

PLUMBING SYSTEMS

Codes: See *Codes, Standards and Regulations* within these *Design Guidelines* for governing plumbing code.

Design Drawings: Design drawings shall include schematic diagrams or riser diagrams for: all domestic CW / HW / HWC and process water systems. Show all valving and pipe specialties.

Provide riser diagrams for all waste / vent systems.

Domestic Water System: Avoid locating domestic water lines in exterior walls and unheated spaces within the building. Routing water lines near un-ducted outside air louvers where exposure to freezing temperatures may occur shall not be permitted.

Domestic water pressure booster pump assemblies shall have bypass capability. Isolation valves for domestic cold and hot water service shall be installed at every branch tee connection $\frac{3}{4}$ " and larger serving more than one fixture.

No below grade domestic hot or cold water piping shall be allowed inside buildings.

All valves shall be readily accessible.

Provide water hammer arresters on all CW branch piping (i.e., restroom groups, counter sinks, etc.). Arresters shall be shown on plumbing plans.

Fixtures: All toilets, urinals, and lavatories must be wall hung.

All toilets, urinals, and lavatories shall be vitreous china. Urinals shall have integral flushing rim, semi-concealed overflow, and integral trap.

All toilets, urinals, and lavatories shall be mounted with carriers.

Fixtures and appurtenances shall be of the water conservation type.

Stainless steel sinks shall not be less than 18 gauge thickness.

Flushometers shall be Sloan or UNL-BSM approved equivalent.

Thermostatic Mixing Valves: Water heaters should be designed to produce at least 140F water. However, 95-100F may be delivered through a building domestic tempered water system after a master thermostatic mixing valve (TMV). This approach eliminates the need for individual TMVs for emergency showers and eye wash stations and lavatories, and also eliminates the need to insulate these lines.

Circulating Pumps: Hot and tempered water systems shall be recirculated to provide hot or tempered water upon demand at each fixture unless the water heater is located directly adjacent to the fixture(s) served.

Drinking Fountains: We prefer that water coolers and drinking fountains be located in alcoves, while maintaining handicapped accessibility. All water coolers and drinking fountains shall be provided with a bottle filling feature including sensor for no-touch activation and automatic time delay shutoff.

Sill Cocks: Buildings shall be provided with an appropriate number of exterior sill cocks to facilitate landscape maintenance operations and exterior window washing. Minimally, one sill cock shall be provided on each side of the facility. On larger buildings, two or three may be necessary to prevent placement of hoses across sidewalks.

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Floor Drains: Provide floor drains / floor sinks in all mechanical equipment rooms, areas serving emergency showers, toilet rooms, wet labs, and custodial rooms where a mop sink is not floor mounted.

Architectural drawings should be detailed or noted such that floors slope toward floor drains.

Floor drains shall be flashed.

Building Sanitary System: Sanitary sewer sewage ejectors shall be avoided when possible. When these become necessary, only those fixtures requiring pumping shall discharge to these pumps. Sewage ejectors shall be specified as a duplex system so that either pump may be removed for maintenance without disturbing the other. A high level alarm shall be part of the system.

No combination waste/vent systems shall be designed into any facility.

Sanitary sewer vents must terminate vertically through the roof of the building.

Acid waste piping shall be connected to sanitary piping at a point creating optimal dilution.

Cleanouts located above ceilings shall not be allowed for waste systems. In areas requiring waste drain piping under supported structural floor slabs, the cleanouts shall be accessed at least 6" above the flood level of the highest fixture served. All risers shall be properly plugged and painted to match the adjacent surface.

Building Storm Water System: Primary roof drains shall discharge to the underground storm sewer system. A secondary roof drainage system (when scuppers or other non-piped overflow methods are not used) shall discharge to a visible location without causing a safety hazard.

Provide a grated area drain at all below grade building entrances to intercept water that may accumulate within the area way.

The use of storm water pumps should be avoided.

Vertical storm piping should avoid offsets below the uppermost floor line.

Lab Gas Systems: Gas isolation valves serving single appliances or laboratory benches shall not be located above ceilings. Locate isolation valves as close to the appliance as practicable in readily accessible and clearly observable or identified locations.

Process Water: Selection of material for process water systems must be done in consultation with FPC Engineering and BSM and early in the design process.

Miscellaneous: Water, steam, or gas piping terminated for future use shall be valved and capped.