

**SECTION 22 05 00
PLUMBING PIPING**

PART 1- GENEAL

- A. Related Sections
 - 1. 220510 Plumbing Specialties.
 - 2. 220640 Plumbing Fixtures.
- B. Reference Standards: American Society for Testing and Materials (ASTM):
 - 1. A74-96 Specification for Cast Iron Soil Pipe and Fittings.
 - 2. B32-96 Specification for Solder Metal.
 - 3. B88-96 Specification for Seamless Copper Water-Tube.
 - 4. B306-96 Specification for Copper Drainage Tube (DWV).
 - 5. C564-95a Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
- C. Submit properly identified manufacturer's literature before starting work.
- D. Shop Drawings:
 - 1. Pipe and Fittings: Manufacturer's name and mill reports.
 - 2. Expansion Joints: Catalog cuts.
 - 3. Dielectric Unions: Catalog cuts.

1.1 COMPONENTS

- 1. Sanitary Sewer Piping, Above Grade.
 - a. Cast Iron Pipe: CISPI 301, hubless, service weight.
 - (1) Fittings: Cast iron.
 - (2) Joints: CISPI 310, neoprene gaskets and stainless-steel clamp-and-shield assemblies.
 - b. Copper Tube: ASTM B306, DWV.
 - (1) Fittings: ASME B16.23, cast bronze, or ASME B16.29, wrought copper, or ASME B16.32, solvent.
 - (2) Joints: ASTM B32, solder, Grade 50B.
- 2. Water Piping, Above Grade.
 - a. Copper Tubing: ASTM B88, Type L hard drawn.
 - (1) Fittings: ASME B16.18 cast copper alloy or ASME B16.22, wrought copper and bronze, solder joint, pressure type.
 - (2) Joints: ASTM B32, solder, grade 95 Tin - Antimony.
- 3. Sanitary Vent Piping.
 - a. Smaller than 2":

- (1) Service weight hubless cast iron with cast iron fittings, or:
 - (2) Copper, Type L, DWV wrought copper fittings.
 - b. 2" and larger:
 - (1) Service weight hubless cast iron.
- 4. Flanges, Unions, And Couplings.
 - a. Pipe Size 3" and Under:
 - (1) Copper tube and pipe: Class 150 bronze unions with soldered joints.
 - b. Pipe Size Over 3":
 - (1) Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
 - c. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
- 5. Valves.
 - a. Provide products complying with requirements of this section from one of the following manufacturers. Model numbers are listed to establish a level of quality only. Products of other manufacturers may be provided subject to compliance with requirements of this section and Section on Substitutions and Product Options.
 - (1) Nibco.
 - (2) Milwaukee.
 - (3) Stockham.
 - (4) Hammod.
 - (5) Watts.
 - b. Ball Valves.
 - (1) Up To and Including 2":
 - (a) Manufacturer/Model:
 - (1) Nibco, Model S-595-Y-66.
 - (2) Milwaukee, Model BA-3505.
 - (3) Hammond, Model 8613.
 - (b) MSS SP-110, Class 150 PSIG, bronze body, full port, 316 stainless steel trim, blowout-proof stem, TFE seats, solder ends.
 - c. Gate Valves.
 - (1) 2-1/2" and 3".
 - (a) Manufacturer/Model:
 - (1) Nibco, Model T-134/S-134.
 - (2) Milwaukee, Model 1150.
 - (3) Stockham, Model B-122/B-124.
 - (4) Hammond, Model IB641/IB648.

- (b) MSS SP-80, Class 150 PSIG, bronze body, bronze trim, rising stem, solid wedge disc, threaded bonnet, solder or screw ends, malleable iron hand wheel.
 - d. Gate Valves.
 - (1) 4" and larger:
 - (a) Manufacturer/Model:
 - (1) Nibco, Model F-617-O.
 - (2) Stockham, Model G-623.
 - (3) Hammond, Model IR114OUL.
 - (b) MSS SP-70, Class 125 PSIG, iron body, bronze trim, OS & Y, bolted bonnet, solid wedge, flanged ends.
- 6. Gas Piping
 - a. Schedule 40 ASTM A-53 Grade B Black Steel with Black Malleable Iron Fittings or Steel welded fittings.

1.2 INSTALLATION

- A. Run piping as indicated in Construction Documents subject to modifications as required to suit field conditions, to avoid interference with other trades, and for proper, convenient, and accessible locations to parts of the piping system.
- B. Run piping in wall chases, recesses, pipe shafts, and hung ceilings where provided.
 - 1. Do not run water piping in floor fill.
 - 2. Run piping as high as possible under building, above ceilings, and close to slabs.
 - 3. Do not permanently close, furr in, or cover piping before examination and final tests.
- C. Run piping straight and where concealed as direct as possible with risers erected plumb and true.
 - 1. Install piping with minimum 1-inch clearance between finished pipe coverings and adjacent work.
 - 2. Support piping from structure above, maintaining maximum headroom available.
- D. Do not run piping in telephone rooms, electrical equipment rooms/closets, transformer vaults or rooms containing related equipment, or close to or above control panels, switchboards and electric motors except required branch piping to pumps.
- E. Provide control valves where noted or required for complete regulating control of systems, plumbing fixtures, and equipment. Provide valves in accessible locations or accessible through access panels.
- F. Fittings, Valves, and Hangers on Chrome Plated Piping: Chrome plated finish to match.
- G. Provide reducing fittings for changes in pipe sizes. Bushings will not be allowed.

- H. Provide extra heavy pipe for nipples where unthreaded pipe is less than 1-1/2".
 - 1. Do not use close nipples. Use saddle nipples.
 - 2. Provide galvanized iron sleeves for pipes passing through roof slabs, interior floors, ceilings, walls, or partitions.
- I. Expansion Swings:
 - 1. Make adequate provisions for proper expansion and contraction of piping and for piping passing through building expansion joints.
 - 2. Make branch connections from risers with ample swing or offset to avoid strain on fittings or short pipe lengths. Anchor horizontal runs of pipe over 50 feet in length to walls or supporting structure about midway of run to allow expansion evenly divided toward ends.
 - 3. Provide sufficient number of elbow swings or accepted expansion joints to allow proper expansion and contraction of mains and risers.
- J. Pipe Slopes:
 - 1. Lay horizontal soil and waste pipes, unless otherwise noted on drawings, to:
 - a. 1/8" per foot minimum for pipe 3 inches and larger
 - b. 1/4" per foot minimum for pipe less than 3 inches
 - c. Horizontal vent lines shall have a minimum grade back to the stacks or vertical lines and shall run as direct and free from bends as possible.
- K. Exposed Piping:
 - 1. Install horizontal runs maximum 4 inches below adjacent structure and run parallel or perpendicular to walls, ceilings, beams, and columns unless otherwise noted on Construction Documents.

1.3 CLEANING AND ADJUSTING

- A. Clean fixtures, equipment, piping, and exposed work.
 - 1. Show traps, wastes, and supplies free and unobstructed.
 - 2. Plated, polished bronze, or painted surfaces bright and clean.
- B. After installation, adjust valves, faucets, and automatic control devices for quiet operation. Balance system as required for proper operation.
- C. Disinfection: After cleaning and testing domestic water system, disinfect by introducing a solution of calcium hypochlorite with 50 parts per million of chlorine.
 - 1. Open and close all valves while system is being chlorinated. After disinfecting agent has been applied for 24 hours, test for residual chlorine at ends of pipe.
 - 2. If less than 5 ppm is indicated, repeat process until it is equal to or greater than 5 ppm or according to AWWA C601 Standards.

1.4 TESTS

- A. Furnish necessary instruments, test equipment, and personnel required to perform

- tests and remove test equipment and drain pipes after tests have been made and accepted
- B. After portions of mechanical work are completed and ready for testing, give 48 hours notice to A/E and perform tests in A/E's presence.
- C. Tests may be made of isolated portions of piping to facilitate the general progress of installation.
1. Revisions subsequently made in piping system shall require retesting of such affected portions of piping systems.
 2. Subject piping and connections to a hydrostatic or pneumatic pressure test before painting, installation of insulation or concealment.
 3. Sanitary and Storm
 - a. Apply a water test to all parts of drainage systems before pipes are concealed or fixtures set in place.
 - b. Close openings of each system to be tested tightly except highest openings above roof and fill entire system with water up to overflow point of highest opening.
 - c. Subject systems to not less than 10 feet of hydrostatic head, except uppermost 10 feet of piping directly below opening.
 - 1) Water shall remain in the systems for not less than 60 minutes after which time no leaks occur at any point and no lowering of water level at overflow point is visible.
 4. Water Supply Piping:
 - a. Apply a pressure test to water system before piping is concealed or insulated and before fixtures and equipment are connected.
 - b. Apply a hydrostatic pressure of not less than 200 psig for 2 hours, with no leaks occurring in the system.
 - 1) Water used for tests shall be obtained from a potable source of supply.

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