23 2100 – Hydronic Piping and Pumps

Last Update: October 22, 2019

A. General:

1. Much of the campus is served by geothermal heating hot water system. Heating coils should be designed for an entering water temperature of 140º F (maximum) with a 20ºΔT minimum to a maximum of 40ºΔT
2. In new installations/buildings, a steam to hot water heat exchanger will be used to provide back up to the geothermal system. Controls must be provided to prevent the two systems from operating simultaneously as this could lead to overheating of the campus geothermal system. Where steam is not available a high efficient gas fired boiler shall be used. This should be discussed early in design.
3. Typically chilled water is supplied at 44ºF. Leaving coil temperatures should be designed for 56ºF.
4. Provide shutoff valves on supply and return of all pieces of equipment, including pumps, coils, heat exchangers, reheat coils, etc.
5. Provide shutoff valves at each floor and branch lines serving multiple pieces of equipment on hot water reheat systems, to minimize the effect of any outages.
6. Thermal expansion in piping systems shall be evaluated. In general, piping layout, offsets, risers, and changes in direction shall be used to accommodate this expansion. If necessary, expansion loops shall be provided. The use of expansion joints is not preferred.
7. Provide manual air vents at all system high points in the piping system, provide automatic air vents on heat transfer coils and elsewhere as required for system venting. Provide a hose bib connection on all manual air vents.
8. Reverse return piping systems are preferred. Exterior radiation loops should be separated from reheat coil loops for control purposes on large systems.
9. Piping systems must be pressure tested and accepted before insulation is installed.
10. Automatic Flow Control valves are preferred over calibrated balancing valves at all terminal units.

B. Hydronic Piping

1. Hot-water heating piping, aboveground, 1-1/4" to 2", shall be Type L drawn-temper copper tubing, wrought-copper fittings, and brazed joints, aboveground,

1" and smaller shall be Type L drawn-temper copper tubing, wrought-copper fittings, and soldered joints.

2. Hot-water heating piping, aboveground, 2-1/2" and larger, shall be the following:
   a. Schedule 40 steel pipe, wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, and welded joints.

3. Chilled-water piping, aboveground, 1-1/4" to 2", shall be Type L drawn-temper copper tubing, wrought-copper fittings, and brazed joints, aboveground, 1" and smaller shall be Type L drawn-temper copper tubing, wrought-copper fittings, and soldered joints.

4. Chilled-water piping, aboveground, NPS 2-1/2 and larger, shall be the following:

   a. Schedule 40 steel pipe A53, wrought-steel fittings and wrought-cast or forged-steel flanges and flange fittings, and welded joints and flanged connections.

5. Condensate-Drain Piping shall be Type L, drawn-temper copper tubing, wrought-copper fittings, and soldered joints.

C. Piping Accessories Manufacturers are as follows or approved equal.

1. Calibrated Balancing Valves and Calibrated Metering Stations (auto-flow valves are preferred. See 4. Below):
   a. Armstrong Pumps, Inc.
   b. Flow Design, Inc.
   c. Griswold Controls.
   d. ITT Bell & Gossett; ITT Fluid Technology Corp.
   e. Nexus.
   f. Taco, Inc.

2. Pressure-Reducing Valves:
   a. Amtrol, Inc.
   b. Armstrong Pumps, Inc.
   c. Conbraco Industries, Inc.
   d. ITT Bell & Gossett; ITT Fluid Technology Corp.

e. Spence Engineering Company, Inc.
f. Taco, Inc.
g. Watts Industries, Inc.; Watts Regulators.
h. Zurn Industries, Inc. Wilkins Division.

3. Safety Valves:
   a. Amtrol, Inc.
   b. Armstrong Pumps, Inc.
   c. Conbraco Industries, Inc.
   d. ITT McDonnell & Miller Div.; ITT Fluid Technology Corp.
   e. Kunkle Valve Division.
   f. Spence Engineering Company, Inc.

4. Automatic Flow-Control Valves (Preferred):
   a. Flow Design, Inc.
   b. Griswold Controls.
   c. ITT Bell and Gossett; ITT Fluid Technology Corp.
   d. Nexus

5. Expansion Tanks:
   a. Amtrol, Inc.
   b. Armstrong Pumps, Inc.
   c. ITT Bell & Gossett; ITT Fluid Technology Corp.
   d. Taco, Inc.
   e. Wessels

6. Air Separators:
   a. Amtrol, Inc.
   b. Armstrong Pumps, Inc.
   c. ITT Bell & Gossett; ITT Fluid Technology Corp.

d. Taco, Inc.

e. Spirotherm, Inc.

7. Other Hydronic Accessories (air vents, etc.)

a. Amtrol
b. Armstrong Pumps, Inc.
c. ITT Bell and Gossett; ITT Fluid Technology Corporation.
d. Metraflex
e. Mueller
f. Spirotherm
g. Taco
h. Watts

8. Flexible Connectors:

a. Flex – Hose Company.
b. Hyspan.
c. Metraflex.
d. Unasphere.
e. Vibration Eliminator.

9. Strainers:

a. Armstrong.
b. Flexonics.
c. Keckley.
e. Metraflex.
f. Mueller.
g. Watts.

D. In-Line and Base Mounted Pumps Approved Manufacturers

1. Ball & Gossett
2. Taco, Inc
3. Thrush
4. Armstrong