

SECTION 15120 – HYDRONIC PIPING SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 WORK INCLUDED

- A. Secure all permits and local/state approvals for the installation of all components included under this Section.

1.3 RELATED SECTIONS

- A. Examine all drawings and criteria sheets and all other Sections of the Specifications for requirements which affect work under this Section whether or not such work is specifically mentioned in this Section.

1.4 REFERENCES

- A. Applicable provisions of the following Codes and Trade Standard Publications shall apply to the work of this Section, and are hereby incorporated into, and made a part of the Contract Documents.
- B. ASME: American Society of Mechanical Engineers
- C. ANSI: American National Standards Institute
 - 1. B16.1: Cast Iron Pipe Flanges and Flanged Fittings
 - 2. B16.3: Malleable Iron Threaded Fittings
 - 3. B16.4: Cast Iron Threaded Fittings
 - 4. B16.5: Pipe Flanges and Flanged Fittings
 - 5. B16.22: Wrought Copper and Copper Alloy Solder Joint Pressure Fittings
 - 6. B31.1: Power Piping

1.5 SUBMITTALS

- A. See Section 15050 and General Conditions for additional requirements.

- B. Product Data: Include, steam/condensate specialties, pipe fittings and accessories. Provide manufacturers catalogue information.
- C. Manufacturer's Installation Instructions: Indicate hanging and support methods, joining procedures.
- D. Maintenance Data: Include installation instructions, spare parts lists, exploded assembly views.

1.6 QUALITY ASSURANCE

- A. Installer: Company specializing in performing work of the type specified in this section, with documented experience.

1.7 REGULATORY REQUIREMENTS

- A. Conform to ASME B31.9 code for installation of steam and condensate piping systems including specialties.
- B. Welding Materials and Procedures: Conform to ASME (BPV IX) and applicable state labor regulations.

1.8 DELIVERY, STORAGE AND HANDLING

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

1.9 ENVIRONMENTAL

- A. Do not install equipment when environmental conditions are outside the specific limitations of the referenced codes and manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide thermometers and gauges:
 - 1. At each inlets and outlets of all air handling unit coils

2. At each pump
3. At each heat exchanger
4. At each boiler
5. At each PRV station
6. At each chiller
7. At each cooling tower cell
8. At each flow meter station
9. As shown on the drawings
10. As required

- B. Thermometers and pressure gauges shall be provided for the above described equipment regardless of pipe size. If pipe size is such that the installation of wells or taps is not feasible, then oversized pipe to accommodate the above installation requirements.
- C. No products containing mercury will be acceptable.

2.2 THERMOMETERS, GAUGES AND PRESSURE/TEMPERATURE TAPS

- A. Acceptable manufacturers subject to compliance with the specifications.
1. Weksler
 2. Moeller
 3. Taylor
 4. Dresser
 5. WAIK Instrument Corp.
 6. Miljoco
- B. All thermometers in liquids shall have separable sockets.
- C. Thermometers shall be with glass fronts, aluminum or phenol cases, and adjustable as required for ready reading from the floor.
- D. All thermometers shall use a non-toxic liquid filled magnifying lens front tubes.
- E. All thermometers shall have 9" scales and 12" cases.
- F. All thermometers shall be accurate to $\pm 1\%$ of scale range.
- G. Thermometer ranges shall be selected so that the normal operating range of each will occur in the middle half of the total range and so that under minimum and maximum conditions thermometers will not be harmed.
1. Condenser Water: 30°F to 130°F
 2. Chilled Water: 0°F to 100°F
 3. Heating Water: 30°F to 240°F
 4. Glycol Water: 30°F to 240°F

2.3 THERMOMETER WELL

- A. 304 or 316 stainless steel tapered shank.
- B. Where installed in insulated systems provide extended neck.
- C. 3/4 inch NPT process connection; 1/2 inch NPT instrument connection and nominal 1/4 inch bore.

2.4 GAUGES

- A. Acceptable manufacturers subject to compliance with the specifications.
 - 1. Weksler
 - 2. Dresser
 - 3. Fisher & Porter
 - 4. WAIK Instrument Corp.
 - 5. Miljoco
- B. Except for the automatic temperature control system, gauges shall be constructed with bourdon type bronze tubes, stainless steel movements, white dials, black micrometer adjustable points, aluminum or phenol surface mounted beaded cases, matching aluminum or phenol screwed rings and bottom connections. All gauges shall have 4 1/2" diameter cases. All gauges shall be accurate to 1% of scale range.
- C. Gauge ranges shall be selected such that the normal operating range of each will occur in the center of the total range and under minimum and maximum conditions no gauge will be harmed.
- D. All gauges shall be provided with needle valves
 - 1. Barstock needle Valves shall be equal to:
 - a. Crane
 - b. Edward
 - c. Dresser.
 - d. WAIK Instrument Corp.
- E. Gauges installed in pump discharge piping shall be provided with snubbers with siphons equal to Ray.

2.5 PRESSURE DIFFERENTIAL GAUGE

- A. Acceptable manufacturers subject to compliance with the specifications.
 - 1. Similar to ITT Barton Instruments Company.

2.6 RELIEF VALVES, PRESSURE REDUCING VALVES

- A. Acceptable manufacturers subject to compliance with the specifications.
 - 1. Bell and Gossett, ITT.
 - 2. Amtrol.
 - 3. Watts Regulator Company.
 - 4. Kunkle Valve Company.
- B. Relief Valves
 - 1. Relief valve body shall be of iron or bronze construction.
 - 2. ASME rated direct spring loaded type, level operated, non-adjustable factory set discharge pressure.
 - 3. For expansion tank application, select system relief valve pressure setting and equipment relief valve pressure setting as indicated on mechanical contract drawings.
 - 4. Pressure relief valve shall be suitable for maximum system operating pressure and temperature.
- C. Pressure Reducing Valve
 - 1. Pressure reducing valve shall be bronze or iron body construction, with renewable stainless steel seat, and high temperature resisting diaphragm, direct acting, spring loaded, suitable for inlet pressure of 150 psi.
 - 2. Built in stops shall protect diaphragm against sudden shock waves that could stretch or tear the diaphragm.
 - 3. Provide a cartridge seat assembly with a seat washer and monel strainer for quick cleaning and replacement.

2.7 PRESSURE/TEMPERATURE TAPS

- A. Acceptable manufacturers subject to compliance with the specifications.
 - 1. Sisco P/T Plugs.
 - 2. Peterson Equipment Company.
 - 3. Fairfax Company
 - 4. WAIK Instrument Corp.
- B. All pressure/temperature taps shall have a solid brass 1/4" or 1/2" NPT fitting (test plug).

- C. Test plug shall be capable of receiving either a pressure or temperature probe 1/8" o.d. Valve core shall be neoprene for temperatures 60°F to 200°F, nardel to 350°F, and shall be rated zero leakage from vacuum to 1000 psig.
- D. The Contractor shall also furnish the following:
 - 1. Three (3) pressure gauge adapters with 1/16" and 1/8" o.d. probe
 - 2. Three (3) 5" stem pocket testing thermometers for 25° to 125°F (chilled water)
 - 3. Three (3) 5" stem pocket testing thermometers 0° to 220°F (hot water)
 - 4. Three (3) 5" stem pocket testing thermometers 50° to 500°F (temperatures above 220°F).
 - 5. A Master test kit which shall contain
 - a. A 2 1/2" test gauge of suitable range
 - b. A gauge adapter with 1/16" and 1/8" o.d. probe
 - c. A 5" stem pocket testing thermometers 0° to 220°F
 - d. A 5" stem pocket testing thermometers 50° to 550°F).

2.8 PRESSURE DIFFERENTIAL GAUGE

- A. Dual rupture proof liquid filled bellows having integral temperature compensation.
- B. Designed to withstand repeated overranges equal to the working pressure of the instrument housing without causing a calibration change. Gauge and components shall be suitable for a working pressure of 200 psig and a water temperature of 200 degrees F.
- C. Motion transmission is by a hermetically sealed torque tube, no lubrication required.
- D. Dial shall be a minimum of 6 inches round. Indicator case shall be fabricated from die-cast aluminum and finished in black epoxy paint. The indicating scale shall be graduated uniformly for measurement of differential pressure.
- E. Scale shall be calibrated in 1 psig increments. Full scale range shall be from 0 to 25 psig.
- F. The indicating mechanism shall consist of a precision-made, jeweled, rotary movement. It multiplies rotation of the torque tube through a gear and pinion to the indicating pointer. The indicating pointer shall traverse a 270 degree arc. The movement shall have micrometer screws for convenient zero and range adjustments. Zero and range adjustments shall be made without removing the scale plate or the pointer. The rotary movement and the pointer should be fully protected from overrange in either direction.
- G. Accuracy shall be within 2 percent of the full scale differential pressure range when operating at or below 200 psig.
- H. A three-valve manifold shall be used. The manifold shall provide two block valves and a bypass valve for installation and zero check. Valves shall also be provided on the instrument housings for bleeding or venting.

- I. Two 10 foot neoprene hoses shall be included with the differential pressure gauge. Hoses shall be equipped with 1/4 inch NPT male fittings for connecting to the manifold. The other end of the hoses shall have an adaptor to mate with the pressure temperature tap.
- J. The differential pressure gauge, valve manifold, bleed valves, hoses and instruction booklet shall all be placed in a plastic carrying case. The gauge indicator and manifold shall be permanently mounted on the base of the case. The case cover shall be equipped with a handle fastened to the base with toggle type latches.
- K. Differential pressure gauge shall be similar to ITT Barton Model 247A.

2.9 AIR VENTING AND DRAINAGE

A. Manual air vent.

- 1. Provide hose end ball valves, (minimum size 1/2" with chains and caps), or larger where shown or required by the service.
- 2. See HVAC Valve specification

B. Automatic air vent.

- 1. Acceptable manufactures subject to compliance with the specifications:
 - a. Armstrong
 - b. Bell and Gossett
- 2. Float type with isolating valve, cast iron body, stainless steel float, stainless steel valve, and valve seat. Suitable for 300 psig operating pressure and 300 degrees F system temperature.
- 3. Vents shall be designed to eliminate air from the system automatically without permitting the passage of water.
- 4. Minimum size shall be 3/4" or as indicated or required.
- 5. Similar to Armstrong Model 1-AV.

C. Drains

- 1. Provide ball valves with capped hose connections, (minimum size 3/4"), or larger where shown or required by the service.
- 2. See HVAC Valve specification

PART 3 – EXECUTION

3.1 THERMOMETER INSTALLATION

- A. Shall be installed in accordance with manufacturer recommendations, Contract Drawings and reviewed submittals.
- B. Shall be turned as such to be readily visible from the operating floor.
- C. Thermometers subject to vibration or physical damage shall be adequately supported and protected.

3.2 THERMOMETER WELL

- A. Shall be installed in accordance with manufacturer recommendations, Contract Drawings and reviewed submittals.

3.3 PRESSURE RELIEF VALVE

- A. Shall be installed in accordance with manufacturer recommendations, Contract Drawings and reviewed submittals.
- B. Provide at:
 - 1. Cooling coil side of isolation valve.
 - 2. Sectionalized chilled water mains and submains.
 - 3. Sectionalized chilled water and secondary chilled water mains and submains.
 - 4. Equipment side of isolation valve.
 - a. Water chillers
 - b. Heat exchangers
 - c. Convertors in water piping
 - 5. Other locations as noted.
- C. Pipe to spill over floor drain or slop sink unless otherwise indicated.

3.4 PRESSURE REDUCING VALVE

- A. Shall be installed in accordance with manufacturer recommendations, Contract Drawings and reviewed submittals.

3.5 PRESSURE DIFFERENTIAL GAUGE

- A. Shall be installed in accordance with manufacturer recommendations, Contract Drawings and reviewed submittals.
- B. Provide differential pressure gauge package to user after system balancing.

3.6 GAUGE INSTALLATION

- A. Shall be installed in accordance with manufacturer recommendations, Contract Drawings and reviewed submittals.
- B. Shall be turned as such to be readily visible from the operating floor.
- C. If the gauge is more than 8'-0" above the floor or cannot otherwise be made readily readable, extended pipe connections gauge to a readable location.
- D. Gauges subject to vibration or physical damage shall be adequately supported and protected.

3.7 PRESSURE/TEMPERATURE TAPS INSTALLATION

- A. Shall be installed in accordance with manufacturer recommendations, Contract Drawings and reviewed submittals.
- B. Provide pressure taps wells for all in-duct or in-box water coils.

3.8 AIR VENTING INSTALLATION

- A. Manual air vent
 - 1. Provide all high points in closed water piping systems shall be relieved of air through accessible manual vents on the high points of the pipe lines and at the equipment. Vent valves on piping and equipment shall be 1/2" ball valves with chains and caps and with discharge pipes to convenient points for catching discharge.
 - 2. Provide access doors to all vents.
- B. Automatic air vent
 - 1. Provide as indicates and at expansion tank connection to main pipe..
 - 2. Pipe to spill over floor drain or sink.

3.9 DRAINAGE

- A. Grade all piping for drainage through equipment or through accessible drain valves so that system can be conveniently freed of water by gravity flow.
- B. Provide drains from air handling units and from air intake and other intake and exhaust plenums with traps. Traps shall be a minimum of 4", unless the static pressure requires additional trap depth. Discharge drains to nearest floor drain, janitor sink, roof or outdoors, as indicated on the drawings and approved by Architect.

3.10 MAKE-UP WATER ASSEMBLY

- A. Provide cold water make-up assembly with fill valve, bypass valve and relief valve as scheduled on the drawings for the hot and chilled water systems. Coordinate location of make-up line with the Plumbing Contractor. All accessories shall comply with ASME requirements and shall be UL labeled. All piping downstream of backflow preventers to HVAC systems shall be provided under this Contract.

END OF SECTION