

SECTION 22 00 00
BASIC PLUMBING SYSTEMS
Design Standard

PART 1 GENERAL

1.1 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 San Mateo County Community College District. The intent is to achieve a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

PART 2 PRODUCT

2.1 CODES – SYSTEMS WILL BE DESIGNED IN ACCORDANCE WITH THE LATEST EDITION OF THE FOLLOWING CODES:

- A. Uniform Building Code; California Building Code.
- B. Uniform Mechanical Code; California Mechanical Code.
- C. Uniform Plumbing Code; California Plumbing Code.
- D. Uniform Fire Code; California Fire Code.
- E. National Electrical Code; California Electrical Code.
- F. State of California Code of Regulations (CCR).
- G. Energy Efficiency Standards and Title 24 Regulations.
- H. Local City of Newark Amendments and Regulations.
- I. DSA – Department of the State Architect.

2.2 STANDARDS – THE FOLLOWING REFERENCE STANDARDS SHALL BE USED FOR THE DESIGN:

- A. ANSI – American National Standards Institute.
- B. ASME – American Society of Mechanical Engineers.
- C. ASSE – American Society of Sanitary Engineering.
- D. ASTM – American Society for Testing and Materials.
- E. AWS – American Welding Society.
- F. AWWA – American Water Work Association.
- G. CISPI – Cast Iron Soil Pipe Institute.
- H. CS – Commercial Standards.
- I. EPA – Environmental Protection Agency.
- J. NEMA – National Electrical Manufacturer's Association.
- K. NFPA – National Fire Protection Association.

- L. NFPA 10 – Portable Fire Extinguishers.
- M. NFPA 101 – Life Safety Code.
- N. NSF – National Sanitation Foundation.
- O. PDI – Plumbing and Drainage Institute.
- P. UL – Underwriters' Laboratory.
- Q. LEED – U.S. Green Building Council.

2.3 GENERAL:

- A. Coordinate and provide the access panels and doors for plumbing items requiring access that are concealed behind finished surfaces. Coordinate with construction manager for Access panels, doors and requirements from other trades. Access panels and doors shall be sized to allow full access to the item requiring access, up to, and including, full body access if required.
- B. Refer to 01 91 00 for Commissioning requirements. Provide all required support as required to allow the Commissioning to be performed.
- C. Refer to 25 10 00 for metering and monitoring. All meters and monitoring components required to be installed shall be furnished by the BMS contractor and installed by the plumbing contractor as directed by the BMS contractor.
- D. Refer to the Acoustical Design Standard for general plumbing acoustical guidelines.

2.4 WATER PIPING:

- A. 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.
- B. Add known continuous demands to the total estimated demand.
- C. 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.
- D. 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. Consider the use of 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 SMCCCD.
- E. SMCCCD'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. SMCCCD prefers high-grade brass nipples and brass unions at transition points. If the use of dielectric unions is unavoidable, the design professional shall specify Elster Perfection Clearflow® Dielectric Waterway Fittings (or equivalent), which separate dissimilar metals in the electrolyte (waterway) - reducing the local galvanic cell.

2.5 SOIL AND WASTE, AND VENT PIPING:

- A. Size soil and waste piping by the fixture unit method as outlined in the California Plumbing Code (CPC).
- B. 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).
- C. Vent all sanitary fixtures as required by code.
- D. 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.
- E. 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 SMCCCD.
- F. Use gravity flow for all building drainage systems. Where this appears to be impractical, discuss installation of pumps with SMCCCD and obtain approval before proceeding with design.

2.6 STORM PIPING:

- A. 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.
- B. Grade interior piping, above grade, at 1/4" per foot minimum as required by California Plumbing Code (CPC).
- C. Insulate underbodies and horizontal mains.

2.7 INDUSTRIAL WATER SYSTEMS:

- A. The industrial water system shall serve all points of water use that could cause contamination by their backflow into the domestic water system.
- B. Where an industrial water system is selected for a project, protect the domestic water system by installation of two approved reduced pressure backflow prevention devices in parallel at the point of connection.
- C. Detail the installation of the devices in an accessible location with the lower a minimum of 1' above the floor and the upper a maximum of 5'. Provide adequate drainage below the devices for testing or malfunction, via floor drains.
- D. Each outlet or connection to the industrial water system shall be posted with a sign reading Industrial Water - Do Not Drink. These may be waterproof cloth tape with printing protected by clear vinyl and self-adhesive back; 1/4" high, black letters on yellow background.

2.8 CONNECTIONS TO KITCHEN EQUIPMENT:

- A. Kitchen equipment is normally furnished under the specification section for kitchen equipment. Work shall be coordinated with Kitchen Equipment Installation Contractor to provide a complete, code compliant installation.

- B. Include a schedule in the plumbing drawings for the rough-in and final connections to all kitchen equipment.
- C. Coordinate the furnishing of all equipment trim, such as traps, faucets and valves, with the kitchen equipment drawings and specifications.
- D. Provide a pressure regulating valve, pressure gauge, pressure relief valve, thermometer and shock absorber in the 180° rinse line to the dishwasher connection.

2.9 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.

2.10 BACK FLOW PREVENTION:

- A. 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.
- B. Provide backflow protection at any building water system where there are connections, actual or potential, to a contaminating liquid. Examples include connection from domestic system to HHW makeup and cooling towers.
- C. 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.
- D. 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 SMCCCD.

2.11 ROOF, FLOOR, AND AREAWAY DRAINS:

- A. Include provisions in the design for coordination of drain and cleanout elevations and other work such as concrete and waterproofing. Wherever possible, provide wall cleanouts in lieu of floor cleanouts. All cleanouts shall be installed with the clearances required by the California Plumbing Code at a minimum.
- B. Locate toilet room floor drains out of foot traffic below water closet partitions or between urinals.
- C. Where floor drains are roughed in for future use, cover with a flush plate and gasket for protection against fume leakage.
- D. Provide trap primers to retain trap seals on floor drains installed in areas where floors are not washed periodically or there is no regularly used water outlet to replenish trap seal.
- E. Trap primer shall be wall type accessibly installed behind an access door and with an isolation valve. The trap primers shall be accessible from the Men's Restroom side of a plumbing wall even when serving the Women's Restroom.
- F. All floor drains to have 3" or larger traps plus trap primers.

- G. All horizontal drain runs to have cleanouts on the end of the run on every floor.
- H. Main drain stacks must have cleanouts installed on each floor.

2.12 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 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. Provide hose bibbs on roof – 100 ft. maximum spacing. 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.

2.13 DISINFECTION OF WATER SYSTEMS:

- A. Clean and disinfect the domestic hot and cold water systems, including fire systems connected to the domestic water systems, in accordance with the generally accepted standards and Codes. For remodeling work, modify the procedure as required to accommodate the occupants.
- B. Plumbing Isolating Valves:
- C. Show all valves on drawings.
- D. Arrange and valve all utility services so that, as a minimum, each floor may be isolated.
- E. 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. The pipes to the valves shall be brought down to a level of 5'-0" above the finished floor with the valves installed inside access doors at 5'-0" above finished floor.
- F. Show sectionalizing valves in top center and bottom of risers in hot water supply and return systems.
- G. Each floor shall be isolated from the remainder of the building;
- H. Provide manual shut-off valves on all services entering each building to allow for total isolation of each building from site services.
- I. Place valves on each side of backflow or check valve to permit servicing.
- J. 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.

2.14 PIPE INSTALLATION:

- A. Specify a proper corrosion preventive wrapping for any black steel piping installed below grade (bituminous and paper wrapping or extruded plastic).
- B. 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.

- C. 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.
- D. Do not embed piping in concrete.

2.15 KITCHEN GREASE, PLASTER, SEDIMENT AND SAND TRAPS:

- A. 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.
- B. Provide a sand and oil interceptor where required for separation of solids from the sanitary sewer system.

2.16 EQUIPMENT, GENERAL:

The contractor must be able to document and substantiate the proposed method for achieving the LEED goals.

2.17 FIXTURES, GENERAL:

- A. 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.
- B. Restrooms shall be either all automatic (faucets and flush valves) or all manual and not a mixture of both within a single restroom.
- C. Vitreous ware shall be institutional quality.
- D. Design cast iron enameled ware with acid-resisting enamel.
- E. Design fixtures complete with trims, where applicable. Exposed trims shall be coordinated with finish of plumbing fittings.
- F. Provide accessible fixtures per Architectural documentation.
- G. Provide stops in hot and cold water lines serving all fixtures, including hose bibs.

2.18 FIXTURE CONNECTIONS:

- A. Exposed water supply pipe, tubing and waste piping connections shall be chrome-plated brass.
- B. Fit supply pipe, tubing, and other connections with chrome-plated brass escutcheons at walls.
- C. 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.
- D. Fit fixtures tight to walls and seal joint. Coordinate sealant with architectural.
- E. Specify red brass for all nipples from copper water lines to fixture stops. Do not allow galvanized nipples.

2.19 SUSTAINABLE DESIGN PRACTICES:

- A. San Mateo County Community College District is strongly committed to promoting sustainability throughout their campus projects. Section 01 81 13 Sustainability of the Design Standard provides guidelines and recommendations for implementing sustainability

strategies. Where relevant, specific sustainability criteria is noted in this section, however, each project should review and cross reference that front section while developing the specific project and its documentation. Each discipline shall confirm that specific performance and manufacturer information provided in the specification section is in alignment with code requirements, LEED Gold criteria and any other goals for sustainability.

- B. The minimum energy savings shall exceed the latest version of California Title 24 requirements by 15%.
- C. Consider rainwater and grey water collection and filtration for use on providing water supplies for irrigation, water closets and urinals. If this system is utilized, provide all necessary components to facilitate the use of this recycled water (dual pipe system to water closets and urinals and a purple pipe system to ensure systems requiring potable water is not connected to the recycled piping system; dual pipe capabilities on water closets and urinals).

2.20 APPROVED MANUFACTURERS:

Acco Clearflow© Dielectric Unions

PART 3 EXECUTION

3.1 SUBSTITUTES ALLOWED?

Not Applicable

3.2 ASSOCIATED DESIGN STANDARDS AND CONSTRUCTION SPECIFICATIONS:

Division 22 Design Standards and Construction Specifications

END OF SECTION