

22 07 00 – Insulation for Plumbing Piping

1. Introduction

- A. This section covers insulation systems for plumbing piping 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/roof leader piping
 - 6. Vent piping
 - 7. Natural gas piping
- B. Building Insulation Guidelines are listed in Division 07, Section 07 21 00 of the Duke University Design Guidelines.
- C. Designers should coordinate with Duke FMD to coordinate selection and execution requirements for insulation systems.

2. References

- A. ASHRAE Standard 90.1 – 2007
- B. NC State Energy Code, 2012
- C. NC State Plumbing Code, 2012
- D. USGBC LEED v3.0
- E. Duke University LEED+ Standard

3. Design Standards

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

<u>Service</u>	<u>Marker</u>	<u>Size</u>	<u>Location</u>	<u>Material</u>	<u>Thickness</u>	<u>Finish</u>	<u>Color</u>
Domestic (city) water	DW	2" and smaller	all	fiberglass or mineral wool	1"	Color-coded PVC	green
		2-1/2" and larger	all		1-1/2"	Color-coded PVC	
Non-potable water (NPW)	NPW	2" and smaller	all	fiberglass or mineral wool	1"	Color-coded PVC	brown
		2-1/2" and larger	all		1-1/2"	Color-coded PVC	
		2-1/2" and larger	all		2"	Color-coded PVC	
Domestic Hot water	DHW	2" and smaller	all	fiberglass or mineral wool	1"	Color-coded PVC	light green
		2-1/2" and larger	all		1-1/2"	Color-coded PVC	
Reclaim/re-use/gray water	RECLAIM	All	all	none	n/a	enamel paint	gray
Fire Protection	FP	all	all	none	n/a	none	none
Drain	DRAIN	All	all	none		enamel paint	gray
Gas (natural or syn.)	GAS	All	all	none	n/a	enamel paint	safety yellow
Gas vent	GAS VENT	All	all	none	n/a	enamel paint	safety yellow

B. Insulation thickness should comply at minimum with requirements of current version of ASHRAE standards/requirements. Increased insulation thickness should be utilized if justifiable per project Life Cycle Cost Analysis.

C. Specific installation situations:

1. Any insulation installed outdoors must be jacketed and sealed to prevent moisture penetration.
2. All piping, equipment jacketing must adhere to Duke University Design Guideline regarding Identification of Plumbing Systems (see Section 3A of this section).
3. Any jacketing requiring all service jacket shall be ASJ+ or equivalent type material similar to the jacket provided by Knauff. ASJ shall be puncture resistant conforming to TAPPI Test T803.
4. Concealed piping shall not be jacketed with color coded PVC jacketing as identified in Section 3A. Piping shall be insulated according to required thickness and wrapped in an ASJ+ material.

5. Underground utility piping insulation is not covered in this Design Guideline, as insulation of those systems is typically integral an engineered piping system and must be coordinated and engineered on a project-specific basis.

D. Documentation and Review Requirements:

1. Provide estimated energy usage calculation for all considered insulation systems. This calculation should compare energy usage and estimated costs for baseline (ASHRAE 90.1-compliant) insulation versus proposed higher efficiency models.
2. Insulation selection and specification must be reviewed by Duke FMD and the Commissioning Agent (when applicable) on a project-by-project basis.
3. Specifications shall include an insulation schedule in table format.

E. Installation and Performance Requirements:

1. Confirm installation responsibilities at outset of project. Installation services will be provided in-house or contracted out.
2. Coordinate all required tie-in points with Duke Utilities and Engineering Services (DUES).
3. Coordinate all commissioning efforts with DUES.

F. Piping Insulation:

1. All valves and fittings shall be insulated with preformed fitting insulation. Also provide preformed insulation for all cold and hot surfaces of equipment when available from the manufacturer. Extensions should be installed on small ball valves so that the handle is extended beyond the insulation and is visible and operational.