

PART 1: GENERAL

1.01 Purpose:

- A. This standard is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. The responsibility of the engineer is to apply the principles of this section so that the University may achieve a level of equality and consistency in the design and construction of their facilities. Deviations from these guidelines must be justified through LCC analysis and submitted to the University for approval.

1.02 References:

And 3½" and 5"

- H. Provide sectional valves on each branch and riser, close to main, where branch or riser serves 2 or more hydronic terminals or equipment connections. For Loop/Header systems isolation valves shall be located on either side of any later connection.
- I. Provide drain valves on each mechanical equipment item located to completely drain equipment for service or repair. Install at base of each riser, at base of each rise or drop in piping system, and at any low point required to completely drain hydronic piping system.
- J. Provide high point vents/valves, and air pots at high points on lines.
- K. Route groups of pipes parallel to each other, spaced to permit applying full insulation and servicing of valves.
- L. Select pumps on the ascending side of the efficiency curve. All pumps shall be ~~vented~~ vented.
- M. In all cases, the PSP shall evaluate system conditions and select the optimum pump type and configuration based on efficiency, pump characteristics, and system curve.
 - 1. All pumps shall be floor mounted, with strainers installed and shall have isolation valves
- N. Provide pumps design to operate to 1,750 RPM unless directed otherwise.
- O. Provide pumps free of flashing and cavitation at all flow rates between 25% and 125% of design flow under the suction conditions of the pump installation.
- P. Provide pumps sized for critical speed of at least 115% of operating speed.
- Q. Provide base mounted pumps on minimum of 4" high concrete base equal or greater times total weight of pump and motor, with anchor bolts poured in place. All pump bases shall be grouted in place with minimum 2" nonshrink epoxy grout pad.
- R. Provide manufacturer's recommended clearances as a minimum. Indicate on Drawings access space around pumps for service.
- S. Design pipe changes off pumps using long radius reducing elbows or eccentric reducers to reduce and minimize turbulence. Provide piping support such that piping weight is not transferred to pump flanges or casing. Provide supports under elbows attached to inertia bases on pump suction and discharge.
- T. Use of expansion joints is discouraged, and shall not be used in the main chilled water piping loop or at primary building pump connections unless specific approval is granted from the Utilities Department at SHSU.
- U. Provide a minimum of five straight pipe diameters at pump inlet connections. Use of suction diffusers is discouraged and only allowed if space constraints require their use. Provide line size isolation valve and strainer on pump suction piping. Provide line sized, ~~spring~~ spring loaded silent check valve and isolation valve on pump discharge piping.

PART 2: PRODUCTS

2.01 Piping:

- A. Pipe Size ½" (connections to fan coil units): Type "L" copper w/ wrought copper fittings.
- B. Pipe Size 2" and Smaller: Black steel pipe; Schedule 40; Class 150 malleable iron fittings with threaded joints.
- C. Pipe Size 2½" and Larger: Black steel pipe, Schedule 40, wrought buttwelded fittings with welded joints. Mechanical/grooved fittings and couplings may be specified by the PSP.
- D. For main loop chilled water distribution piping (definition above), utilize the Utilities Department specifications for piping, valves, and fittings.
- E. No ERW piping shall be used on SHSU Campuses.
- F. All direct bury hydronic piping shall be HPDE NO EXCEPTIONS

2.02 Piping Specialties:

- A. Provide pipe escutcheons with inside diameter closely fitting pipe outside diameter, or outside of pipe insulation where pipe is insulated. Select outside diameter of escutcheon to completely cover pipe penetration hole in floors, walls, or ceilings; and pipe sleeve extension, if any. Furnish cast brass or sheet brass pipe escutcheons with nickel or chrome finish for occupied areas, prime paint finish for unoccupied areas.
- B. Provide strainers full line size of connecting piping, with ends matching piping system materials. Select strainers for working pressure of the piping system, with type 304, stainless steel sockets. Provide shut off valves to service strainers.
- C. Provide dielectric unions as recommended by manufacturer for use in service conditions which effectively isolate ferrous from non-ferrous piping (electrical conductance), prevent galvanic action, and stop corrosion.
- D. Sleeve Seals shall be modular mechanical type, consisting of interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve, connected with bolts and pressure plates which cause rubber sealing elements to expand when tightened, providing watertight seal and electrical insulation.

2.03 Pumps:

- 1. Aurora Armstrong, Goulds, Peabody & Paco Chill water pumps preferred.

A. In-Line Circulator Pumps:

- 1. Provide maintenance free units design for the working pressure of the piping system and 225°F continuous water temperature.
- 2. Seals: Two piece mechanical ceramic seals.

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- E. Provide mill material specs on all pipe with heat numbers and Mill Test Reports (MTR).
- F. All welds will be done to ASME B31.1 standards.