SECTION l560l

HYDRONIC HEATING SYSTEMS
PIPING AND SPECIALTIES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work Included: Provide and install a complete hot water heating system including all the required specialties and appurtenances as shown on the Drawings and as specified herein.

B. Related Work Specified Elsewhere:
   1. "HVAC - General" is specified in this Division.
   2. “Steel Pipe & Fittings” is specified in Section 15061.
   3. “Copper Pipe & Fittings” is specified in Section 15063.

1.2 QUALITY ASSURANCE

A. Acceptable Manufacturers:
   1. Valves:
      a. Stockham.
      b. Crane.
      c. Nibco.
      d. Walworth.
      f. Or approved equal.
   2. Specialties:
      a. Bell & Gossett.
      b. Taco.
      c. Or approved equal.
   3. Instruments:
      a. Trerice.
      b. U.S. Gauge.
      c. Taylor.
      d. Or approved equal.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Manufacturers' names given below are intended to identify type and style. Products of other manufacturers may be acceptable upon the approval of the Engineer.

B. Pipe: Schedule 40 black steel or Type L copper.

C. Valves (general):
   1. Gate Valves:
      a. Up to and including 2-1/2 inch - screwed or solder end, bronze body, rising stem, solid bronze disc, 125 psi steam pressure. Equal to Nibco T-111 or S-111.
      b. 3-inch and larger - refer to Section 15101 - General Service OS&Y - 3 inches and larger.
   2. Globe Valves:
      a. Up to and including 2-1/2 inch - screwed or solder end, bronze body, TFE disc, 125 psi steam pressure. Equal to Nibco T-211 or S-211.
      b. 3 inch and larger - refer to Section 15102 - General Service 3 inches and larger.
   3. Check Valves:
      a. Up to and including 2-1/2 inch - screwed or solder end, bronze body, Buna-N disc, 200 psi WOG cold pressure. Equal to Nibco T-413-W or S-413-W.
      b. 3 inch and larger - refer to Section 15110 - Valves - 3 inches and larger.
   4. Ball Valve: Acceptable in lieu of gate and globe valves for 2 inch and smaller, full port bronze ball screwed or solder ends, 3 part bronze body, TFE or equal resilient seat, lever handle, 400 lb. WOG. Equal to NIBCO S-595-W.

D. Strainer:
   l. "Y" Pattern: Bronze or cast iron body, screw or flange ends, 250 psi body, stainless steel screen of 40 mesh.
   2. Basket Type: Bronze or cast iron body, clamped cover, l25 psi working pressure, perforated brass basket, equal to Mueller #l35.

E. Air Separation (as indicated):
   l. In Line: In-line cast iron or fabricated steel, removable strainer, l25lb ASME Construction, Bell & Gossett, Rolairtrol or Equal.

F. Pressurized Diaphragm Expansion Tank:
   l. Size and capacity as indicated on the Drawings.
   2. Steel shell designed and constructed per ASME Section VIII.
   3. Heavy duty Butyl rubber diaphragm removable for inspection.
   4. Working pressure - 125 psig.
   5. Operating temperature - 240°F.
   6. Vertical floor mounted style.
   7. Equal to Taco CAX.

G. Expansion Tank:
   1. Size and capacity as indicated on the Drawings.
   2. ASME construction for 125 PSI working pressure.
   3. Provide sight glass and shut-off valves.
   4. Air control fitting equal to Bell & Gossett Airtrol.
   5. Provide combination drain and air charging valve.

H. Make-up Water Pressure Reducing Valve: Brass body with anti-siphon check valve, integral strainer, field adjustable spring, l2 PSI setting, equal to Bell & Gossett FB3.

I. Self Contained Thermostatic Valve:
   l. Equal to Danfoss RA-6.
   2. Capillary tubing and bulb thermostatic element with guard when exposed.
   3. Combination thermostat dial and control valve.
   4. Bronze body valve with composition disc.

J. Triple Duty Valves
   1. Equal to Bell & Gossett Model 3D or 3DS.
   2. Cast iron body construction.
   3. Designed to permit repacking under full line pressure.
   4. Non-slam check valve with a spring loaded weighted disc and a calibrated adjustment feature permitting regulation of pump discharge flow and shut off.
   5. Acceptable in lieu of gate, check and balancing valve on discharge of each pump.

K. Vents:
   l. Provide vents at all piping high points and where indicated.
   2. Automatic vents shall be l/2 inch connection, l25 PSI working pressure, brass body with built-in air chamber. Provide gate valve between piping system and vent.
   3. Manual vents shall consist of a minimum 3/4 inch air chamber with 3/8 inch piping and gate valve off top.

L. Thermometers:
   l. Furnish brass immersion thermowells where indicated on the Drawings.
   2. Furnish two additional immersion thermometers suitable for all thermowells for use in balancing and by operating personnel.
   3. Furnish and install where indicated on the drawings 9 inch separable socket mercury thermometer with a range of 30^{o} to 240°F. Provide adjustable angle type where required for proper visibility. Equal to Trerice industrial thermometers.

M. Pressure Gauges:
   l. Furnish pressure gauge connections where indicated consisting of l/4 inch take-off and globe valve.
   2. Furnish 0-l00 PSI, 3-l/2 inch pressure gauge where indicated. Equal to Trerice Model 600.

N. Expansion Compensator: Brass body with stainless steel or brass bellows capable of l inch minimum change in length.

O. Balancing/Flow Measuring Valve:
   l. Meter connections with built-in check valve.
   2. Integral pointer register in degree of valve opening.
   3. Bubble tight shut-off.
   4. l25 pound working pressure.
   5. Equal to Bell & Gossett circuit setter.

P. Pressure Relief Valve:
   l. Diaphragm operated, ASME rated in BTU/hr.
   2. Capacity shall exceed the maximum heating capacity of the protected device by 110% minimum. Set point shall be equal to or less than the normal working pressure of the protected device.
   3. Fluid shall not discharge into valve chamber.
   4. Low blow-down differential.
   5. Equal to Bell & Gossett.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide offsets in all pipe to place in proper position and avoid work of other trades.
B. Erect all piping to provide for easy and noiseless circulation of hot water under all working conditions.
C. Use inverted eccentric fittings to reduce the size of the water mains.
D. Make proper allowances for the expansion and contraction of all piping. Anchor piping where necessary to control expansion.
E. Install a sufficient number of unions for disassembling pipe around equipment.
F. Weld all steel piping 3 inches and larger in size. Weld or install screwed fittings in pipe 2-l/2 inches and under in size.
G. Install piping level or slightly pitched upward in the direction of flow so that no air pockets are formed in the piping.
H. Install pipe hangers to properly support all equipment and piping in accordance with Specification Section 15094.
I. Sleeves and Plates:
   1. Provide and install sleeves sized to provide 1/4 inch minimum annular space around pipes passing through masonry walls and floors. Allow all insulation to pass through sleeves except where gas-tight calking is required.
   2. Where exposed pipes pass through finished walls, floors, ceilings, etc. provide and set split cover plates.
J. Drains:
   l. Provide drain valves where shown on the Drawings, at all low points, and at all equipment.
   2. Drains shall be l/2 inch hose valve style.
K. Provide and install dielectric unions at junction of pipes of dissimilar metals.
L. Provide and install control measurement and valves in piping systems that are supplied by other trades.
M. Provide and install unions to allow removal of all control valves.

3.2 TESTING AND BALANCING

A. Perform a hydrostatic pressure test on all piping and equipment.

B. Test pressure shall be l00 psi or l-l/2 times the working pressure, whichever is greater.
C. Repair, replace and rework, as required, to repair any defects and retest for approval.
D. Perform all testing prior to installation of insulation. Test systems in sections as required to prevent delay of project.
E. Balance the entire hydronic heating system in accordance with applicable sections of Division 1 and Section 15907 of this Division.
F. Operational Test: Upon completion of installation of all equipment and acceptance of tests and balancing, perform a 24 hour continuous operational test in the presence of the Engineers and Owner's representative to demonstrate proper operation of all functions of the equipment and system.

3.3 PAINTING AND IDENTIFICATION

A. All heating system piping, valves, pumps and equipment shall be painted and labeled in accordance with Specification Section 09900.

END OF SECTION