

22 11 18 - Plumbing Piping

1. Introduction

- A. This Design Guideline covers piping systems for building plumbing systems, including, but not limited to:
 - 1. Domestic cold water piping.
 - 2. Domestic hot water piping.
 - 3. Non-potable water piping.
 - 4. Sanitary sewer piping
 - 5. Storm water/rain water piping
 - 6. Vent piping
 - 7. Natural Gas piping

- B. Designers should coordinate with Duke FMD to coordinate selection and execution requirements for piping systems.

2. References

- A. North Carolina State Plumbing Code, 2012
- B. City of Durham Water Quality Division
- C. Duke University Design Guidelines, Section 22 07 00 Insulation for Plumbing Piping

3. Performance Requirements

- A. Piping components and installation shall be capable of withstanding the following minimum working pressure and temperature:
 - 1. Domestic Water Piping: 100 psig at 250 deg F
 - 2. Non-potable Water Piping: 100 psig at 250 deg F
 - 3. Sanitary Waste and Vent Piping: 0 psig at 100 deg F
 - 4. Force Main Piping: 50 psig at 80 deg F
 - 5. Natural Gas Piping:

4. Design Standards

A. The following table illustrates desired piping standards for different plumbing systems:

Service	Size	Fitting Connection	Pipe Connection	Material
Domestic/Potable/ Non Potable Water (Hot & Cold)	Up to 2"	Solder (95/5) or Propress	Solder (95/5) or Propress	Type L copper, hard drawn
	2" to 4"	Brazed or Propress, excetion for Valves, Flanges, Unions may be Solder (95/5)	Brazed or Propress	Type L copper, hard drawn
	6" and larger	Class 125 Flanged, or Brazed	Brazed	Type L copper, hard drawn
Natural Gas	2" and smaller	Threaded (NPT)	Threaded	SCH 40, A53 Gr B Carbon Steel, Seamless
	2-1/2" and larger	Class 150 Flange	Butt Weld	SCH 40, A 53 Gr B Carbon Steel, Seamless

1. Sanitary piping shall be installed per current North Carolina Plumbing Code with exception to piping installed above finished floor. Piping above finished floor shall be cast iron, hubless construction.
2. Storm and roof leader piping shall be installed per current North Carolina Plumbing Code.
3. Valves shall be installed in compliance with Duke University Design Guidelines 23 05 23 – General Duty Valves for Piping. All valves shall be equipped with valve tag and corresponding valve chart located at water entry or plumbing equipment room.
4. Piping shall be insulated in accordance with Duke University Design Guidelines 22 07 00 – Insulation for Plumbing Piping
5. Piping shall be supported in accordance with the North Carolina Plumbing Code.
 - a. Pipe supports mounted to floor shall be grouted in place with non-shrink grout a minimum of 1" prevent rusting from flooding or standing water on floor.
 - b. Wall supports shall be installed in a manner with a minimum of 1" gap between support and floor to prevent rusting from flooding or standing water on floor.

- c. Each hanger/support shall be individually supported from above. Hangers may not be supported from other hangers unless it is designed as such and approved by Duke Utilities and Engineering Services.
 6. T-Drill is not an acceptable form of fitting in any piping application.
 7. Material use should be consistent throughout piping segment. Piping should not transition from one material to another unless previously approved by DUES. The use of dielectric fittings is not acceptable. Where dissimilar metals are joined, the use of a bronze/brass ball valve or fitting is preferred.
 8. Valves to be located at all branch lines off risers. Drains shall be installed downstream of valve.
 9. Vents shall be install at top of all risers to aid in air removal. If an automatic air vent is used, an isolation valve must be between the vent and piping.
 10. All sensors and gauges shall be equipped with an isolation valve at the main to facilitate replacement without a system shut down.
 11. Cleanouts
 - a. Required on risers 18" above fixture flood rim
 - b. Shall have access panels, escutcheon, or other trim device
 - c. Test tees above sanitary tees must be accessible
5. Flushing & Testing
- A. Flushing and testing shall be done in accordance with City of Durham quality requirements.
6. Installation and Performance Requirements
- A. Documents shall include an existing conditions drawing. Existing conditions shall include piping size, location, capacity, etc.
 - B. Confirm installation responsibilities at out-set of project. Installation services will be provided in-house or contracted out.
 - C. Coordinate all required tie-in points with Duke Utilities and Engineering Services.
 - D. Coordinate all commissioning efforts with Duke Utilities and Engineering Services.
 - E. Documents shall include riser diagram as part of drawing set.