

Section 221300 Facility Sanitary Sewerage DESIGN GUIDE

1 General

1.1 General

- A. Design facilities to avoid use of pumping sewerage systems wherever practical.
- B. See Section 226600 for Chemical Waste Systems.

2 Materials

2.1 Sanitary Sewer and Vent Piping-Gravity Drainage

- A. Cast Iron Pipe and fittings: service weight
 - 1. Joints: Hub-and-spigot, compression type with neoprene gaskets
 - 2. Joints: neoprene gasket and heavy-duty stainless-steel clamp and shield assemblies, minimum 3/8" stainless hex head screw. Husky SD 4000 series or equivalent.
- B. DWV ABS Pipe and Fittings: Schedule 40
 - 1. Joints: solvent weld
 - 2. Hollow core and cellular core pipe and fittings are not allowed.
- C. DWV PVC/CPVC Pipe and Fittings: Schedule 40.
 - 1. Joints: solvent weld



2. Hollow core and cellular core pipe and fittings are not allowed.

2.2 Sanitary Sewer-Pressurized

- A. Galvanized steel Pipe: Schedule 40.
 - 1. Cast Iron Fittings: threaded fittings
 - 2. Malleable Iron Fittings: screwed type

2.3 Indirect Waste and Cooling Coil Condensate Drain Piping:

A. Type M copper tubing with soldered Joints. Min. size ³/₄"

2.4 Traps and Drain Connections

A. Manufacturers: McQuire, T.S. Brass

2.5 Pressurized Waste-Above Grade

A. Galvanized

2.6 Pumped Sanitary Sewer, Below Grade

- A. This section applies to sanitary sewer and elevator sump drainpipe below grade and downstream of the pump until it terminates into the horizontal gravity line.
- B. Steel Pipe: ASTM A53 Schedule 40, galvanized
 - 1. Cast Iron Fittings: ASME B16.4, threaded fittings
 - 2. Malleable Iron Fittings: ANSI/ASME B16.3, screwed type
 - Groove locked couplings: In lieu of welded flanged or soldered joints noted above, groove locked couplings as specified below may be used IN ACCESSIBLE AREAS ONLY for piping systems which do not exceed the design parameters of the respective gasket. Piping enclosed in inaccessible chases and shafts, above



inaccessible ceilings or otherwise inaccessible shall have welded or soldered joints as specified above.

2.7 Sewage Ejectors and Sump Pumps

- A. Duplexing required for all applications where failure would inhibit building operations or cause water damage. Vaults and elevator pits may be equipped with simplex pumps.
- B. Pedestal support required for black water applications.
- C. Submersible allowed for grey water applications.
- D. Provide with motor control panel with motor starters, safeties, alternator and HOA functions. High water alarm shall tie to BAS in Section 230900.

2.8 Cleanouts

A. This item reserved for future content.

2.9 Floor Drains/Floor Sinks/Drains

- A. All products shall be commercial grade.
- B. See part 2 for application.

3 Execution

3.1 Testing

- A. Test in the presence of the Owner's representative. Provide copies of test to the Owner's representative and include in the O&M manual.
- B. Test all building sanitary sewer and vent piping to ensure system is watertight.
- C. Drainage piping shall be tested to the point of connection to mains outside the building.



- D. Water test: The water test shall be applied to the drainage and vent systems either in its entirety or in sections.
 - 1. If applied to the entire system, all openings in the piping shall be tightly closed, except the highest opening, and the system filled with water to point of overflow.
 - 2. If the system is tested in sections, each opening shall be tightly plugged except the highest opening of the section under test, and each section shall be filled with water, but no section shall be tested with less than a 10 foot head of water. In testing successive sections, at least the upper 10 feet of the next preceding section shall be tested, so that no joint or pipe in the building (except the uppermost 10 feet of the system shall have been submitted to a test of less than 10 feet head of water.
 - 3. The water shall be kept in the system, or in the portion under test, for at least fifteen minutes before inspection starts.

3.2 General

A. Provide easy access to all valves, traps, cleanouts, primers and strainers and equipment requiring service and replacement for operation and servicing.

3.3 Sanitary Sewer and Vent Piping

- A. Slope for drainage at ¼ inch per foot (2%) for pipes 3" and lower, pipes 4" and above may be slowed at 1/8 inch per foot (1%) with approval from the AHJ.
- B. PVC/ABS/CPVC pipe and fittings
 - Allowed for direct buried piping not subject to heat (temperature 140 degrees and less for PVC and 160 degrees or less for ABS/CPVC) and not required to be cast iron (see below). PVC/ABS piping is not permitted for drainage serving autoclaves, kitchens, glasswashers, mechanical rooms appliances upstream of the PVC/ABS piping
 - 2. Allowed for above grade (indoor) vent piping installed in nonplenum areas.



- C. Cast iron pipe and fittings:
 - 1. Cast iron pipe and fittings are required for all under slab drainage piping from the mechanical room to the exterior cleanout.
 - 2. Pipe not specifically permitted to be PVC/ABS shall be cast iron.
- D. Water discharged to drain above 140 degrees F shall be provided with blowdown cooler either provided in Division 22 or with the equipment.

3.4 Direct Buried Utilities

- A. The Architect/Engineer must identify and/or verify critical utilities location on a project-by-project basis.
- B. Provide locator tape with metallic strip for all major non-metallic underground utility lines, including main irrigation lines. Locator tape to be placed twelve inches (12") minimum above all main lines, 4" or greater. Site and/or utilities plans shall indicate this tracer wire and locator tape requirement.
- C. Provide pea gravel or sand bedding and cover around all utility lines.
- D. During construction all pipe ends must be closed when left unattended.
- E. All main sewer lines must be a minimum of six inches (6") in diameter throughout campus.
- F. Utilities Easement. All underground utilities design must be conceived and designed with an "easement approach" in mind, thus facilitating their maintenance and accessibility. The Schematic Design utility site plan and all other utilities site plan(s) thereafter, must clearly indicate the outline of this utility easement.

3.5 Cleanouts

- A. Urinal cleanouts shall be located above fixtures' flood levels. Cleanout plugs to be easily removable during Commissioning inspection and testing. Clean out screws shall not protrude into drainage or vent lines.
- B. Exterior cleanouts must be located at least four feet (4') away but no more than 7 feet away from buildings.



- 1. Cleanouts in hard surfaced areas shall have brass access cap flush with grade.
- For easy of locating, cleanouts in non-hard surfaced areas shall be located in a 16"x16" concrete pad or located in an enclosed 12" x 18" heavy duty (concrete or stainless steel) utility access box with removable lid at surface. Cleanouts shall be as close to the top of the utility box as possible for ease of use.
- C. Cleanouts located in crawl spaces shall have access caps extended to the floor immediately above the crawl space.
- D. It is preferred that cleanouts are not located in ceiling spaces and that cleanouts be extended up in nearby wall or up through floor. Locations shall be indicated in the construction documents and coordinated with the architect. Where walls and floor are not located in reasonable proximity (attics, below roofs etc.), coordinate to ensure that cleanouts are accessible.

3.6 Floor Drains

- A. Provide floor drains in
 - 1. Toilet rooms (including single occupancy restrooms).
 - 2. At safety showers and eyewash stations
 - 3. Mechanical rooms
 - 4. Rooms with water heaters
 - 5. Rooms with backflow prevention
 - 6. Custodial closets
 - 7. In service/storage or maintenance rooms where water spillage and/or floor hosing may occur
 - 8. At equipment that has drains: base mounted pumps, boilers, water heaters, etc.
- B. Floor shall be sloped to floor drain and locate in the low point of the floor for positive drainage. All floor drains shall be tested during commissioning. Where this is not practical in renovations, obtain approval from the Mechanical Plumbing Manager.



C. Each floor drain shall have a trap primer. See Section 221100.

3.7 Trench Drains

A. Trench drains shall be installed in front of ADA showers.

3.8 Grease Traps

A. Locate outside buildings.

3.9 Sewage Ejectors and Sump Pumps

- A. Duplexing arrangement shall include factory authorized/warranted start up.
- B. Provide sump pumps in elevator pits when required by code. Utilize equip with oil sensing pumps when approved by the AHJ in lieu of oil/water separator.
- C. Submit start-up certificate with the O&M manuals.

3.10Lab Waste and Vent

A. See 226600

4 Appendix

4.1 Reserved for future.