

Part 1 General**1.1 REFERENCES**

- .1 American Society of Mechanical Engineers (ASME)
 - .1 ASME Boiler and Pressure Vessel Code 2013.
- .2 ASTM International Inc.
 - .1 ASTM A47/A47M-99(2014), Standard Specification for Ferritic Malleable Iron Castings.
 - .2 ASTM A278/A278M-01(2011), Standard Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures up to 650 degrees F (350 degrees C).
 - .3 ASTM A516/A516M-10, Standard Specification for Pressure Vessel Plates, Carbon Steel, for Moderate - and Lower - Temperature Service.
 - .4 ASTM A536-84(2014), Standard Specification for Ductile Iron Castings.
 - .5 ASTM B62-09, Standard Specification for Composition Bronze or Ounce Metal Castings.
- .3 Canadian Standards Association (CSA International)
 - .1 CSA B51-14, Boiler, Pressure Vessel, and Pressure Piping Code.

1.2 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Provide submittals in accordance with Section 01 00 10 – General Instructions.
- .2 Product Data:
 - .1 Provide manufacturer's printed product literature and datasheets for expansion tanks, air vents, separators, valves, and strainers and include product characteristics, performance criteria, physical size, finish and limitations.

1.3 CLOSEOUT SUBMITTALS

- .1 Submit maintenance and operation data in accordance with Section 01 00 10 – General Instructions.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

Part 2 Products**2.1 DIAPHRAGM TYPE EXPANSION TANK**

- .1 Vertical steel pressurized diaphragm type expansion tank.
- .2 Diaphragm sealed in EPDM suitable for 115°C operating temperature.
- .3 Working pressure: 860 kPa with ASME stamp and certification.
- .4 Air precharged to 84 kPa (initial fill pressure of system).
- .5 Base mount for vertical installation.

- .6 Supports: provide supports with hold down bolts and installation templates incorporating seismic restraint systems.
- .7 Renewable diaphragm.
- .8 Characteristics:
 - .1 As indicated.

2.2 CHILLED WATER BUFFER TANK

- .1 ANSI 150 flanged connections
- .2 . ASME Code constructed and stamped in accordance with Section VIII of the ASME Code.
- .3 Tank shall be registered with the National Board of Boiler and Pressure Vessel Inspectors and a certificate of shop inspection shall be furnished.
- .4 ASME working pressure shall be 862 kPa.
- .5 Material of construction shall be Carbon Steel.
- .6 Complete with internal baffle to divert water flow.
- .7 Tank shall be furnished with an air vent, a 13 mm flexible, elastomeric thermal insulation black in color,

2.3 AIR VENT

- .1 Manual Vents:
 - .1 With notch for screwdriver, 0 to 1035 kPa operating pressure
- .2 Automatic Vents:
 - .1 NPS 3 and less: with isolation valve, operating pressure from 0 to 1035 kPa.
 - .2 Over NPS 3: with isolation valve from 0 to 1035 kPa .

2.4 PIPE LINE STRAINER

- .1 On steel piping:
 - .1 NPS 1/2 to 2: cast iron body to ASTM A-126, threaded connections to 1725 kPa, able to resist hydrostatic pressure of 2069 kPa at 65.6°C .
 - .2 NPS 2 1/2 to 8: Type CI-125, cast iron body to ASTM A278/A278M, Class 30, flanged connections.
 - .3 NPS 10 to 18: F-125 type with cast iron body to ASTM 126 class B flanged connections.
- .2 On copper piping
 - .1 NPS 1/2 to 2: type BT-250, bronze body to ASTM B62, screwed connections, Y pattern, able to sustain 2760 kPa at 65.6°C .
 - .2 NPS 2 1/2 to 12: flanged connections.
- .3 Blowdown connection: NPS 1.
- .4 Screen: stainless steel with perforations as follows:
 - .1 0.8 mm on steam.
 - .2 1.58 mm on fuel oil.

- .3 1.19 mm on water coils
- .4 3.175 mm at chillers, chilled and hot water pumps

2.5 WATER MAKE-UP

- .1 For all chilled water, and hot water systems, provide automatic water makeup system including the following devices:
 - .1 Two isolating ball valves
 - .2 Strainers
 - .3 Backflow preventer
 - .4 Pressure reducing valve
 - .5 Safety valve
 - .6 By-pass for filling with ball valve.

2.6 AIR SEPARATOR AND DIRT SEPARATOR

- .1 Air and dirt removal device shall be constructed of steel.
- .2 Inlet and outlet connections to be in line with piping system. Both inlet and outlet to be in the same horizontal and vertical planes.
- .3 Each air and dirt removal device shall be equipped with a brass conical shaped air venting chamber designed to minimize system fluid from fouling the venting assembly. The air vent shall be able to be closed to allow flushing and purging of dirt via side port without dirt passing through vent on initial system fill.
- .4 A brass flushing cock shall be located on the side of each separator to facilitate system fast-fill and removal of the floating impurities from the air system interface within the separator.
- .5 A blow down valve shall be provided by the unit manufacturer on the bottom of each unit to allow blow down and cleaning. On units 65mm and smaller the valve and all of its fittings shall be 25mm. On units three 80mm and larger the valve and all openings shall be 50mm.
- .6 The air and dirt removal device shall remove air down to 18 microns and shall remove dirt/debris down to 35 microns. The unit shall be 100% efficient at removing dirt down to 90 microns in 100 passes or less.

2.7 CIRCUIT BALANCING VALVES

- .1 “Y” pattern, equal percentage globe-style and provide three functions:
 - .1 Precise flow measurement
 - .2 Precision flow balancing
 - .3 Positive shut-off.
- .2 Valve shall provide multi-turn, 360° adjustment with micrometer type indicators located on the valve handwheel. Valves shall have a minimum of five full 360° handwheel turns. Valve handle shall have hidden memory feature.
- .3 Integral check connections, one on each side of seat, to allow connection of instruments.
- .4 NPS 2 and under:
 - .1 Bronze body, operating pressure of 2069 kPa at 121°C, screwed fitting.
 - .2 ¼" NPT drain.

- .5 NPS 2½ to NPS 8:
 - .1 Cast iron body, flanged connections, 862 kPa, TFE seat, for NPS 2½ and NPS 3, bronze replaceable discs and seats with EPDM for larger diameter. Operating pressure of 1200 kPa at 121°C.

2.8 SAFETY VALVES

- .1 Safety relief type, with test lever by Farris, proven capacities in accordance with ASME and N.B.S.
- .2 On water headers, bronze with safety cap on adjustment mechanism. Adjustable from 1725 kPa .

2.9 REHEAT COIL (RC-01, RC-02)

- .1 Reheat coils are available for use with both hot water proof-tested at 2 MPa (air) and leak-tested at 0.69 MPa (air under water). Maximum main coil working pressure is 2 MPa. Maximum entering water temperature is 93°C. Tubes and u-bends are copper. Fins are aluminum and are mechanically bonded to the copper tubes.
- .2 Horizontal arrangement, mounted in galvanized steel frame, 1.6 mm thick.

2.10 FLEXIBLE PIPE CONNECTORS

- .1 Braided flexible connectors shall consist of braided metal hose, The connectors shall be engineered to move laterally, absorb vibration, and shall impart no thrust loads to system anchors.
- .2 Materials of construction of the braided connector hose to be corrugated stainless steel with a stainless steel braid.
- .3 Up to NPS 2 ½:
 - .1 Male NPT connections.
- .4 Over NPS 2 ½:
 - .1 With inlet and outlet ANSI carbon steel plate flange connections.

Part 3 Execution

3.1 APPLICATION

- .1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.2 GENERAL

- .1 Maintain adequate clearance to permit service and maintenance.
- .2 Should deviations beyond allowable clearances arise, request and follow Departmental Representative's directive.
- .3 Check shop drawings for conformance of tappings for ancillaries and for equipment operating weights.

3.3 FLEXIBLE PIPE CONNECTORS

- .1 Provide and install on chillers, fluid coolers, HVAC pumps, and customer's hydraulic pumping units.

3.4 STRAINERS

- .1 Install in horizontal or down flow lines.
- .2 Ensure clearance for removal of basket.
- .3 Install ahead of each pump.
- .4 Install ahead of each automatic control valve larger than NPS 1 and as indicated.

3.5 AIR VENTS

- .1 Install at high points of systems.
- .2 Install gate valve on automatic air vent inlet. Run discharge to glycol supply system's holding tank.

3.6 EXPANSION TANKS

- .1 Adjust expansion tank pressure to suit design criteria.
- .2 Install lockshield type valve at inlet to tank.

3.7 PRESSURE SAFETY RELIEF VALVES

- .1 Run discharge pipe to terminate into glycol supply system's holding tank.

END OF SECTION