SECTION 230516 - HYDRONIC PIPING SPECIALTIES

PART 1-GENERAL

1.1 SECTION INCLUDES

A. Piping expansion joints (compensators & expansion loops) and piping guides.

B. Pressure reducing valves

C. ASME safety relief valves

D. Manual and automatic air vents.

E. ASME compression and expansion tanks

F. Air separators with automatic air vent

G. Strainers

H. Pump suction fitting

1.2 SUBMITTALS

A. Submit shop drawings and product data per applicable Division I Specification.

B. Shop drawings shall include product data noting materials, sizes, and dimensions.

1.3 QUALITY ASSURANCE

A. Pressure piping shall meet ASME B31.9 Code.

B. Safety relief valve requirements shall meet ASME Boiler and Pressure Vessel Code.

1.4 WARRANTY

A. Contractor shall warranty entire systems and equipment for a period of one (1) year.

PART 2-PRODUCTS

2.1 EXPANSION JOINTS

A. Expansion Compensator:
   1. Manufacturers:
      a. Keflex Model 7QT
      b. Flexonics Model H
      c. Metraflex Model HP.
      d. Twin City Hose

   2. Body: Steel

3. Working Pressure: 125 psi.
4. Maximum Temperature 250 degrees F
5. Maximum Compression 1 ½ inch
6. Maximum Elongation ½ inch
7. Joint: Copper Sweat End
8. Size: Used pipe size units.
9. Application: Copper piping 2 inch and under.

B. Pipe Alignment Guidelines:
1. Manufacturers:
a. Keflex.
b. Flexonics.
c. Metraflex.

2. Two-piece welded steel with enamel paint, bolted, with spider to fit standard pipe, frame with four mounting holes, clearance for minimum 1 inch thick insulation, minimum 3 inch travel.

C. Grooved End Expansion Joints
1. Packless, gasketed, slip-type expansion joint with grooved end telescoping body for installation with Style 07 rigid couplings, providing up to 3 inch axial end movement. Designed for service up to 230° F and for working pressures up to 350 psi.

2 Combination of Style 75 or 77 flexible couplings and grooved end short nipples joined in tandem to provide increased expansion. Joint movement and expansion capabilities determined by number of couplings/nipples used in the joint. Designed for service up to 230° F. Pressure rating dependent on size and style of flexible couplings used.

2.2 EXPANSION LOOPS (V & U CONNECTORS)

A. Expansion Compensator V & U Connectors:
1. Manufacturers:
a. Twin City Hose
b. Flex-Weld
c. Metraflex Metraloop
d. Engineered Flexible Products

B. When indicated on drawings, use flexible thermal V and U connectors of the size, type and end fittings noted. V and U connectors allow movement along the 6 planes of the X, Y and Z axis. Movements are primarily in lateral directions, minimizing weld attachment stress.

C. In expansion compensation situations, the V and U connector can be installed pre-compressed or pre-extended, only if the full range of motion will be encountered in only one direction. Larger connectors are supplied with shipping bars attached. These bars are tack welded on to maintain the proper designed length. The shipping bars need to be removed from the V or U after installation.

D. Anchors are required on either side of the V or U connector to react to the spring forces of the connector. Pressure thrust loads are not a consideration because the V or U connector will not impose pressure thrust onto the system. Anchors should be of sufficient strength to withstand the spring forces of the loops and the frictional forces of the pipe sliding through any pipe alignment guides.

2.3 PRESSURE-REDUCING VALVES

A. Bronze or cast iron body with inlet strainer and non-corrosive valve seat and stem. Preset at 12 psig (adjustable).

2.4 ASME SAFETY-RELIEF VALVES

A. Manufacturers:
1. Kunkle
2. Bell & Gossett
3. McDonnel Miller
4. Watts

B. Brass or bronze body with brass and rubber wetted internal working parts. Size for the pressure and capacity of the system.

2.5 MANUAL AIR VENTS

A. Provide 1/2 inch diameter piping loop with ball valve and standard hose end connection.

2.6 AUTOMATIC AIR VENTS

A. High capacity with float operation. Constructed of cast iron body with stainless steel, brass and EPDM internal parts. Rated for 250 degrees F at 150 psig. Unit shall be designed not to allow air into the vent in case of system pressure dropping below atmospheric pressure. Use for relieving air from the system at the air separator only.

1) Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a) Armstrong Pumps, Inc.
   b) Bell & Gossett Domestic Pump.
   c) Nexus Valve, Inc.
   d) Taco, Inc.
2) Body: Bronze or cast iron.
3) Internal Parts: Nonferrous.
4) Operator: Noncorrosive metal float.
5) Inlet Connection: NPS 1/2.
6) Discharge Connection: NPS 1/4.
7) CWP Rating: 150 psig.
8) Maximum Operating Temperature: 240 deg F.

2.7 EXPANSION TANKS

A. Manufacturers:
1. Taco

2. Bell & Gosset
3. Armstrong

B. Shall be type CA as manufactured by Taco, Bell & Gosset or Armstrong of heavy duty, BUTYL rubber bladder tank allows permanent separation of air and water within the ASME designed and constructed pressure vessel. Tank shall be designed for 125 PSIG water pressure. Provide tank for each closed loop system.

2.8 AIR & DIRT SEPARATORS

A. Manufacturers:
1. Taco.
2. Bell & Gosset
3. Spirotherm

B. Furnish and install air and dirt removal devices of the size and type as shown on the plans. Air and dirt separation devices shall be Taco model 4900 series of size and capacities noted on drawings.

C. Air and dirt removal devices shall be constructed of steel design and fabricated per ASME Section VIII Division I with a maximum working pressure rating of 125 psi at 270º F. Units up to 3-inch in size shall be provided with a threaded system connection. Units 4-inch and larger shall be provided with a flanged system connection as standard.

D. Each air and dirt separator shall be equipped with a brass conical shaped air venting chamber designed to minimize system fluid from fouling the venting assembly. A brass flushing cock shall be located on the side of each separator to facilitate system fast-fill and the removal of floating impurities from the air system interface within the separator. A blowdown valve shall be provided by the unit manufacturer on the bottom of each air/dirt separator to allow cleaning as required.

E. The air and dirt separator shall employ the use of high surface pall rings to achieve optimal separation of gas and dirt. The supplier of the air and dirt separator shall furnish to the design engineer the results of independent air and dirt testing of a representative unit from the supplier standard product offering. Suppliers not providing these independent performance test results will not be accepted.

2.9 STRAINERS

A. Size 2 inch and Under:
1. Manufacturers:
a. Mueller
b. Grinnell
c. Fisher
d. Victaulic
e. Nexus
2. Screwed brass or iron body for 150 psig working pressure, Y pattern with 1/32 inch stainless steel perforated screen.

B. Size 2-1/2 inch to 4 inch:
1. Manufacturers:

a. Mueller
b. Grinnell
c. Fisher
d. Victaulic
e. Nexus

2. Flanged iron body for 150 psig working pressure, Y pattern with 3/64 inch stainless steel perforated screen.

C. Size 5 inch and Larger:
1. Manufacturers:
a. Mueller
b. Grinnell
c. Fisher
d. Victaulic
e. Nexus
2. Flanged iron body for 150 psig working pressure, basket pattern with 1/8 inch stainless steel perforated screen

2.10 PUMP SUCTION FITTINGS

A. Manufacturers:
1. Taco
2. Bell & Gosset.
3. Armstrong.
4. Victaulic

B. Fitting: Angle pattern, cast iron body, threaded for 2 inch and smaller, flanged for 2-1/2 inch and larger, rated for 175 psig working pressure, with inlet vanes, cylinder strainer with 3/16 inch diameter openings, disposable fine mesh start-up strainer to fit over cylinder strainer, and permanent magnet located in flow stream and removable for cleaning. Size to be as noted on drawings.

C. Accessories: Adjustable foot support, blowdown tapping in bottom, gage tapping in side.

PART 3-EXECUTION

3.1 INSTALLATION

A. Rigidly anchor pipe to building structure where necessary. Provide pipe guides so movement is directed along axis of pipe only. Erect piping such that strain and weight is not on cast connection or apparatus.

B. Provide support and equipment required to control expansion and contraction of piping. Provide loops, pipe offset, and swing joints, or expansion joints where indicated.

C. Provide expansion loops as indicated on drawings.

D. Provide pressure reducing valves at the domestic cold water make-up connection to the closed loop heating and chilled water piping systems.

E. Provide ASME safety relief valve in all closed hydronic loop systems. Relief valves shall

be sized for the proper relief capacity to protect each system.

F. Provide manual air vent valves at all coils and at the high points of each system.

G. Provide automatic air vent valves on the air separator for each system. Pipe this air relief discharge to the nearest floor drain.

H. Provide an ASME bladder type expansion tank for each closed loop system.

I. Provide a full size (size, capacity and standard velocity) centrifugal air and dirt separator on the suction side of each closed loop pumping system. The capacity shall meet or exceed the flow requirements of the system.

END OF SECTION 230516