



**Office of Capital Planning
and Project Management**

DIVISION 22

PLUMBING

This Article on Codes, Regulation and Standards shall apply
to all Divisions of the Building Standards

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SECTION 22 05 16 - EXPANSION FITTINGS AND LOOPS FOR PLUMBING PIPING

- Piping expansion and contraction shall be accommodated via the use of expansion loops only. Mechanical expansion shall not be allowed.

END OF SECTION 22 05 16

SECTION 22 05 19 - METERS AND GAUGES FOR PLUMBING PIPING

- Digital solar thermometers shall be installed upstream and downstream of all air and liquid temperature systems and subsystems for the purpose of maintenance and troubleshooting.
- Gauges shall be installed before and after all equipment to aid in troubleshooting and maintenance.
- Operating pressure scale to be centered at the top of the gauge.
- Pressure sensitive gauge tubing to be looped to prevent visual flutter of the indicator.
- Petes plugs are not acceptable in lieu of gauges.
- All fans and air handling units shall have solar temperature gauges for the discharge air, return air and outside air.

END OF SECTION 22 05 19

SECTION 22 05 23 - GENERAL DUTY VALVES FOR PLUMBING PIPING

- Gate valves 2" and smaller: 150 lb. bronze, rising stem, screwed ends, ASTM B 61 (B62 for domestic water) bronze body and union bonnet, solid wedge disc, and painted malleable iron wheel. Design shall allow repacking under pressure. For use in steam condensate, chilled water, hot water, and fire protection.
- Gate valves 2-1/2" and larger: Iron body, bronze trim, flanged ends, OS&Y, ASTM A 126 Class B ferro steel body and bonnet, solid cast iron disc with bronze trim, replaceable bonnet bushing, 2 piece ball-type gland. Design shall allow repacking under pressure. Wheel shall be malleable iron. For use in steam condensate, chilled water, hot water, and fire protection.
- Globe valves 2" and smaller: 150 lb. bronze, screwed end with ASTI B 62 bronze body, union bonnet, composition disc, and painted malleable iron wheel. For use in steam condensate, chilled water, hot water, and fire protection.
- Globe valves 2-1/2" and larger Flanged end with ASTM A 126 Class B ferro steel body and yoke bonnet, bronze disc, stem, stem hole bushing and bronze renewable body seat rings, and malleable iron wheel. For use in steam condensate, chilled water, hot water, and fire protection.

- Check valves 2" and smaller . Y pattern, bronze, body, 200 lb, SWP, screwed ends and cap. For steam, chilled water, hot water, domestic water and fire protection systems.
- Check valves 2-1/2" and larger for domestic water: Spring loaded, center guided. Check valves shall be wafer type for 6" and smaller type, and flanged type for 8" and larger. Check valves shall have semi-steel body and bronze trim, and shall be designed for pressure service required but not less than 125 psi. For steam, chilled water, hot water, domestic water and fire protection systems.
- Check valves for sump pumps and ejectors: Iron body, bronze trim, bolted cap, renewable and regrindable bronze seat ring, composition disc, with lever and weight or lever and spring, flanged ends.
- Refer to 23 05 53 Identification for HVAC Piping and Equipment Section for valve tag identification.
- High Performance Butterfly Valves: carbon steel body with stainless steel disc, stainless steel stem with top and bottom alignment bearings, ANSI 1 Class 125/150 flanges. Teflon seats and seals for use in chilled water systems.
- Plug Valves: ASTM A 126, Class B, cast iron body, bolted bonnet, teflon-coated plug, 200 psi WOG rating, threaded ends. For use in compressed air systems.
- Pressure Relief Valves: Pressure relief valves shall be self-closing type, conforming to ASME Boiler code, and shall be provided with non-corrosive interior operating parts with valve seats and high temperature silicone. Valves shall have test levers. Valves shall be sized in accordance with ASME requirements. Refer to contract Drawings for capacities of systems and required set points.
- Compressed air relief valve shall be the self-operated, tamper-resistant type designed to keep instrumentation on line in case of supply overpressure. The relief valve shall be installed in an in-line, flow-through arrangement with no remote vent piping. Valve shall have aluminum body, steel spring, stainless steel trim, nitrile diaphragm, and threaded ends, and be suitable for 250 psig and 150°F.
- Water Pressure Reducing Valve: Water pressure reducing valves shall have bronze, renewable stainless steel seats, stainless steel strainers and high temperature diaphragms. For potential use in chilled water and low temperature water systems.
- Fire Hose Valve: Fire hose valves shall be similar to the following catalog number which is based on Potter-Roemer. Valve shall be No. 4065, 2-1/2".

END OF SECTION 22 05 23

SECTION 22 10 00 - PLUMBING PIPING AND PUMPS

- All pipes going through walls or floors shall go through sleeves, and the openings in the sleeves shall be fire caulked.
- Where dissimilar metals are used, use 'Clearwater' or 'Perfection Nipples' in place of dielectric.

END OF SECTION – 22 10 00

SECTION 22 11 16 - DOMESTIC WATER PIPING

- All domestic water piping and meters supplied to buildings shall be installed as per City of Chicago Code. Provide gate valve beyond meter for University use.
- Cold water storage tanks are to be cathodically protected.
- The domestic water distribution system in buildings requiring a booster pump shall have electric driven horizontal centrifugal type pumps, coupling guards, and control cabinets incorporating all necessary control devices, including combination starters with fused disconnects; gauges, pipe and fittings, low pressure cut-off switch, valves, auto pressure regulation, controls for remote monitoring via a Building Automation System (BAS), and accessories for a complete installation. Booster pumps will be designed so as to not interfere with the water usage in other buildings or for other purposes.
- Branches and risers shall be provided with full port shut-off valves. In copper systems, valves should be full in-line port (F.I.P.) with copper sweat adaptors. Sections with large quantities of water shall be provided with a drain valve, nipple, and cap to facilitate draining of the section. Drain valves are to be F.I.P. type valves. Hose valves are not permitted. Isolation valves and drain points shall be indicated on the drawings.
- All isolation valves shall have an associated drain valve assembly as described above.
- Horizontal sections shall have a drain valve. Each branch valve shall have a corresponding isolation valve.
- No water piping shall be run buried under interior floor slabs on grade or in floor slabs.
- Solder shall be lead free. An acceptable product is Bridgit-Canfield Lead-Free solder.

END OF SECTION – 22 11 16

SECTION 22 11 19 - DOMESTIC WATER PIPING SPECIALTIES

- Strainers:
 1. Strainers shall be hard piped to floor drains

- Pipe Sleeves:
 1. Where pipes pass vertically through floors or beams, provide steel pipe sleeves with interior diameter ½ in. larger than the exterior diameter of the pipe (including insulation passing through the sleeve) with bottom flush with construction and top projecting 1 - ½ in. above floor.
 2. Where piping is insulated, allowance in sleeve diameter shall be provided for insulation to pass through undisturbed.
 3. Where pipes pass horizontally through walls, beams or columns, provide sleeves with interior diameter ½ in. larger than the exterior diameter of the pipe (including insulation passing through the sleeve). Ends of sleeves shall be flush with finished wall surfaces.
 4. All sleeves shall be set during the construction of the building and shall be perfectly plumb or level. Locating and setting shall be included in the appropriate contract division.
 5. Pipe sleeves 3 in. and larger in masonry or concrete construction shall have steel anchor lugs welded to the pipe.
 6. Sleeves through floors shall be water tight and compatible with assembly rating.
 7. All sleeves and inserts shall have a coat of "rust inhibitive" paint before installation.
 8. Sleeves through non-rated assemblies shall be Schedule 40 black steel pipe.
 9. Sleeve fire rating to be greater than or equal to assembly rating.

END OF SECTION – 22 11 19

SECTION 22 12 00- FACILITY POTABLE WATER STORAGE TANKS

- Do not separate potable and non-potable water unless approved by the university plumber and Safety Office.
- Use water saving fixtures and technologies to reduce estimated water use at least 20% below recommendations of Energy Policy Act 1992.
- Potable water storage tanks are to be cement lined.

END OF SECTION – 22 12 00

SECTION 22 13 16 - SANITARY WASTE PIPING SPECIALTIES

- All animal waste piping to be Dur-Iron.
- Soil piping to be extra heavy cast iron below slab on grade and exterior applications.
- Copper piping (where applicable) to be type L only.
- Galvanized steel piping to be Schedule 40.
- Glass piping shall be used where required by Code.

END OF SECTION – 22 13 16

SECTION 22 13 19- FACILITY POTABLE WATER STORAGE TANKS

- Cleanouts:
 1. Exposed drains: Clean outs for exposed drains shall have cast iron ferrules with raised head brass plugs, or as required for the specific application.
 2. Concrete floors: Clean outs located in concrete floors shall be nickel bronze top.
 3. Vinyl tile floors: Clean outs located in tile floors shall be inlay type with recessed access cover and frame.
 4. Walls: Clean outs located in walls shall be caulked, screwed, and shall be provided with stainless steel cover plates.

END OF SECTION – 22 13 19

SECTION 22 13 19.13 - SANITARY DRAINS

- Floor Drains for Toilet Rooms, Stair Wells and Finished Areas: Cast iron body with integral seepage pan and clamping collar. Strainer shall be type Y cast nickel bronze, 9" x 9" size adjustable top with square openings and vandal proof nickel bronze screws.
- Area Drains: Cast iron with flat top, heavy duty grate and secondary strainer in all area ways subject to traffic. Cast iron drain with dome grate and screen for area ways that are not subject to traffic or walkways.
- Floor drain requirements:
 1. Each toilet room shall be provided with 1 or more floor drains located and set in a manner to intercept overflow water.
 2. Floor drains shall be provided at the lowest level of all exterior stairs.
- Funnel-Type Drains:
 1. Cast iron body with integral seepage pan and clamping collar, nickel bronze grate, and 4" diameter funnel extension and strainer head.

END OF SECTION – 22 13 19.13

SECTION 22 13 29 - SANITARY SEWERAGE PUMPS

- Sewage ejectors inside the buildings shall be duplex type. Discharge lines shall run to an external manhole and shall not be connected to any portion of the sewer system within the building.
- Pumps handling sewage or other waste materials should be of the non-clog type. Mechanical ventilation is necessary for the dry and/or wet wells in order to prevent gaseous emissions escaping into the building or other habitable areas.
- Sewage Ejectors:
 1. Sewage ejector assemblies shall consist of centrifugal volute casings, bronze impellers, long split steel pump shafts, thrust bearings, metal guide bearings, flexible couplings, float switches with copper floats (or rubber coated mercury float switches), duplex gas-tight steel floor plates, low speed motors (1750 rpm or less) mounted above floor plate, and float guide pipes.
 2. Combination fused motor starters with lead/lag pump control, pump operating pilot lights, and automatic lead pump selector switch with seven day timer, completely pre-wired in a wall mounted control panel shall be furnished and installed for each pump installation. Lead pump shall be alternated once each seven days for one day to exercise the lag pump (i.e., lead pump runs for six days, lag pump acts as lead pump for one day of every seven days.)
 3. A high water float switch and alarm bell shall be provided for each sewage ejector or sump pump installation. Alarm bell to sound at the pump and the Central Building Automation System.
 4. Pump installations shall not be used by any contractor during the construction phase. The installing contractor shall put the pumps into service when the building is accepted for occupancy by the University.
 5. Horizontal swing check valves shall be installed on each individual pump discharge. Spring-loaded check valves in vertical piping are not acceptable.
 6. Check valves for sump pumps and ejectors: iron body, bronze trim, bolted cap, renewable and regrindable bronze seat ring, composition disc, with lever and weight or lever and spring, flanged ends.
 7. The pump motors should be mounted at the floor line and should not be submerged.
 8. Sewage ejectors should be designed to handle plumbing fixtures serving basement areas and should not receive sewage from floors above grade. (Floors above grade shall be designed to flow by gravity to the outside sewage systems.)
 9. The design document drawings should have a detail of the ejector system.
- Basins:
 1. Basins shall be cast iron of required size. The basin shall be constructed so that the basin covers will provide a gas-tight installation. All bolts and studs for all

basin covers shall be brass. Mud settling and blow-off basins shall be cast iron of required sizes. Rodding basins shall be similar to mud settling basins and, when located in finished floors, shall have recessed covers with bronze finishing rings of equivalent floor tile thickness integral with basin floor frame and cover. Bolts for basin covers should fit flush with finished floors. Basins shall be vented to the outside.

END OF SECTION – 22 13 29

SECTION 22 14 13- FACILITY STORM DRAINAGE PIPING

- No unique University standards requested. Refer to Codes and Standards Section for appropriate design requirement.
- Please note: City of Chicago requires the use of Vitreous Clay Storm Piping at the building exterior.
- Implement a storm water management plan so that the post development peak discharge rate does not exceed the pre development peak discharge rate and where possible reduces the storm water runoff.
- Investigate feasibility of collecting storm water run-off for use as irrigation water.

END OF SECTION – 22 14 13

SECTION 22 14 23.23- FATS, OILS & GREASE DISPOSAL SYSTEMS

- Oil interceptor drains shall be cast iron, triple garage basin sets, sized as required.

END OF SECTION – 22 14 23.23

SECTION 22 14 26.13 - ROOF DRAINS

- With gravel stops, clamping device, dome strainer, extension sleeve, under-deck clamp and lead caulked outlet.

END OF SECTION – 22 14 26.13

SECTION 22 14 29- SUMP PUMPS

- Pumps for storm water drains inside the buildings shall be duplex type. Discharge lines shall run to an external manhole and shall not be connected to any portion of the sewer system within the building.
- Roof drains and area drains should not be routed to subsurface drainage sumps.

- Under no circumstances shall elevator pits be used as a collection basin for any type of drainage. The elevator pit shall contain a sump pit and sump pump and shall discharge to a sanitary open site drain.
- For elevator pits and other locations, where only a small pump can be used, a submersible type may be used. It shall be complete with a manual test button and waterproof cord and plug. A gate valve, check valve and union shall be installed in the pump discharge. Submersible type sump pumps are to be avoided for other than elevator pit service.
- Sump pump assemblies shall consist of centrifugal volute casings, bronze impellers, long split steel pump shafts, thrust bearings, metal guide bearings, flexible couplings, float switches with copper floats (or rubber coated mercury float switches), duplex gas-tight steel floor plates, low speed motors (1750 rpm or less) mounted above floor plate, and float guide pipes.
 1. Combination fused motor starters with lead/lag pump control, pump operating pilot lights, and automatic lead pump selector switch with seven day timer, completely pre-wired in a wall mounted control panel shall be furnished and installed for each pump installation. Lead pump shall be alternated once each seven days for one day to exercise the lag pump (i.e., lead pump runs for six days. Lag pump acts as lead pump for one day of every seven days.)
 2. A high water float switch and alarm bell shall be provided for each sump pump installation. Alarm bell to sound at the pump, Central Building Automatic System.
 3. Pump installations shall not be used by any Contractor during the construction phase. The installing Contractor shall put the pumps in service when the building is accepted for occupancy by the University.
 4. Horizontal swing check valves shall be installed on each individual pump discharge. Spring loaded check valves in vertical piping are not acceptable.
 5. Check valves for sump pumps and ejectors: iron body, bronze trim, bolted cap, renewable and re-grindable bronze seat ring, composition disc, with lever and weight or lever and spring, flanged ends.
 6. The pump motors should be mounted at the floor line and should not be submerged.
 7. The design document drawings should have a detail of the sump and pumps.
- Basins:
 1. Sump basins shall be cast iron or fiberglass of required sizes. The basin shall be constructed so that the basin covers will provide a gas-tight installation. All bolts and studs for all basin covers shall be brass. Mud settling and blow-off basins shall be cast iron of required sizes. Rodding basins shall be similar to mud settling basins and, when located in finished floors, shall have recessed covers with bronze finishing rings of equivalent floor tile thickness integral with basin

floor frame and cover. Bolts for basin covers should finish flush with finished floors. Basins shall be vented to the outside.

END OF SECTION – 22 14 29

SECTION 22 35 00- DOMESTIC WATER HEATER EXCHANGERS

- The preferred domestic hot water system shall consist of a Tube and Bundle, double walled, water heater with steam to hot water heat exchanger.
- Where hot water is the only available heating source, (East Campus) medium temperature hot water is to be run through the outer walls of the water heater jacket.
- Hot water storage tanks are required only for high demand usage.

END OF SECTION – 22 35 00

SECTION 22 40 00- PLUMBING FIXTURES

- Hands free electronic faucets shall be used in all restrooms.
- Use water efficient fixtures to reduce the overall water consumption of the building compared to the baseline numbers as outlined in LEED v.3 Water Efficiency; Credit 3. All fixtures must be Energy Star rated.
- Water closets shall be vitreous china wall mounted, elongated bowl, blowout type with 1-1/2 in. top spud, white open front seat, less cover, with concealed check hinge, flush valve with handle stop, vacuum breaker quiet flush equipment and chair carrier. The water closet and flush valve shall be designed and adjusted to flush the water closet with less than 3.5 gallons of water.
- NO WASHOUT CLOSETS WILL BE PERMITTED.
- Water closets shall be mounted on floor mounted carriers. Sanitary connection (nipple) between waste pipe and fixture to be made of cast iron (no substitutes will be allowed).
- American Standard Siphon-jet 1.6g. is the preferred model. Accessible units shall comply with State and Federal accessibility guidelines.
- Urinals shall be vitreous china wall hanging blowout urinal with jet, extended shields and trap, vacuum breaker, 1 1/4 in. top spud, wall hangers, 2 in. I.P.S. outlet connection, open passageway. The urinals and flush valves shall be designed and adjusted to flush the urinals with less than 1.5 gallons of water.
- NO WASHOUT URINALS WILL BE PERMITTED.
- Urinals shall be wall mounted on floor-mounted carriers concealed within the wall construction.
- Shower enclosures generally will be constructed in place with membrane waterproofing in the walls and floor. In the event pre-cast receptors are used for individual showers, they shall have integral membrane waterproofing and special care shall be taken to finish the wall membrane waterproofing over the top rim of the

receptor. Lead safing pans for showers shall not be used. Strainer shall have a minimum free flow area of 13.25 square inches. Accessible shower enclosures shall be the same as above except to further include a lever diverting valve, 60" rubber hose, spray head, atmospheric vacuum breakers, and wall hook assembly. Special arrangements of the curbs, shower enclosure and trimmings are required in residence hall showers for students using wheel chairs.

- Mixing valve and shower head shall be for concealed piping, consisting of built-in shutoff valve, integral volume control, maximum temperature stop, replaceable Delrin cartridge including poppet-type equalizing chamber, 1 /2 in. pipe connections, shower set with chrome plated arm, flange and self cleaning circular off-the-wall shower head with ball joint, separate spray control maximum 2.5 GPM delivery rate, inlet screwed end stop valves. Valve shall be provided with either Lucite or lever handle.
- Safety showers and eyewash stations shall be located in the corridor, within 100 feet or 10 seconds travel distance of any corrosive activity and shall be clearly identified for that purpose.
- Water supply to the safety shower and eyewash area shall be connected to high use water lines to avoid problems with stagnant water in the line. American Standard is the preferred manufacturer.
- Mop basins shall be floor level type pre-cast terrazzo mop basins.
- Exterior sillcocks shall be of the non-freeze integral vacuum breaker type, and should be arranged around the outside of building so that 100 ft. of hose shall reach all portions of the project site perimeter. Consult Facilities Management for unusual conditions. Each sillcock will have its own isolation valve inside the building.
- Sillcocks shall be provided at each loading dock and trash collection area.

END OF SECTION – 22 40 00

SECTION 22 47 00-DRINKING FOUNTAINS AND WATER COOLERS

- All drinking water coolers are to be wall-mounted.
- Accessible Units: Individually wall mounted type with stainless steel receptors. Preferred manufacturer and model: "Elkay" EBFSA-86. Mount units on floor-mounted carriers concealed within wall construction.

END OF SECTION – 22 47 00

**SECTION 22 60 00- GAS & VACUUM SYSTEMS FOR LABORATORY
HEALTHCARE FACILITIES**

- Laboratory vacuum pumps must be independently vented to atmosphere above the main roof. Discharge must be at least 25 feet from any air intake. Drainage type fittings shall be used in the vacuum piping, with Y fittings at branches and changes in direction having brass screw plugs to serve as clean-out openings.
- Standard weight galvanized steel pipe and screwed malleable iron galvanized fittings shall be used.

END OF SECTION – 22 60 00

This section of the Building Standards establishes minimum requirements only.
It should not be used as a complete specification