SECTION 22 10 00

PLUMBING PIPING AND PUMPS

PART 1 – GENERAL

1.1 Purpose:

A. This standard is intended to provide useful information to the Professional Service Provider (PSP) to establish a basis of design. PSP is to apply the principles of this section such that the University of Texas at Arlington (UTA) may achieve a level of quality and consistency in the design and construction of their facilities. Deviations from these guidelines must be approved by UTA and may require justification through Life Cycle Cost (LCC) analysis and submitted to UTA for approval.

1.2 Lessons Learned:

A. PEX piping not allowed.
B. Minimum standard: Copper piping Type L for water lines (no PVC).
C. Plumbing coordination – Avoid routing plumbing vertically through load-bearing walls (Wood construction). Make sure adequate space is allowed for vertical plumbing distribution.
D. Drawings must show clearance for all plumbing equipment. Doors to mechanical rooms must provide adequate clearance to remove equipment for repairs, or replacement. Double door: At a minimum provide one pair of double doors with 2 - three foot door leafs as a standard for mechanical rooms.
E. Sewer Stub-ups and floor drain hub stub-ups should be located when possible in the back one-third of retails shell space. The back one-third of the concrete floor slab should be left open for future connections.
F. Provide the ability to drain the main line of domestic (hot, cold and return) water systems.

1.3 Requirements:

A. Provide water hammer arrestors, complete with accessible isolation valve, in hot and cold water lines at the end of each battery of plumbing fixtures and at each plumbing fixture location remote from a battery of fixtures; size in accordance with PDI WH-201.
B. Isolate domestic water lines for building services from cross connection by means of a code-approved backflow preventer. Provide additional backflow prevention devices in process water connections off the main building service.
C. Provide backflow preventers at any connection between potable and non-potable water systems.
D. Provide clean-out capability for domestic hot water return piping in recirculating loops.
E. Route groups of pipes parallel to each other with spacing to allow for insulation and valve service.
F. Provide dielectric couplings at connections between dissimilar metals.
G. Provide sectional valves on each branch and riser, close to main, where branch or riser serves 2 or more plumbing fixtures or equipment connections.
H. Provide shutoff valves installed on inlet of each plumbing equipment item and on inlet of each plumbing fixture.
I. Provide drain valves at equipment, bases of risers, and low points in system to completely drain potable water system.
J. Provide soft-seat check valves on discharge side of each pump.
K. Provide balance cocks in each hot water recirculating loop.
L. In all cases, the Designer shall evaluate system conditions and select the optimum pump type and configuration based on pump efficiency and characteristics.
M. Recommend in-line circulating pumps or close-coupled end suction pumps for low flow (up to 50 GPM) circulating systems.
N. Recommend base-mounted end suction pumps for circulating systems with flow rates between 50 and 500 GPM.
O. Pumps furnished as part of factory-fabricated equipment such as a part of booster pump skids, are to be end-suction, if available.
P. Provide all booster pumps with a valve bypass line to facilitate maintenance.

PART 2 - PRODUCTS

2.1 Pipes and Pipe Fittings:

A. Pipe sizes ¾" to 2" and smaller shall be Type L copper with lead free soldered connections using wrought-copper, solder-joint fittings. Copper press fittings with rubber o-rings joined using a hydraulic compression tool may only be used with prior approval from the Owner.

B. Pipe sizes 2½" to 6" shall be Type L copper with soldered silver phosphate connections. Copper piping 4" and larger may be joined using roll grooved fittings, must be approved by Owner in advance.

C. Piping larger than 6"shall be ASTM A53 galvanized steel pipe, schedule 40, with rolled grooved ends and mechanical couplings.

D. Exterior below grade or below concrete slab equipment or fixture supply feeds: Piping shall be Type L copper, soft-annealed temper, with wrought copper fittings and lead free jointing.

E. Below building concrete slab : Tube size ¾" and larger: type "L" soft - annealed copper coil tubing. Copper tubing installed below building concrete slab on grade shall be installed without solder joints.

F. Underground water main piping systems: All pipe used for underground water piping mains shall be Class 52 centrifugally cast, close grained cast iron pipe or Class 50 ductile iron pipe arranged with bell and spigot mechanical joints.

2.2 Piping Specialties:

A. Provide basket strainers with cast-iron body, 125-psi flanges, bolted type or yoke type cover. Furnish with removable, non-corrosive perforated strainer basket, with ⅛" perforations and lift-out basket handle.

2.4 Bibbs and Faucets:

A. Hose Bibbs shall be threaded end, bronze body, renewable composition disc, tee handle, ¾" NPT inlet, ¾" hose outlet. Provide with vacuum breaker.

B. Sill Faucets shall be bronze body, renewable composition disc, wheel handle, ¾" solder inlet, ¾" hose outlet. Provide with vacuum breaker.

2.5 Hydrants:

A. Recessed Non-Freeze Wall Hydrants: Cast-bronze casing, length to suit wall thickness, vacuum breaker, hinged locking cover, ¾" inlet hose outlet.

B. Project Non-Freeze Wall Hydrants: Cast-bronze hydrant, chrome plate face, tee handle key, bronze casing, length to suit wall thickness, vacuum breaker, ¾" inlet hose outlet.

C. Projected Non-Freeze Wall Hydrants: Cast-bronze hydrant, chrome plated face, tee handle key, bronze casing, length to suit wall thickness, vacuum breaker, ¾" inlet hose outlet.

D. Floor Level Non-Freeze Hydrants: Bronze hydrant, rough bronze box, tee handle key, bronze casing, length to suit depth of bury, drain hole, vacuum breaker, hinged locking cover, ¾" inlet, hose outlet.

E. Non-Freeze Post Yard Hydrants: Bronze hydrant, tee handle key, bronze casing with cast-iron casing guard, length to suit depth of bury, drain hole, vacuum breaker, ¾" inlet, hose outlet.

2.6 Backflow Preventers:

A. Shall be of the reduced pressure zone (RPZ) type. RPZ's cannot be installed below grade. The assembly shall include shutoff valves on inlet and outlet, and strainer on inlet. Backflow preventers shall include test cocks, and pressure-differential relief valve located between 2 positive seating check valves. Construct in accordance with ASSE Standard 1013. Coordinate the exact model of the backflow preventer with the University prior to incorporation into the design.

2.7 Pressure Regulating Valves:

A. Shall be single seated, direct operated type, bronze body, integral strainer, complying with requirements of ASSE Standard 1003. Provide inlet and outlet shutoff valves and throttling bypass valve. Provide pressure gauge on valve outlet.

2.8 Relief Valves:

A. The standard relief valves shall be manufactured in accordance with ASME Boiler and Pressure Vessel Code. Valves shall be combined pressure-temperature relief valves with bronze body, test lever, thermostat and shall comply with ANSI 21.22 listing requirements for temperature discharge capacity. Provide temperature relief at 210° F and pressure relief at 150 psi.

2.9 Pumps:

A. In-Line Re-Circulation Pumps:
   1. Provide maintenance-free circulator pumps designed for 125 PSI working pressure 225° F continuous water temperature and specifically designed for quiet operation.
   2. Body: Stainless steel fitted construction with iron body.
   3. Shaft: Steel, ground and polished, metal impregnated carbon thrust bearing.
   4. Motor: Non-overloading at any point on pump curve, open, drip proof, sleeve bearings, quiet operating, rubber mounted construction, built-in thermal overload protection.
   5. Coupling: Self-aligning, flexible coupling.

B. Water Pressure Booster System:
   1. General: Provide factory-fabricated and tested water pressure booster system consisting of diaphragm type water tank, centrifugal pumps, power and control panels, instrumentation, and operating controls. It is a University standard to provide pumps with a valve bypass to facilitate maintenance.
   2. Pumps: Provide variable speed, single stage, end-suction design, cast-iron; bronze fitted centrifugal pumps with mechanical shaft seals. Mount pumps on vibration insulators. Provide temperature probe and electric purge valve immediately upstream of each PRV. Provide drip-proof motors.
   3. Water Tank: Provide factory pre-charged diaphragm type water tank with replaceable flexible membrane. Construct in accordance with ASME Code and provide ASME stamp for 125-psi minimum.
   4. System Controls: Maintain system pressure with pilot-operated diaphragm type combination pressure regulating and non-slam check valve on each pump discharge line.
      a). Provide low system pressure switch located on discharge header to sense drop in system pressure, and to activate alarm and automatically start standby pump.
      b). Provide adjustable vane type flow switch to sequence lag pump.
   5. Control Panel: Provide UL-listed, NEMA 1, hinged door, lockable control panel containing the following:

C. Duplex Pedestal Type Sump Pumps:
   1. Pump: Duplex, centrifugal, semi-open impeller type sump pump, complete with galvanized steel strainer, cast-iron base plate, suction plate and casing, and cast-iron or bronze impeller.
   2. Shaft: Stainless steel of length to suit depth of basin, connected with flexible coupling to motor, and intermediate sleeve bearing for lengths over 4’.
   3. Motor: Open drip-proof, electrical characteristics as scheduled
   4. Basin: Fiberglass construction of indicated dimensions, with inlet connections of size and location as indicated. Maintain minimum of 3’ depth below lowest inlet invert.
   5. Cover: Cast-iron or steel circular cover with manhole or handhole opening, depending on diameter. Provide openings for pump, control rod, and discharge piping.
   6. Controls: Pump controls shall include float switch with gas-tight seals, bronze or stainless steel floats and rods, alternator, high level automatic alarm switch with gas-tight seals, and provisions for activation of a remote alarm light. Control panel shall be a factory-wired NEMA Type 1 enclosure and shall include alternator, combination motor controller with circuit breaker, provisions for activation of a remote alarm light, control power transformer, and pump running lights. Alarm switch and all controls shall operate on 120 volt, 60 hertz, alternating current.

D. Submersible-Sump Pumps:
   1. Pump: Cast-iron shell, bronze impeller, stainless steel shaft, factory-sealed grease lubricated ball bearings, ceramic mechanical seal, and perforated steel strainer.
   2. Motor: Hermetically sealed, capacitor-start, with built-in overload protection, electrical characteristics as scheduled. Provide 20’ of 3-conductor PVC cord and molded grounding plug.
   3. Controls: Float-operated mercury switch.
   4. Provide with stainless steel safety/lifting chain.

PART 3 - EXECUTION

3.1 Pipe Testing Procedures:

END OF SECTION 22 10 00