



22 1000 –Plumbing Piping and Specialties

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A. General:

1. Provide water hammer arrestors, complete with accessible isolation valve, in hot and cold water lines at the end of each group/bank of plumbing fixtures and at each plumbing fixture location remote from a group of fixtures
2. Isolate domestic water lines for building services from cross connection by means of two code-approved backflow preventers piped in parallel in for each water feed to the building to allow for maintenance without shutting down entire service. Provide additional backflow prevention devices in process water connections and fire system connections off the main building service.
3. Provide backflow preventers at any connection between potable and non-potable water systems.
4. Provide clean-out capability for domestic hot water return piping in recirculating loops.
5. Route groups of pipes parallel to each other with spacing to allow for insulation and valve service.
6. Provide dielectric couplings at connections between dissimilar metals.
7. Provide sectional valves on each branch and riser, close to main, where branch or riser serves 2 or more plumbing fixtures or equipment connections.
8. Provide shutoff valves installed on inlet of each plumbing equipment item and on inlet of each plumbing fixture.
9. Provide drain valves at equipment, bases of risers, and low points in system to completely drain potable water system.
10. Provide balance cocks in each hot water recirculating loop.

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B. Domestic Hot and Cold Water Pipes and Pipe Fitting Schedule:

	Ductile class 53	Copper type L soldered	Copper type L grooved	Copper type K soldered	PVC sch 80 solvent weld	316 Stainless Steel threaded
Potable hot & cold ≤ 2”	--	Yes	--	--	--	--
Potable hot & cold ≥ 2½”	--	Yes	Yes	--	--	--
Potable hot & cold buried	Yes	--	--	Yes	--	--
Lab process water (RO)	--	--	--	--	Yes	--
Lab process DI & purer	--	--	--	--	--	Yes

1. Pipe Size 2 ½” and larger
 - a. Rolled grooved end fittings and couplings for grooved end copper tube (Victaulic or Gruvlok only)
2. Exterior below grade or below concrete slab equipment or fixture supply feeds: Piping shall be Type K copper, soft-annealed temper, with wrought copper fittings and lead free jointing.
3. Underground water main piping systems: All pipe used for underground water piping mains shall be mechanical joint ductile iron pipe

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C. Sanitary Waste & Vent Piping Schedule:

	Cast Iron bell & spigot	Cast Iron No Hub Couplings	Durion	Copper type L soldered	PVC sch 40 solvent weld	Polypropylene mechanical joint	Glass bead joint
Sanitary waste ≤ 2½ ”	--	Yes	--	Yes	--	--	--
Sanitary waste 3” & 4”	--	Yes	--	--	--	--	--
Sanitary waste ≥ 5”	Yes	--	--	--	--	--	--
Sanitary waste buried	Yes	--	--	--	--	--	--
Sanitary vent	Yes	--	--	Yes	--	--	--
Acid waste & vent under cabinets	--	--	--	--	--	Yes	--
Acid waste & vent mains & branches	--	--	Yes	--	--	--	Yes
Acid waste & vent buried	--	--	Yes	--	--	--	--
Storm drain buried straight pipe & elbows	Yes	--	--	--	--	--	--
Storm drain buried tees & wyes	Yes	--	--	--	--	--	--
Storm drain above grade	Yes	--	--	--	--	--	--
AHU condensate drain	--	--	--	Yes	Yes	---	--

D. Piping Specialties

1. Floor Drains and Clean-Outs:

- a. Floor drains in concrete slabs to have floor level trap clean-out large enough to allow the line to be "snaked."
- b. Provide floor drains in all mechanical rooms, restrooms and in the vicinity of safety showers.
- c. Clean-outs on buried drains shall extend through and be installed flush with the floor.



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- d. Clean-outs on overhead drains shall extend through and be installed flush with the floor above.
 - e. Concealed clean-outs shall be provided with an access panel or extend through the wall with a chrome plated cover installed flush with the wall.
 - f. BSU approves and uses several manufacturers for floor drains and cleanouts including, but not necessarily limited to the following:
 - 1) Josam Company; Josam Div.
 - 2) MIFAB, Inc.
 - 3) Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - 4) Tyler Pipe; Wade Div.
 - 5) Zurn Plumbing Products Group; Specification Drainage Operation.
 - 6) Watts Manufacturing
2. Hose Bibbs/Hydrants:
- a. Interior hose bibs shall have an integral vacuum breaker.
 - b. Exterior hose bibs shall be "freeze proof" with drain down to the exterior of the building and shall have an integral vacuum breaker.
 - c. BSU approves and uses several manufacturers for floor drains and cleanouts including, but not necessarily limited to the following:
 - 1) Woodford
 - 2) Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
 - 3) Josam Company
 - 4) Zurn Industries, LLC; Plumbing Products Group; Specification Drainage Products.
3. Backflow Preventers.
- a. Shall be of the reduced pressure zone (RPZ) type.
 - b. The assembly shall include shutoff valves on inlet and outlet, and strainer on inlet.
 - c. Backflow preventers shall include test cocks, and pressure-differential relief valve located between 2 positive seating check valves.
 - d. Provide backflow preventers at any connection between potable and non-potable water systems.
 - e. **Watts, model 909** is the standard model.



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4. Pressure Regulating Valves
 - a. Shall be single seated, direct operated type, bronze body, with integral strainer.
 - b. Provide inlet and outlet shutoff valves and throttling bypass valve.
 - c. Provide pressure gauge on valve outlet.
 - d. BSU's preferred manufacturers are Conbraco and Zurn.

5. Balancing Valves
 - a. Calibrated Type
 - 1) Amtrol
 - 2) B & G
 - 3) Nibco
 - 4) Armstrong

 - b. Memory Stop Type
 - 1) Conbraco
 - 2) Crane
 - 3) Grinnell
 - 4) Nibco

6. Automatic Flow Control Valves
 - a. Flow Design
 - b. Griswold
 - c. Nexus

7. Thermostatic Mixing Valves
 - a. Symmons
 - b. Lawler
 - c. Bradley