

SECTION 15410

PLUMBING PIPING

PART 1 - GENERAL

1.01 SUMMARY

A. Section Includes:

1. Pipe, tube, fittings, joint materials.
2. Plumbing systems
 - a. Water: Domestic, de-ionized, distilled.
 - b. Waste: Storm, sanitary and acid.
 - c. Laboratory: Compressed air, vacuum.

B. Related Sections:

1. Section 15010 - Basic Mechanical Requirements.
2. Section 15050 - Basic Mechanical Materials and Methods:
 - a. Valves.
 - b. Pipe hangers.
 - c. Supports and accessories.
 - d. Identification of piping.
 - e. Freeze protection systems.
 - f. Dielectric pipe fittings and isolators.
 - g. Welding.
 - h. Sleeves.
 - i. Plates and closures.
3. Section 15240 - Mechanical Sound and Vibration Control:
 - a. Piping isolation hangers and supports.
 - b. Flexible piping connectors.
4. Section 15430 - Plumbing Specialties.
5. Section 15440 - Plumbing Fixtures.
6. Section 15450 - Plumbing Equipment.
7. Section 15460 - Special Plumbing Equipment Systems.

1.02 SYSTEM DESCRIPTION

A. Design Requirements:

1. Point of Connection: Normally inside foundation of the building.
2. Maintenance: Isolate areas by sectional valving with easy maintenance access.
3. Piping runs prohibited over or in the following locations:
 - a. Elevator machine rooms.
 - b. Telephone equipment rooms.
 - c. Sensitive instrument and equipment rooms.
 - d. Electrical switch gear, busways and equipment rooms.
4. Domestic Water Supply (from flanged connection within building):
 - a. Service supply pressure can reach 130 psi. Regulate down to 70 psi.
 - b. Select water distribution velocities for minimal noise levels while maintaining

adequate flow. Velocities shall not exceed 7 ft/sec for piping greater than 1 ¼", and shall not exceed 10 ft/100ft head loss for piping 1 ¼" and smaller. **During peak demand and through operation of flushometers, system pressure must maintain the 30 psi minimum manufacturer's requirement of approved fixture at the highest or furthest location of a flushometer, but not less than 30 psi.**

- c. Specify flange connections to valves and equipment for PRV station at each end of the legs, to allow for component replacement.
- d. Provide isolation valve downstream of station.
- e. All branch isolation valves to be within 2 ft. of main.
- f. No dead legs on domestic water lines more than 4 ft.
- g. All lab faucets need to have a vacuum breaker.
- l. No butterfly valves on domestic water systems.

5. Liquid Waste Removal:

- a. The University Sanitary Sewerage System is connected to the City of Boulder Waste Treatment System and must conform with the requirements of the City of Boulder.
 - b. Design sanitary waste systems to allow for future addition of laterals to accommodate 20 percent building revisions in research and laboratory buildings.
 - c. Design acid waste systems to allow for future addition of laterals to accommodate 20 percent expansion of system capacity.
 - d. Per **IPC**, "vent pipe shall rise at least 6 inches in height above flood level of fixture (including floor drains) before offsetting horizontally. If this is not possible, combination waste and vents are required (**University approval required**).
 - e. Special Note: Crosses in lieu of double-wye drainage fittings for common drain between lavatories are prohibited. Staggered tees are preferred. If this is not possible, double-wye drains should be specified with each "dirt leg" vented and a clean-out above the double-wye, above lavatory height.
 - f. The use of sewage ejectors is strongly discouraged. However, if needed, specify duplex submersible ejector pumps.
6. Whenever remodeling, the plumbing systems in those areas need to be brought up to code and UCB standards, unless authorized by UCB personnel.

7. Water Supply for Maintenance:

- a. Provide a service sink with hot and cold water in the main mechanical room(s) of the building. If a water-treatment station is located in the mechanical room, locate the sink within 3 feet, and include a combination emergency eye and body washing devise.
- b. Provide a hose-bibb close to cooling towers and condensers, unless a wall hydrant is available within 20 feet of furthest point of tower.

PART 2 - PRODUCTS

2.01 PIPING MATERIALS

A. Domestic Hot and Cold Water:

1. Copper tube Type K soldered to wrought copper fittings or to cast bronze tensile strength fittings. For tubing less than 2", use low-liquidus/solidus solder, which does not contain lead or antimony, with a shear strength equal or greater than 10,000 psi.

For tubing 2" and above, use 15% silver solder to braze the fittings. Brazer shall have

brazing or medical gas certification. Braze mains in hallways 2" and larger.

Manufacturer: All-State "Aquasafe," Bridgit or approved equal.

2. Provide plastic isolators at all clamps.

B. Interior Storm Drain, Sanitary Sewer, Waste and Vent:

1. Buried Pipe:

- a. Centrifugally-cast iron soil pipe with cast iron drainage fittings.
- b. Joint materials and systems may be bell and spigot with neoprene gaskets and lubricant (preferred), or University-approved "no-hub" with stainless steel bands. Only roof drains and underground sewer piping shall have "super duty" no-hub couplings.

2. Suspended Pipe:

- a. Service weight (SV) cast iron pipe "No Hub System" using hubless cast iron soil pipe couplings certified to withstand a minimum of 13 psig internal pressure.
- b. No-Hub couplings shall be of "super-duty" type, such as Husky Series 4000 or equivalent, for all roof drains.
- c. Where stack pressure may theoretically exceed 50 psig, use couplings with restrained joints horizontal and vertical up to 80 psig.
- d. For pressures above 80 psig, use schedule 40 galvanized steel pipe with thread cast iron drainage fittings. Use teflon tape or compound.
- e. PVC shall not be used for any application within buildings, unless approved by the University.
- f. DWV copper pipe is not allowed. Use type 'L' copper instead.
- g. Clean-outs installed per section: 708 IPC 2003

C. Acid Resistant Drain, Waste and Vent:

1.

Polypropylene:

a.

Manufacturers:

Enfield
Orion
Sloan "Fuseal"

- b. Polypropylene pipe and fittings, Schedule 40, with electrically-induced fusion joints or mechanical joints.
- c. Only mechanical joints shall be used for trap arms, even if fused joints are used elsewhere.

D. Compressed Air:

1. Shop and Industrial Use (less than 250 psi and less than 200F):

- a. Type L copper tubing and wrought copper fittings with soldered joints same as domestic water.

2. Laboratory:

- a. Use tubing material as required by laboratory needs. Follow appropriate methods for soldering to avoid contamination.

E. Laboratory Vacuum: (Classroom and Industrial Use)

1. Type L copper tubing and wrought copper fittings with soldered joints same as domestic water.

F. Distilled and De-ionized Water:

1. Schedule 80 Polypropylene, having no pigments or plasticizers, with compatible valves.

G. For other piping systems consult with UCCS personnel.

PART 3 - INSTALLATION

3.01 INSTALLATION

- A. Specify that all underground plumbing shall be surrounded by a minimum of 6" of "squeegee."
- B. Specify that "all plumbing piping and fixtures shall be installed under the direct, on-site supervision of a journeyman plumber licensed by the State of Colorado. The ratio of plumbing apprentice-helpers shall not exceed two apprentice-helpers for each journeyman."

PART 4 - EXECUTION

Not Used

END OF SECTION

