation, provide air purge vent in each pipe.
- B. Automatic Float Type Air Eliminator: Non-ferrous brass or semi-steel body, copper float, stainless steel float, stainless steel valve and valve seat; suitable for system operating temperature and pressure; with isolating valve.
- C. High Volume Automatic Air Eliminator with a cast iron body and bonnet, Model No. 90 AC, CS manufactured by Wright-Austin or Equal. Place discharge pipe within 4" of grade floor.

## 2.3 AIR SEPARATORS

- A. Air Separators: Steel, tested and stamped in accordance with ASME Boiler and Pressure Vessels Code, for 125 psig operating pressure, with inlet and outlet flanged connections tangential to the vessel shell.
- B. Provide vessel top with two threaded ports and one lifting lug.
- C. Provide a bottom-threaded blow down port connection with horizontal pipe extension, ball valve, and threaded cap for routine cleaning.
- D. Provide a high volume air eliminator for one of the top ports.
- E. Provide tank insulation after vessel is fully painted with two coats of enamel paint.

## 2.4 STRAINERS

- A. Air Handler - Size 2" and under: Y pattern screwed brass or iron body for 175 psig working pressure, with 1/8" stainless steel perforated screen equal to 2½ times pipe area minimum.
- B. Air Handler - Size 2½" to 4": Y pattern flanged or grooved ductile iron body for 300 psig maximum working pressure, with 1/8" or 1/16" stainless steel perforated screen equal to 2½ times pipe area minimum.
- C. Chiller Plant - Size 5" and Larger:
  - 1. Basket pattern flanged iron body for 175 psig working pressure, with 1/8" stainless steel perforated screen equal to 2½ times pipe diameter area.
  - 2. Flanged and grooved coupling ductile iron body for 300 psig maximum working pressure, T or Y pattern with 1/8" or 1/16" stainless steel perforated screen equal to 2½ times pipe diameter area.
- D. Provide one strainer for each air handler, fan coil unit, or chilled water pump unless two or more pumps have common suction connection from one strainer.

## 2.5 PUMP SUCTION FITTINGS

- A. Fitting: Angle pattern, cast-iron or ductile body, threaded for 2" and smaller, flanged or grooved for 2½" and larger, rated for 300 psig maximum working pressure, with inlet vanes, cylinder strainer with 3/16" diameter openings, disposable stainless steel fine mesh strainer to fit over cylinder strainer, and permanent magnet located in flow stream and removable for cleaning.
- B. Pump Suction Diffuser: Provide inlet suction diffuser (without strainer) for each pump that has short radius inlet piping in a chilled water or glycol water system.
- C. Accessories: Provide base support boss or adjustable foot support, blow down tapping in bottom, gage tapping in side.

## 2.6 FACTORY ASSEMBLED EQUIPMENT DROPS AND HEADERS

- A. Factory-fabricated grooved end header [manifold] all-in-one assembly for fluid distribution. Header shall consist of an ASTM A53, Grade B, standard weight pipe spool with required outlet connections. Grooved ends roll grooved to Victaulic [OGS] [AGS] dimensions, with enamel coating or galvanized to project requirements. Basis of Design: Victaulic Vic-Header.
- B. Factory Assembled Grooved End Vibration Pump Drops: 3" through 12" (DN80 through DN300). Orange enamel coated installation-ready assembly with flexible couplings to accommodate vibration attenuation and stress relief. Rated for working pressure to 300-psig (2068-kPa).
  - 1. Discharge Drop: Class 150 flange for pump connection, [base elbow for horizontal pump connection] [straight line with concentric reducer for vertical pump connections], tri-service valve assembly consisting of a spring-actuated check [Venturi-Check] valve and butterfly valve with offset stem for 360-degree circumferential seating, and pipe spool with thermometer and pressure ports. Basis of Design: Victaulic Series 380.
  - 2. Suction Drop: Suction diffuser with stainless steel basket and diffuser and Class 150 flange for pump connection, butterfly valve with offset stem for 360-degree circumferential seating, and pipe spool with thermometer and/or pressure ports. Basis of Design: Victaulic Series 381.
  - 3. Suction Drop: 90-degree base elbow with Class 150 flange for pump connection, Wye pattern strainer with stainless steel perforated metal basket, butterfly valve with offset stem for 360-degree circumferential seating, and pipe spool(s) with thermometer and/or pressure ports. Basis of Design: Victaulic Series 382.
- C. Manufactured grooved end vibration isolation drop for air handling unit coil supply and return connections in sizes 2" through 6" (DN50 through DN150) to accommodate isolation, straining, balancing, and drainage. Orange enamel coated drop, consisting of ASTM A53 carbon steel pipe spool(s), Victaulic #20 (straight) and #25 (reducing) tees or Style 920/920N Mechanical-T fittings, with base end cap with drain outlet and DZR brass drain valve. Supply connections include a Vic-300 MasterSeal butterfly valve and Style 732 Y-pattern strainer with PT ports, and the return connection includes a Series 787 or 789 circuit balancing valve. Installation-ready, with flexible couplings to accommodate vibration attenuation and stress relief, rated for working pressure to 300-psig (2068-kPa). Basis of Design: Victaulic Series 385

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2.7 FLOW INDICATORS

- A. Brass construction, threaded for insertion into piping system, packless, with paddle with removable segments, vapor proof electrical compartment with switches.
- B. Provide pressure differential flow switch with tubing connected to the inlet and outlet of piping to the chiller, cooling tower, etc for verification of water flow prior to start up.

2.8 FLOW VENTURI

- A. Provide welded or threaded flow venturi with two quick disconnect measuring ports and an inline cutoff valve for each port.
- B. Insure measuring tube ports are extended the proper length to the pipe insulation thickness.
- C. Provide tag for each venturi indicating pipe size, type, and other pertinent information.
- D. Measuring ports shall be color-coded red and green, indicating flow direction.

2.9 RELIEF VALVES

- A. Provide relief valve with bronze body, teflon seat, stainless steel stem, and springs, automatic, direct pressure actuated capacities ASME certified and labeled.
- B. Combination pressure relief and pressure reducing valve shall be provided for chiller make-up water system.
  - 1. Both valves shall be adjustable for designated operating pressures and preferably from the same manufacture

2.10 GLYCOL SYSTEM

- A. Expansion Tank: Provide expansion tank and vent fitting with automatic air eliminator.
- B. Air Separator Tank same as section 2.3, provide tank with two threaded ports in top of vessel.
  - 1. One port dedicated for the air eliminator and the other plugged or connected to expansion tank. (See Engineered Schematic Drawings).
- C. Glycol Injector Pump System
  - 1. Provide storage tank, pump, and controls to monitor glycol levels in main system with the ability to add chemical and restore main system make-up volume as necessary.
  - 2. Glycol Solution: Inhibited ethylene or propylene glycol and water (food safe) solution mixed in a ratio suitable for design operating temperatures specified on the design drawings.
  - 3. Either glycol type used shall contain anti-corrosion and anti-fouling additives to prevent damage to piping and components.

2.11 CHILLED WATER PIPE WELLS

- A. All chilled water pipe wells shall be ¾" weld-o-let type welded to the steel piping.

2.12 VIBRATION ISOLATION

- A. Provide flexible pipe connectors at chilled water pumps and chillers for vibration isolation.
- B. Flexible pipe connectors shall have annular corrugated seamless hose body with flanged carbon steel fittings and stainless steel braid.
- C. Three grooved joint flexible pipe couplings may be used in lieu of stainless steel flexible connectors at equipment connections in applicable piping systems. Couplings shall be placed in close proximity to the vibration source in accordance with manufacturer's installation instructions for vibration attenuation.

2.13 BACKFLOW PREVENTERS

- A. Spring loaded check valves, Class 150, iron body, bronze trim, stainless steel spring, renewable composition disk, screwed, lug or flanged.
  - 1. Provide backflow preventer for potable make-up water that connects to the chilled water system as required by code.
  - 2. Provide piping from backflow preventer's discharge to nearest floor drain.

### **PART 3 EXECUTION**

#### **3.1 INSTALLATION AND APPLICATION**

- A. Install specialties in accordance with manufacturer's instructions to permit intended performance.
- B. Support tanks inside building from building structure per manufacturer's instructions; coordinate with structural engineer and paint support assembly.
- C. Where large air quantities can accumulate, provide enlarged air collection standpipes with air eliminators.
- D. Provide manual air vents in chilled water piping at system high points and as indicated for each air handler and various piping in the chiller plant.
- E. For automatic air vents in ceiling spaces or other concealed locations, provide vent tubing to nearest drain.
- F. Provide air separator on suction side of system circulation pump and connect to expansion tank.
- G. Provide valve drain and hose connection on strainer blow down connection.
- H. Provide pump suction fitting on suction side of base mounted centrifugal pumps.
  - 1. Remove temporary strainers after cleaning the systems.
- I. Support pump fittings with floor mounted pipe and flange supports or ceiling mounted supports.
- J. Provide relief valves on pressure tanks, low-pressure side of reducing valves, heat exchangers, and expansion tanks.
- K. Pipe the relief valve outlet to nearest floor drain.
  - 1. Pipe the backflow preventer to the nearest floor drain.
- L. Where one line vents several relief valves, make cross sectional area equal to sum of individual vent areas.
  - 1. Pipe the make up water to suction side of pump.
  - 2. Automatic Cold Water Fill Assembly: Pressure reducing valve, reduced pressure double check back flow preventer, test cocks, strainer, vacuum breaker, and valve by-pass.
- M. Install high volume air eliminator on top of air separator.
- N. Installation of hydronic piping and specialties shall not obstruct service access and chiller component removal.
- O. Paint all exposed component steel surfaces and handles with two coats of oil based enamel paint.
- P. Provide auxiliary full line size on connection ports in chilled water system for emergency chiller.
  - 1. Ports connections shall be located on high and low side of chilled water pumps to allow temporary chiller to operate utilizing the existing pumps.
  - 2. Ports shall consist of flanged, gear- operated valves with bolted blank-off flanges.
  - 3. Insulate auxiliary port piping and valves making end cap removable.
  - 4. Include the same in design documents.

#### **3.2 DEMONSTRATION AND TRAINING**

- A. Training of the Owner's operation and maintenance personnel is required in cooperation with the Owner's Representative.
  - 1. Provide competent, factory authorized personnel to provide instruction to operation and maintenance personnel concerning the location, operation, and troubleshooting of the installed systems.
  - 2. Schedule the instruction in coordination with the Owner's Representative after submission and approval of formal training plans.
  - 3. Refer to Section 01 91 00, Commissioning, for further contractor training requirements.

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END OF SECTION