

DESIGN REQUIREMENTS

PIPE AND TUBES FOR PLUMBING PIPING AND EQUIPMENT

GENERAL INFORMATION

- 1.1 This section applies to piping systems for domestic hot and cold water, sanitary waste, indirect waste, storm water, natural gas, compressed air, laboratory waste and vents.
 - a. The design documents shall include riser diagrams for each system indicating all major components of the system, isolation and control valves, fixtures, drains, vents, pipe sizes, pressure and/or temperature relief devices, direction of flow, etc.
 - b. The design documents shall include fixture schedules indicating individual fixture types, capacities, sizes and designations.
- 1.2 The specifications shall require the contractor to cover, cap or otherwise protect open ends of all piping during construction to prevent damage to threads or flanges and prevent entry of foreign matter. Water supply piping shall be disinfected.

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- 2.1 Materials and Pipe Fittings:

SERVICE	MATERIAL	WEIGHT	TYPE
Vents Above Ground	Cast iron	ASTM A-888	No-hub Neoprene/Stainless Steel Clamp
Vents Below Ground	Cast iron	Extra heavy	ASTM C-564 Compr. Gasket
Soil & Waste Above Ground (up to 10")	Cast iron	ASTM A-888	No-hub Neoprene/Stainless Steel Clamp
Soil & Waste Above Ground (12" and 15")	Cast iron	Service weight	Lead and Oakum Joints
Soil & Waste Below Ground	Cast iron	Extra heavy	ASTM C-564 Compr. Gasket

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SERVICE	MATERIAL	WEIGHT	TYPE
Leaders Above Ground (up to 10", Low-rise only)	Cast iron	ASTM A-888	No-hub Neoprene/Stainless Steel Clamp
Leaders Above Ground (12" and 15")	Cast iron	Service weight	Lead and Okum Joints
Leaders Above Ground (up to 10")	Galvanized cast iron	Service weight	Screwed or Grooved Mech Coupling
Leaders Below Ground	Cast iron	Extra heavy	ASTM C-564 Compr. Gasket
Indirect Waste	Wrought Copper	Standard	95-5 Solder
Exterior Sanitary & Storm House Sewers	Cast iron	Extra heavy	ASTM C-564 Compr. Gasket
Ejector & Sump Pump Pumped Discharge Above Ground	Galvanized cast iron		Screwed Drainage
Domestic Water & Fire Protection Below Ground	Ductile Iron Class 52		Mechanical
Cold Water Service Below Ground 3" & larger 2" & smaller			
	Wrought Bronze	Standard	95-5 Solder
	Type 'K' Copper	Standard	95-5 Solder
Cold Water Above Ground 4" & smaller 5" & larger			
	Type "L" Copper	Standard	95-5 Solder
	Ductile iron	Class 150	Screwed
Hot Water & Hot Water Circulation Below Ground 2" & smaller 3" & 4" 5" & larger			
	Type "K" Copper	Standard	95-5 Solder
	Type "L" Copper	Standard	95-5 Solder
	Ductile iron	Class 150	Screwed

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SERVICE	MATERIAL	WEIGHT	TYPE
Gas Below Ground	Steel	Standard	Welded
Gas Above Ground 4" & smaller 5" & smaller	Malleable Iron	Standard	Screwed
	Steel	Standard	Welded
Compressed Air	Wrought Copper	Standard	95-5 Solder
Laboratory Vent & Waste Above Ground	Flame Retardant Polypropylene	Schedule 40	Fused Joint
Laboratory Vent & Waste Below Ground	High silicone iron	Standard	Caulk

- 2.2 Drilled 'T' fittings are not acceptable.
- 2.3 Mechanical press fittings are not acceptable.

CONSTRUCTION REQUIREMENTS

- 3.1 Installation of Piping
- Piping shall be run parallel to the axis of the building and arranged to conform to the building requirements and coordinated with ducts, other piping, conduits, etc. Piping shall be run close to the ceiling or other construction, free of traps or bends.
 - Horizontal sanitary waste and storm drainage shall be run at uniform pitch of not less than 1/8 inch per foot for piping 4 inches and larger. Piping 3 inches and smaller shall be pitched at not less than 1/4 inch per foot. Horizontal vent piping shall be pitched downward from the stack to fixtures.
 - Supply and circulating water piping shall be graded for complete drainage of the system. Hose bibs with caps at low points and air vents at high points are required.
 - An adequate number of elbows, swings and offsets shall be provided to permit free expansion and contraction.
 - Use reducers or increasers. Bushings shall not be used.
 - Unions and Flanges:
 - Piping connections under 3 inches to all equipment will be made up with unions and piping 3 inches and larger will be flanged.

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2. Flanges will be of the same weight and pressure rating of adjacent pipe, valves and fittings.
- g. Dissimilar Metals:
1. All pipe, fittings, hangers, etc. of dissimilar metals shall be insulated against direct contact with one another, by using a high quality grade of dielectric material.
- h. Pipe Expansion Joints, Anchors and Guides:
1. The engineer will ensure that adequate provision for expansion has been made in all piping by means of loops, bends or offsets. Where pipe lines join or where branches occur, provisions shall be made for the expansion of both lines.
 2. Guides will be utilized to permit free axial movement only.
 3. Piping will be adequately anchored where necessary to control expansion, pressure thrust and prevent undue strain on the fittings and apparatus. Anchors shall be of heavy construction attached to pipe and secured to structure. The specifications shall require the plumbing contractor to provide the necessary steel for connection to structure.
- i. The specifications shall require the contractor to cover, cap or otherwise protect open ends of all piping during construction to prevent damage to threads or flanges and prevent entry of foreign matter. Water supply piping shall be disinfected.
- j. Where liquid carrying pipes pass over electrical equipment, protection against leaks must be provided. Protection shall consist of 22 gauge galvanized sheet steel pans with 6 inch lip, soldered corners, suitable hangers, waterproof paint. The pan shall be drained to the nearest floor drain or service sink.
- k. All underground piping shall be continuously supported on a firm compacted bed. Backfill material shall be free of rubbish, clay, roots or stones larger than 3 inches. Provide cautionary plastic labeled tape no less than 6 inches and no greater than 12 inches above pipe.
- l. Exterior underground gas piping shall have a minimum cover of 3 feet. Provide cautionary plastic labeled tape no less than 6 inches and no greater than 12 inches above pipe.
- m. Underground water mains shall have a minimum cover of 4 feet. Provide cautionary plastic labeled tape no less than 6 inches and no greater than 12 inches above pipe.
- n. Fittings and steel piping not mill wrapped for gas service and buried in earth must be wrapped and/or coated with two heavy coats of bitumastic.



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3.2 Pipe Testing

a. Underground Water Service Piping:

1. The specifications will require the contractor to hydrostatically test the piping at one and one-half times street main pressure, but not less than 100 psig, in the presence of Columbia University Commissioning Personnel or their designated Commissioning Agent.

b. Sanitary Drainage, Venting, Water and Gas Piping:

1. Every new plumbing and gas piping system and every part of an existing system that has been altered, except for ordinary repair, shall be inspected and tested to comply with the New York City Building Code and Columbia testing procedures, where applicable.

c. Compressed Air Piping:

1. Test at 150 psi for one hour.

3.3 Disinfection

- a. All water supply piping must be disinfected to provide a clean, safe piping system for the transmission of water for human consumption. Disinfection must conform with the requirements of the New York City Building Code.

REFERENCE

- 4.1 The applicable CSI Specification Section is 22 05 03.