

SECTION 22 11 16

DOMESTIC WATER PIPING

PART 0 GENERAL

0.01 OPERATING AND MAINTENANCE DATA

- A. Include documentation of inspections and tests performed, including logs, curves, and certificates.
- B. Documentation shall note replacement of equipment or components that failed during testing.

PART 1 PRODUCTS

1.01 MATERIALS

- A. Domestic Hot and Cold Water:
 - 1. Copper tube Type L soldered to wrought copper fittings or to cast bronze tensile strength.
 - 2. Fittings using low-liquidus/solidus solder, which does not contain lead or antimony, with a shear strength equal or greater than 10,000 psi.
 - 3. Meet ASTM B 88.
 - 4. Approved solder/flux manufacturer: All-State Aquasafe 100 or equal.
 - 5. The Viega ProPress and/or Appollo/Elkhart press technology systems are allowed for potable water piping only. System valves to be Viega and/or Appollo ball valves up to 2". Appollo is approved for 2-1/2" sizes and larger.
 - 6. Saddle tee fittings are not allowed on domestic water.
- B. Compressed Air:
 - 1. Shop and industrial use (less than 250 psi and less than 200°F).
 - 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.
- C. Laboratory Vacuum (Classroom and Industrial Use)
 - 1. Type L copper tubing and wrought copper fittings with soldered joints (same as domestic water)

PART 2 EXECUTION

2.01 INSTALLATION

- A. Underground plumbing shall be surrounded by a minimum of 6" of "squeegee."
- B. Pipe shall be accurately cut and set in place without springing or forcing.
- C. Structure of the building shall not be compromised.
- D. Above ground piping shall run parallel with the lines of the building unless otherwise indicated.
- E. Bare, uninsulated pipe shall not bear directly on structural elements so as to transmit sound to the structure or prevent flexible movement of the lines.
- F. Change in direction of piping shall be made with fittings.
- G. Allowance shall be made for expansion and contraction of hot water piping. Provide expansion loops where required.
- H. Braided domestic water piping tubes not allowed on any fixture.
- I. Joints shall be made with fittings of compatible material and for the specific purpose intended.
- J. All domestic water branches to be valved.
- K. Piping runs are prohibited above or in the following locations:

1. Elevator machine rooms.
 2. Telephone or computer equipment rooms.
 3. Sensitive instrument and equipment rooms.
 4. Electrical switchgear, busways and equipment rooms.
- L. Pipes passing through concrete or masonry walls, floors, or roofs shall be provided with pipe sleeves fitted into place at the time of construction.
- M. Caulking of screwed joints or holes is not acceptable.
- N. Maximum waste arm distance between trap and vent (dirty Arm).
1. 1 ¼" and 1 ½" – 3'-0" Max.
 2. 2" – 5'-0" Max.
- O. Minimum water closet waste to be 4" line.

2.02 FIELD QUALITY CONTROL

- A. 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.
- B. Defective work found during tests and inspections shall be corrected and the tests repeated before acceptance.
- C. Plumbing systems shall be tested in accordance with NAPHCC Plumbing Code and other applicable codes.
- D. System Flushing:
1. Before operational tests or disinfection, potable piping systems shall be flushed with potable water.
 2. Sufficient water shall be used to produce a minimum velocity of 2.5 feet/sec through the piping.
 3. Flushing shall continue until all the dirt and other material is removed and the water is not discolored.
 4. Drain the system at low points.
- E. Operational tests shall be performed after flushing and before disinfecting. Operational tests shall last not less than 8 hours for each system and shall include the following:
1. Time, date, and duration of the test.
 2. Water pressure at most remote and highest fixture.
 3. Operation of each fixture and trim.
 4. Operation of each valve, hydrant, and faucet.
 5. Pump suction and discharge pressure (if applicable).
 6. Temperature of domestic water supply. Hot water must reach spout within 30 seconds or less.
 7. Operation of each floor and roof drain (if applicable) by flooding with water.
 8. Operation of each vacuum breaker and backflow preventer.
 9. Operation of the water booster system including pump start and stop pressure (if applicable).
 10. Compressed air reading at each compressor inlet and outlet.
 11. Laboratory piping shall be tested in accordance with the manufacturer's recommendations.
- F. Disinfection:
1. After flushing and operational testing is complete, the domestic hot and cold water system shall be disinfected with chlorinated water.
 2. The chlorination procedure shall be in accordance with AWWA M20.
 3. The chlorinated water shall remain in the system for a minimum of 24 hours.
 4. Each valve shall be opened a minimum of 2 times during the testing period to ensure proper disinfection.

5. After disinfection the piping system shall be flushed so that not more than 25 ppm of chlorine is present.
6. Test results provided to DPS and/or QA.

END OF SECTION 22 11 16