

SECTION 15250
INSULATION

A. PIPING INSULATION

1. Material for Indoor Above-ground Piping

Pre-molded fiberglass with All Service Jacket; minimum 2 inch longitudinal laps and butt strips.

Pre-molded elastomeric closed cell foam (temperatures < 220°F).

Use Calcium Silicate insulation with aluminum jacket on hot pipes in areas where insulation will suffer physical damage.

At IUPUI:

Use Foamglas w/Pittwrap for underground steam and fiberglass with screwed-on metal jacket in vaults. Use fiberglass (no jacket req'd) for condensate piping in vaults. Encase expansion loops and street crossings in concrete.

2. Thickness

<u>PIPE SYSTEM</u>	<u>TEMPERATURE RANGE</u>	<u>PIPE SIZE</u>	<u>INSULATION THICKNESS</u>
Chilled Water, Domestic Cold Water	40°F to 75°F	1 1/4" & less 1 1/2" & larger	3/4" 1"
Domestic hot water	140°F	1" & less 1 1/4" to 2" 2 1/2" & larger	3/4" 1" 1-1/2"
Hot Water & Condensate	200°F	1" and less 1-1/2" to 2" 2 1/2" and larger	1" 1-1/2" 2"
Steam 15 psig (10 psig for IUPUI)	250° - 300°F	1 1/4" and less 1 1/2" and larger	1-1/2" 2"
Steam 40 psig (50 psig for IUPUI)	300° - 350°F	3/4" and less 1" to 1-1/4" 1-1/2" to 4" 4" and larger	1-1/2" 2-1/2" 3" 4"
Steam 150 psig *	350° - 450°F *	3/4" and less 1" to 3" 4" and larger	2-1/2" 3" 4"
Refrigerant Suction Lines	Below 40°F	1" and less 1 1/4" and larger	1" 1-1/2"

Equipment and Roof Drains	Ambient	All sizes	1"
Condensate drains in ceiling plenums	40°F to 75°F	All sizes	½"

* For IUPUI: Campus steam distribution system pressures and temperatures. If served directly from CTE steam distribution system, pressure and temperature are 250 p.s.i. and 600 °F.

3. Outdoor Piping (Aboveground)

Increase insulation thicknesses in the above table by 1/2 inch for outdoor pipework. Cover insulated lines outdoors with aluminum jacket.

4. Underground Piping

Chilled Water

Pre-insulated ductile iron piping with 1 ½" polyurethane insulation and 100 mils PVC or PE jacket.

For the IUPUI campus, use non-insulated ductile iron. Consult with Campus Facility Services for details.

Steam

Pre-insulated steel piping with mineral wool insulation (cathodically protected, drainable and dryable) and 10 gauge steel conduit with fusion bonded epoxy coating.

Carrier Pipe: Sch 40.

Insulation: - 2" thick up to 8" pipe and 3" for 10" and larger.

IUPUI: Use cellular glass thermal insulation similar to "Pittsburg Corning FoamGlas". Provide PittWrap jacketing for underground applications. In vaults at IUPUI provide fiberglass with metal jacketing. Attach with screws. Use fiberglass (no jacket req'd) for condensate piping in vaults. Encase expansion loops and street crossings in concrete.

Steam Condensate

Pre-insulated Sch 80 steel carrier pipe with 2" polyurethane insulation and FRP or PVC jacket. Steel piping system shall be cathodically protected. IUPUI requires the use of fiberglass insulation in vaults.

5. Vaults at IUPUI

All piping, steam and condensate, in vaults use fiberglass, metal-jacketed on

steam only, and valves, including bonnets, expansion joints, etc, shall use removable blankets. Condensate drip leg must be insulated up to the second welded isolation valve, the steam side of the trap assembly.

6. Installation

Cover valves, fittings and similar items in each piping system with equivalent thickness and composition of insulation as applied to the pipe. Use pre-molded PVC jackets over fittings and flanges except for steam.

B. EQUIPMENT INSULATION

1. Materials

Flexible board fiberglass or rigid fiberglass board or flexible fiberglass or foam or calsil insulation. Cover with Foil-Scrim-Kraft (FSK) jacket.

Note: Calcium Silicate (calsil) is not preferred at IUPUI.

2. Thickness

Insulation thickness on cold equipment shall be 1 inch. Insulation thickness on hot equipment shall be 2 inches.

3. Installation

Provide removable insulation sections to cover parts of equipment which must be opened periodically for maintenance. Removable, reusable insulation jacket is acceptable.

4. Equipment shall include, but not be limited to all pressure vessels, pumps, air separators, etc.

C. DUCTWORK INSULATION

1. Materials

Rigid fiberglass board or Flexible fiberglass insulation. Cover with Foil-Scrim-Kraft (FSK) jacket.

2. Thickness

Thickness of insulation on outside air duct and plenum shall be 2 inches. Insulation thickness on supply-air and return-air duct shall be 1 1/2 inches, increased to 2 inches in machine rooms. A vapor barrier is required on ductwork operating at temperatures below ambient.

3. Installation

When required, all supply and return ducts shall be insulated externally. Installation of interior duct insulation as acoustic lining is prohibited except on transfer ducts not connected to fan systems. Manufacturers' recommendations for installation should be followed.