SECTION 15182

HYDRONIC PIPING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Pipe and pipe fittings for:
   1. Chilled water piping system.

B. Valves:
   1. Ball valves.
   2. Butterfly valves.
   3. Check valves.

1.02 REFERENCE STANDARDS

A. ASME (BPV IX) - Boiler and Pressure Vessel Code, Section IX - Welding and Brazing Qualifications; The American Society of Mechanical Engineers; 2007.

B. ASME B16.3 - Malleable Iron Threaded Fittings; The American Society of Mechanical Engineers; 1998 (R2006).

C. ASME B31.9 - Building Services Piping; The American Society of Mechanical Engineers; 2004 (ANSI/ASME B31.9).

D. ASTM A 53/A 53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2007.

E. ASTM A 234/A 234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service; 2007.

F. AWS D1.1/D1.1M - Structural Welding Code - Steel; American Welding Society; 2006 and Errata.

G. AWWA C606 - Standard Specification for Grooved and Shouldered Joints; American Water Works Association; 2006.

1.03 SYSTEM DESCRIPTION

A. Use unions, flanges, and couplings downstream of valves and at equipment or apparatus connections. Do not use direct welded or threaded connections to valves, equipment or other apparatus.

B. Provide pipe hangers and supports in accordance with ASME B31.9 unless indicated otherwise.

C. Use globe valves for throttling, bypass, or manual flow control services.

D. Use only butterfly valves in chilled and condenser water systems for throttling and isolation service.

E. Use lug end butterfly valves to isolate equipment.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

1.05 REGULATORY REQUIREMENTS

A. Conform to ASME B31.9 code for installation of piping system.

B. Welding Materials and Procedures: Conform to ASME (BPV IX) and applicable state labor regulations.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.

B. Provide temporary protective coating on cast iron and steel valves.

C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.

D. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

PART 2 PRODUCTS

2.01 HYDRONIC SYSTEM REQUIREMENTS

A. Comply with ASME B31.9 and applicable federal, state, and local regulations.

B. Piping: Provide piping, fittings, hangers and supports as required, as indicated, and as follows:
   1. Where more than one piping system material is specified, provide joining fittings that are compatible with piping materials and ensure that the integrity of the system is not jeopardized.
   2. Use non-conducting dielectric connections whenever jointing dissimilar metals.
   3. Grooved mechanical joints may be used in accessible locations only.
      a. Accessible locations include those exposed on interior of building, in pipe chases, and in mechanical rooms, aboveground outdoors, and as approved by Engineer.
      b. Use rigid joints unless otherwise indicated.
   4. Provide pipe hangers and supports in accordance with ASME B31.9 unless indicated otherwise.

C. Pipe-to-Valve and Pipe-to-Equipment Connections: Use flanges, unions, or grooved couplings to allow disconnection of components for servicing; do not use direct welded, soldered, or threaded connections.

D. Valves: Provide valves where indicated and as follows:

2.02 CHILLED WATER PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A 53/A 53M, Schedule 40, black; using one of the following joint types:
   1. Welded Joints: ASTM A 234/A 234M, wrought steel welding type fittings; AWS D1.1 welded.
   2. Threaded Joints: ASTM B 16.3, malleable iron fittings.
   3. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.
   4. Fittings: ASME B16.3, malleable iron or ASTM A 234/A 234M, wrought steel welding type.
   5. Joints: Threaded or AWS D1.1 welded.

B. Steel Pipe Sizes 12 Inch and Over: ASTM A 53/A 53M, 0.375 inch wall, black; using one of the following joint types:
   1. Welded Joints: ASTM A 234/A 234M, wrought steel welding type fittings; AWS D1.1 welded.
   2. Grooved Joints: AWWA C606 grooved pipe, fittings of same material, and mechanical couplings.
   3. Joints: Welded in accordance with AWS D1.1.

2.03 PIPE HANGERS AND SUPPORTS

A. Conform to ASME B31.9.

2.04 UNIONS, FLANGES, AND COUPLINGS

A. Unions for Pipe 2 Inches and Under:
   1. Ferrous Piping: 150 psig malleable iron, threaded.
   2. Copper Pipe: Bronze, soldered joints.

B. Flanges for Pipe Over 2 Inches:
   1. Ferrous Piping: 150 psig forged steel, slip-on.
   2. Gaskets: 1/16 inch thick preformed neoprene.

C. Mechanical Couplings for Grooved and Shouldered Joints: Two or more curved housing segments with continuous key to engage pipe groove, circular C-profile gasket, and bolts to secure and compress gasket.
   1. Dimensions and Testing: In accordance with AWWA C606.
   2. Housing Material: Malleable iron or ductile iron, galvanized.
   3. Bolts and Nuts: Hot dipped galvanized or zinc-electroplated steel.
   4. When pipe is field grooved, provide coupling manufacturer's grooving tools.

D. Dielectric Connections: Union or waterway fitting with water impervious isolation barrier and one galvanized or plated steel end and one copper tube end, end types to match pipe joint types used.

2.05 BALL VALVES

A. Up To and Including 2 Inches:
   1. Bronze one piece body, chrome plated brass ball, teflon seats and stuffing box ring, lever handle with balancing stops, solder ends with union.

B. Over 2 Inches:
   1. Cast steel body, chrome plated steel ball, teflon seat and stuffing box seals, lever handle, flanged.

2.06 BUTTERFLY VALVES

A. Body: Cast or ductile iron with resilient replaceable EPDM seat, lug ends, extended neck.

B. Disc: Chrome plated ductile iron.

C. Operator: Handwheel and gear drive.

2.07 SWING CHECK VALVES

A. Up To and Including 2 Inches:
   1. Bronze body, bronze trim, bronze rotating swing disc, with composition disc, solder ends.

B. Over 2 Inches:
   1. Iron body, bronze trim, bronze or bronze faced rotating swing disc, renewable disc and seat, flanged ends.

PART 3 EXECUTION

3.01 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.

B. Prepare pipe for grooved mechanical joints as required by coupling manufacturer.

C. Remove scale and dirt on inside and outside before assembly.

D. Prepare piping connections to equipment using jointing system specified.

E. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

F. After completion, fill, clean, and treat systems. Refer to Section 15189 for additional requirements.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Route piping in orderly manner, parallel to building structure, and maintain gradient.

C. Install piping to conserve building space and to avoid interfere with use of space.

D. Group piping whenever practical at common elevations.

E. Sleeve pipe passing through partitions, walls and floors.

F. Slope piping and arrange to drain at low points.

G. Pipe Hangers and Supports:
   1. Install in accordance with ASME B31.9.

H. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 15082.

3.03 SCHEDULES

A. Hanger Spacing for Steel Piping.
   1. 3 inches: Maximum span, 12 feet; minimum rod size, 3/8 inch.
   2. 4 inches: Maximum span, 14 feet; minimum rod size, 1/2 inch.
   3. 6 inches: Maximum span, 17 feet; minimum rod size, 1/2 inch.
   4. 8 inches: Maximum span, 19 feet; minimum rod size, 5/8 inch.
   5. 10 inches: Maximum span, 20 feet; minimum rod size, 3/4 inch.

END OF SECTION