



Design Standard Basic Plumbing System Design

Purpose:

The purpose of this document is to standardize the basic elements of the Plumbing system design process. This design standard has the purpose of creating a consistent application of plumbing system design throughout the South San Francisco Unified School District. The intent is to achieve a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

Design Standard:

Water Piping:

- Determine cold water service and building domestic hot and cold water demands by the fixture unit method as outlined in the California Plumbing Code. This determination should be made for the building as a whole. Although the particular renovation may not involve the entire building, such determination should be made to ensure that there are no existing inadequacies or noncompliant conditions that should be addressed.
- Add known continuous demands to the total estimated demand.
- Size water piping with velocities not exceeding 7.5' per second and minimum of 35 pounds per square inch residual pressure at the highest, or last, fixture or hose rack. For copper pipe, size with velocities of 5' to 8' per second.
- Take particular care in designing and sizing of cold water piping to any shower, or shower room, where the use of adjacent flush valve fixtures could affect the pressure and cause excessive temperature fluctuations. Use a pressure balancing valve between hot and cold water supplies, or separate line from a point that would not be affected by flushing of fixtures and discuss recommendations with SSFUSD.
- SSFUSD's strong preference is to avoid the use of dielectric unions or dielectric pipe nipples on heating hot water, domestic and chilled water piping applications, exterior and interior. The inevitable corrosion issues present unacceptable maintenance headaches. SSFUSD prefers high-grade brass nipples and brass unions at transition points.

Soil and Waste, and Vent Piping

- Size soil and waste piping by the fixture unit method as outlined in the California Plumbing Code (CPC).



South San Francisco Unified School District



Section 22 00 00

Version 1, 2011.9.30

- Grade interior piping, above grade, at 1/4" per foot minimum; 1/8" is acceptable if the pipe size is increased to compensate for the 1% slope as required by California Plumbing Code (CPC).
- Vent all sanitary fixtures as required by code.
- Kitchen or Food Service Waste System: Design a separate waste system for any kitchen or food service and discharge through a grease trap/interceptor. Keep this system separate and connect at a point in the building sanitary sewer system where a stoppage below the connection will not back sewage up to kitchen or food service floor drains or sinks.
- Use corrosive-resistant pipe in any location where the waste may contain corrosives. Keep such waste and vent system separate from the building plumbing soil, waste and vent systems to a point outside the building. In buildings with minor isolated points of corrosive use, discuss the method of handling with SSFUSD.
- Use gravity flow for all building drainage systems. Where this appears to be impractical, discuss installation of pumps with SSFUSD and obtain approval before proceeding with design.

Storm Piping

- Rainwater Leaders and Storm Drains: Compute rainwater quantity on the basis of 1.5" rainfall per hour minimum (.935 gallons per hour/square foot horizontal drainage area). Size all piping per CPC.
- Grade interior piping, above grade, at 1/4" per foot minimum as required by California Plumbing Code (CPC).
- Insulate underbodies and horizontal mains.

Connections to Kitchen Equipment

- Kitchen equipment work shall be coordinated with Kitchen Equipment Installation Contractor to provide a complete, code compliant installation.
- Include a schedule in the plumbing drawings for the rough-in and final connections to all kitchen equipment.
- Coordinate the furnishing of all equipment trim, such as traps, faucets and valves, with the kitchen equipment drawings and specifications.
- Provide a pressure regulating valve, pressure gauge, pressure relief valve, thermometer and shock absorber in the 180° rinse line to the dishwasher connection.



South San Francisco Unified School District



Section 22 00 00

Version 1, 2011.9.30

Garbage Disposals

- Provide garbage disposals in all sinks in staff lunch rooms, or rooms that may be used as staff lunch rooms even if the room's primary or originally programmed function is not as a staff lunch room. If the sink is required to be ADA compliant, the design professional shall specify a double bowl sink with one bowl meeting ADA requirements, and then to install the disposal at the other bowl. The switch shall be placed on a reachable wall or on the front of the casework.

Back Flow Prevention

- The proper design, selection, installation and maintenance of cross-connection control devices is imperative for the protection of potable drinking water and distribution systems. Appropriate backflow prevention assemblies shall be selected.
- Provide backflow protection at any building water system where there are connections, actual or potential, to a contaminating liquid.
- Backflow may be prevented by installing a backflow prevention device at each individual point of possible contamination, where devices such as vacuum breakers or air gaps may be employed, or at a single point where an industrial water piping system takes off from the domestic water piping.
- Back flow devices, including Double Check Detector Assemblies must not be sited adjacent to or visible from building entries and public spaces. Coordinate location of such assemblies with SSFUSD

Roof, Floor, and Areaway Drains

- Include provisions in the design for coordination of drain and clean-out elevations and other work such as concrete and waterproofing.
- Locate toilet room floor drains out of foot traffic below water closet partitions or between urinals.
- Where floor drains are roughed in for future use, cover with a flush plate and gasket for protection against fume leakage.
- Provide trap primers to retain trap seals on floor drains.
- All floor drains to have 3" or larger traps plus trap primers.
- All horizontal drain runs to have cleanouts on the end of the run on every floor.
- Main drain stacks must have cleanouts installed on each floor.

Hose Bibbs and Landscape Irrigation Service

- Provide keyless hose bibbs at important outside entrances to a building along each side of the building and never more than 50' from a paved entrance for washing



South San Francisco Unified School District



Section 22 00 00

Version 1, 2011.9.30

down purposes. Locate these as inconspicuously as possible consistent with accessibility. Provide a ground level hose bibb for wash-down at all large concrete areaways or shafts. Hose bibbs shall be supplied from an industrial water system or have separate reduced pressure device or vacuum breaker and backflow preventer on each hose bibb.

Disinfection of Water Systems

- Clean and disinfect the domestic hot and cold water systems in accordance with the generally accepted standards and Codes. For remodeling work, modify the procedure as required to accommodate the occupants

Plumbing Isolating Valves

- Show all valves on drawings.
- Arrange and valve all utility services so that, as a minimum, each floor may be isolated.
- Arrange and valve domestic hot and cold water piping so that toilet rooms can be isolated without interrupting service to other parts of the building.
- Show sectionalizing valves in top center and bottom of risers in hot water supply and return systems.
- Place valves on each side of backflow or check valve to permit servicing.
- Show valves on all services left for future connections (tees, stubs, etc.) unless they are in a valved zone, or isolated by other valves, that permits only a minor loss of pipe contents when opened.

Pipe Installation

- Specify a proper corrosion preventive wrapping for any black steel piping installed below grade (bituminous and paper wrapping or extruded plastic).
- Provide water hammer arrestors in water lines to equipment or fixtures having quick closing or flush valves and any equipment that might produce water hammer. Water hammer arrestors shall be certified by the Plumbing and Drainage Institute (PDI). Show location and size of all water hammer arrestors on plans and access for maintenance or replacement. Provide access panels if required.
- Show clean-outs in sewer lines as required by code. In addition, vertical to horizontal changes in main risers that occur above furred ceilings shall have a clean-out extended from the base to a floor clean-out or a wall clean-out above the change in direction.



South San Francisco Unified School District



Section 22 00 00

Version 1, 2011.9.30

- Do not embed piping in concrete.

Kitchen Grease, Plaster, Sediment and Sand Traps

- In general, grease traps should be avoided except where required by code or other regulations. If required, locate for easy access and servicing, preferably outside, with proper venting.
- Provide a sand and oil interceptor where required for separation of solids from the sanitary sewer system.

Fixtures, General

- Specify fixtures using a minimum of water consistent with fixture application. Install flow control devices to limit water use, except in tank and flushometer water closets and urinals.
- Vitreous ware shall be institutional quality.
- Design cast iron enameled ware with acid-resisting enamel.
- Design fixtures complete with trims, where applicable. Exposed trims shall be coordinated with finish of plumbing fittings.
- Provide accessible fixtures per Architectural documentation.
- Provide stops in hot and cold water lines serving all fixtures, including hose bibbs.

Fixture Connections

- Exposed water supply pipe, tubing and waste piping connections shall be chrome-plated brass.
- Fit supply pipe, tubing, and other connections with chrome-plated brass escutcheons at walls.
- Cover exposed bolt heads in floor flanges of any fixture, in the back of any fixture, or in the fixture itself, with porcelain bolt caps securely held in place with putty.
- Fit fixtures tight to walls and seal joint. Coordinate sealant with architectural specifications.
- Specify red brass for all nipples from copper water lines to fixture stops. Do not use galvanized nipples.



South San Francisco Unified School District



Section 22 00 00

Version 1, 2011.9.30

Sustainable Design Practices

- South San Francisco Unified School District has a desire to build buildings utilizing sustainable design techniques. Sample sustainable design opportunities are provided in the table located in the SSFUSD Sustainability Design Standard. Each strategy needs to be integrated appropriately into their respective projects. Development of design strategies for each item is beyond the scope of this Plumbing Design Standard and requires careful consideration for proper application.

Substitutes Allowed:

- Not Applicable

Associated Design Standards

- Not Applicable

End of Document