

**SECTION 22 13 00
FACILITY SANITARY SEWERAGE**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Sanitary sewerage systems, including piping, equipment and all necessary accessories as designated in this section.

1.2 RELATED WORK

- A. Penetrations in rated enclosures: Section 07 84 00, FIRESTOPPING
- B. Preparation and finish painting and identification of piping systems: Section 09 91 00, PAINTING.
- B. Section 22 05 11, COMMON WORK RESULTS FOR PLUMBING.
- C. Pipe Insulation: Section 23 07 11, HVAC AND PLUMBING INSULATION.

1.3 SUBMITTALS

- A. Submit in accordance with Section 01 33 23, SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES.
- B. Manufacturer's Literature and Data:
 - 1. Piping.
 - 2. Floor Drains.
 - 3. Cleanouts.
 - 4. All items listed in Part 2 - Products.
- C. Detailed shop drawing of clamping device and extensions when required in connection with the waterproofing membrane or the floor drain.

1.4 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. American Society of Mechanical Engineers (ASME): (Copyrighted Society)
 - A112.6.3-01.....Floor and Trench Drains
 - A13.1-07-96.....Standard Markers for Pipe Identification
 - B16.3.....Malleable Iron Threaded FittingsB16.12-98 Cast
Iron Threaded Drainage Fittings
 - B16.15-06.....Cast Copper Alloy Threaded Fittings
- C. American Society for Testing and Materials (ASTM):
 - A53-07.....Pipe, Steel, Black And Hot-Dipped, Zinc-coated
Welded and Seamless
 - A74-09.....Standard Specification for Cast Iron Soil Pipe
and Fittings
 - A183-03.....Carbon Steel Track Bolts and Nuts

- A888-09.....Hubless Cast Iron Soil Pipe and Fittings
- B32-08.....Solder Metal
- B75-02.....Seamless Copper Tube
- B306-02.....Copper Drainage Tube (DWV)
- C564-08.....Rubber Gaskets for Cast Iron Soil Pipe and Fittings
- D2564-04e1.....Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Pipe and Fittings
- D2665-08b.....Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings
- D. Cast Iron Soil Pipe Institute (CISPI):
 - 301-05.....Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste and Vent Piping Applications
 - 310-04.....Couplings for use in connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications
- E. International Code Council (ICC), International Plumbing Code
- F. American Society of Sanitary Engineers (ASSE):
 - 1018.....Performance for trap seal primer valve-water supply fed
- G. Factory Mutual (FM):
 - 1. Coupling Used in Hubless Cast Iron Systems for Drains, Waste and Vent Systems.
- H. Plumbing and Drainage Institute (PDI):
 - PDI WH-201.....Water Hammer Arrestor

PART 2 - PRODUCTS

2.1 SANITARY PIPING

- A. Cast Iron Soil Pipe and Fittings: Used for pipe buried in or in contact with earth and for extension of pipe to a distance of approximately 1500 mm (5 feet) outside of building walls and interior waste and vent piping above grade. Pipe shall be bell and spigot as required by selected jointing method:
 - 1. Material, (Pipe and Fittings): ASTM A74, Service Class. All Cast Iron Soil Pipe and Fittings shall be marked with the collective trademark CI® of the Cast Iron Soil Pipe Institute.

2. Joints: Provide rubber gasket push on joint.

B. Polyvinyl Chloride (PVC): Schedule 40. PVC shall not be used where waste temperature may exceed 60°C (140°F), such as mechanical equipment rooms. PVC shall not be used for waste risers in noise sensitive areas of the building due to higher noise than other specified material.

1. Pipe: Solid Wall, ASTM D2665 drain, waste and vent manufactured from Type I normal impact resins.

2. Fittings:

a. Solvent Welded Socket Type: Use solvent cement, ASTM D2564.

1) Use PVC solvent cement that has a VOC content of 510 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2) Use adhesive primer that has a VOC content of 550 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

b. Threaded Type: Molded threads only. Use tape or lubricant specifically intended for use with PVC plastic pipe.

2.2 EXPOSED WASTE PIPING

A. Finished Room: Use full iron pipe size chrome plated copper or chrome plated brass piping for exposed waste piping connecting fixtures, casework, cabinets and equipment when not concealed by apron including those furnished by the Government or specified in other sections.

1. Pipe: Fed. Spec. WW-P-351, standard weight.

2. Fittings: ANSI B16.15 cast bronze threaded fittings with chrome finish, (125 and 250).

3. Nipples: ASTM B 687, Chromium-plated.

4. Unions: Brass or Bronze with chrome finish. Unions 65 mm (2-1/2 inches) and larger shall be flange type with approved gaskets.

B. Unfinished Rooms, Mechanical Rooms and Kitchens: Chrome-plated brass piping is not required. Paint piping systems as specified in Section 09 91 00, PAINTING.

2.3 CLEANOUTS

A. Same size as the pipe, up to 100 mm (4 inches); not less than 100 mm (4 inches) for larger pipe. Cleanouts shall be easily accessible and shall be gastight and watertight. Provide a minimum clearance of 610 mm (24 inches) for the rodding.

B. In Floors: Floor cleanouts shall have cast iron body and frame with square adjustable scoriated secured nickel bronze top. Unit shall be

vertically adjustable for a minimum of 50 mm (2 inches). When a waterproof membrane is used in the floor system, provide clamping collars on the cleanouts. Cleanouts shall consist of "Y" fittings and 3 mm (1/8 inch) bends with brass or bronze screw plugs. Cleanouts in the resilient tile floors, quarry tile and ceramic tile floors shall be provided with square top covers recessed for tile insertion. In the carpeted areas, provide carpet cleanout markers. Provide two way cleanouts where indicated on drawings.

2.4 FLOOR DRAINS

- A. ANSI A112.21.1. Provide a caulking flange for connection to cast iron pipe, screwed or no hub outlets for connection to steel pipe, and side outlet when shown. Provide membrane clamp and extensions if required, where installed in connection with waterproof membrane. Puncturing membrane other than for drain opening will not be permitted. Double drainage pattern floor drains shall have integral seepage pan for embedding into floor construction, and weep holes to provide adequate drainage from pan to drain pipe. For drains not installed in connection with a waterproof membrane, provide a 2.2 kg (16-ounce) soft copper membrane, 610 mm (24 inches) square.
- B. Cast iron body, nickel bronze strainer and clamping device. Strainer shall consist of a perforated floor-level square or round grate and funnel extension. Minimum dimensions as follows:
 - 1. Area of strainer and collar - 23 000 square mm (36 square inches).

2.5 TRAPS

- A. Provide on all sanitary branch waste connections from fixtures or equipment not provided with traps. Exposed brass shall be polished brass chromium plated with nipple and set screw escutcheons. Concealed traps may be rough cast brass or same material as pipe connected to. Slip joints not permitted on sewer side of trap. Traps shall correspond to fittings on cast iron soil pipe or steel pipe respectively, and size shall be as required by connected service or fixture.

2.6 TRAP PRIMERS

- A. Trap Primer: Hydraulic.
 - 1. 15 mm (1/2 inch) Inlet/ 15 mm (1/2 inch) Outlet fully automatic, all brass trap primer valve, activated by a drop in building water pressure, no adjustment required. Model for one (1) to four (4) traps with distribution unit, may be located anywhere in an active cold water line, as indicated on the drawings or as required by

code. ASSE Standard 1018. Omit distribution unit when serving a single trap.

2.8 WATERPROOFING

- A. Provide at points where pipes pass through membrane waterproofed floors or walls in contact with earth.
- B. Floors: Provide cast iron stack sleeve with flashing device and an underdeck clamp. After stack is passed through sleeve, provide a waterproofed caulked joint at top hub.
- C. Walls: See detail shown on drawings.

2.9 DIELECTRIC FITTINGS

- A. Provide dielectric couplings or unions between ferrous and non-ferrous pipe.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with the ICC International Plumbing Code and the following:
 - 1. Install branch piping for waste from the respective piping systems and connect to all fixtures, valves, cocks, outlets, casework, cabinets and equipment, including those furnished by the Government or specified in other sections.
 - 2. Pipe shall be round and straight. Cutting shall be done with proper tools. Pipe, except for plastic and glass, shall be reamed to full size after cutting.
 - 3. All pipe runs shall be laid out to avoid interference with other work.
 - 4. Install valves with stem in horizontal position whenever possible. All valves shall be easily accessible. Install valve in each water connection to fixture.
 - 5. Pipe Hangers, Supports and Accessories:
 - a. All piping shall be supported with minimum spacing as required by the ICC International Plumbing Code Section 308.
 - b. Shop Painting and Plating: Hangers, supports, rods, inserts and accessories used for Pipe supports shall be shop coated with red lead or zinc Chromate primer paint. Electroplated copper hanger rods, hangers and accessories may be used with copper tubing.
 - c. Floor, Wall and Ceiling Plates, Supports, Hangers:
 - 1) Solid or split unplated cast iron.
 - 2) All plates shall be provided with set screws.

- 3) Pipe Hangers: Height adjustable clevis type.
 - 4) Adjustable Floor Rests and Base Flanges: Steel.
 - 5) Concrete Inserts: "Universal" or continuous slotted type.
 - 6) Hanger Rods: Mild, low carbon steel, fully threaded or Threaded at each end with two removable nuts at each end for positioning rod and hanger and locking each in place.
 - 7) Riser Clamps: Malleable iron or steel.
 - 8) Rollers: Cast iron.
 - 9) Self-drilling type expansion shields shall be "Phillips" type, with case hardened steel expander plugs.
 - 10) Hangers and supports utilized with insulated pipe and tubing shall have 180 degree (min.) metal protection shield Centered on and welded to the hanger and support. The shield shall be 4 inches in length and be 16 gauge steel. The shield shall be sized for the insulation.
 - 11) Miscellaneous Materials: As specified, required, directed or as noted on the drawings for proper installation of hangers, supports and accessories. If the vertical distance exceeds 6 m (20 feet) for cast iron pipe additional support shall be provided in the center of that span. Provide all necessary auxiliary steel to provide that support.
6. Install cast escutcheon with set screw at each wall, floor and ceiling penetration in exposed finished locations and within cabinets and millwork.
 7. Penetrations:
 - a. Fire Stopping: Where pipes pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke and gases as specified in Section 07 84 00, FIRESTOPPING. Completely fill and seal clearances between raceways and openings with the fire stopping materials.
 - b. Waterproofing: At floor penetrations, completely seal clearances around the pipe and make watertight with sealant as specified in Section 07 92 00, JOINT SEALANTS.
- B. Horizontal Pipe slopes shall conform to the following:
1. Waste and Vent Piping:

Pipe Size	Minimum Pitch
65 mm (2 1/2 inches)	1 : 50 (1/4" to the foot).

and smaller	
80 mm (3 inches) and larger	1 : 100 (1/8" to the foot).

3.2 TESTS

- A. General: Test system either in its entirety or in sections.
- B. Waste Systems: Conduct before trenches are backfilled or fixtures are connected. Conduct water test or air test, as directed.
 - 1. Water Test: If entire system is tested, tightly close all openings in pipes except highest opening, and fill system with water to point of overflow. If system is tested in sections, tightly plug each opening except highest opening of section under test, fill each section with water and test with at least a 3 m (10 foot) head of water. In testing successive sections, test at least upper 3 m (10 feet) of next preceding section so that each joint or pipe except upper most 3 m (10 feet) of system has been submitted to a test of at least a 3 m (10 foot) head of water. Keep water in system, or in portion under test, for at least 15 minutes before inspection starts. System shall then be tight at all joints.
 - 2. Air Test: Maintain air pressure of 35 kPa (5 psi) gage for at least 15 minutes without leakage. Use force pump and mercury column gage.
 - 3. Final Tests: Either one of the following tests may be used.
 - a. Smoke Test: After fixtures are permanently connected and traps are filled with water, fill entire drainage and vent systems with smoke under pressure of 1.3 kPa (one inch of water) with a smoke machine. Chemical smoke is prohibited.
 - b. Peppermint Test: Introduce (two ounces) of peppermint into each line or stack.

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