

230700 HVAC Insulation

Sections Included In This Standard:

- 1.1 Piping Insulation
- 1.2 Equipment Insulation
- 1.3 Ductwork Insulation

(The items in this section are generally considered to be located outside of buildings starting at a maximum distance of 5' outside of the building.)

1.1 PIPING INSULATION

A. GENERAL

- a. No stovepipe cuts on 90's. 22.5 deg cuts (two) are allowed.
- b. Insulation is not allowed to be pushed around elbows (22.5, 45, 90 deg).
- c. Do not use rubber insulation on piping above 1/4" in diameter unless specifically approved by the Facilities Services Division.
- d. Application of insulation shall follow the University of Florida's Environmental Safety and Health Policy on Asbestos Labeling. This can be found on the EH&S website.

B. CHILLED WATER PIPING

1. Provision Requirement:

- a. All chilled water piping shall be insulated as to prevent moisture condensation on exterior surfaces. If condensation occurs at any time during the warranty period, the builder shall be required to re-work the insulation until satisfactory, at no additional expense to owner.
 - b. Provide a vapor barrier to prevent moisture infiltration. Mesh Glass Fabric and mastic are preferred.
 - c. In exposed locations where insulation may be subject to damage, specify a protective aluminum jacket cover in addition to the vapor barrier. Exposed locations that would be considered subject to damage would be
 - i. Any above ground exterior locations.
 - ii. Up to 6' high in mechanical rooms.
2. Above Ground: Foam glass pipe insulation is preferred. Polyiso may be used in applications where when the insulation is disturbed it would be helpful to not generate much dust. i.e. IT rooms where electronics are present.
- a) Pipe size smaller than 6": 1-1/2" thick minimum;
 - b) Pipe size 6" and larger: 2" thick minimum.
3. Underground: See Section 336000 for all underground chilled water pipe insulation requirements.
4. All piping runouts for gauges, thermometers, auto air vents, drains, etc. shall be insulated and sealed with rubber insulating material.

- #### **C. PROCESS WATER PIPING:** All process water piping and equipment shall be insulated with foam glass to prevent moisture condensation on all surrounding surfaces, so as to prevent moisture condensation on exterior surfaces. If condensation occurs at any time during the

warranty period, the project team shall need to investigate and address at no additional expense to owner. In exposed locations where insulation may be subject to damage, specify a protective aluminum jacket cover.

- D. **STEAM AND CONDENSATE PIPING:** The minimum insulation requirements for steam and condensate piping are as follows:
1. Underground: See Section 336000 for all underground chilled water pipe insulation requirements. -
 2. Above Ground: Use calcium silicate piping insulation, minimum 3" thick for steam, 2" for condensate. Fiberglass insulation is not allowed.
 3. Runouts: Piping runouts through 12 feet in length and 2" in diameter may have insulation thickness 1/2" less than indicated above.
 4. Attachments for the insulation below grade: stainless steel wiring, bands, or 16 gauge copper wire, on 9" centers.
- E. **REFRIGERATION PIPING:** All piping shall be insulated with ARMAFLEX PIPE INSULATION (TUBE). In all cases, butt joints and seams are to be sealed with Armaflex 520 Adhesive or, where a low V.O.C. adhesive is required, Armaflex 520 BLV Adhesive. 520 Adhesives are contact adhesives; therefore, in all cases, both surfaces to be joined are coated with adhesive.
1. Nominal wall (insulation) thickness not less than 3/4".
 2. Refrigeration tubing/pipe sizes not to exceed 1". If greater than 1", use foam glass.
 3. Required hangers/straps: Armaflex Insulation Pipe Hangers (IPH) and Nonhalogen Insulation Pipe Hangers (NPH).
 4. All locations where insulation may be subject to damage (to include damage from exposure to UV rays), must specify a protective aluminum jacket cover.
- F. **HEATING HOT WATER SYSTEMS:** Use fiberglass pipe insulation for hot water supply and return.
- G. **CHILLED BEAM SYSTEMS:** Chilled beam piping and equipment shall be insulated with foam glass or polyiso insulation that has a vapor barrier.
1. Nominal wall (insulation) thickness not less than 3/4".

1.2 **EQUIPMENT INSULATION**

- A. **AIR HANDLING EQUIPMENT:** Refer to Section 233000 for the insulation requirements relating to air handling equipment (equipment used to move air through air distribution systems).
- B. **CHILLED WATER EQUIPMENT:** All chilled water equipment shall be insulated so as to prevent moisture condensation on exterior surfaces. If condensation occurs at any time during

the warranty period, the builder shall be required to re-work the insulation until satisfactory, at no additional expense to owner. In exposed locations where insulation may be subject to damage, specify a protective aluminum jacket cover.

1.3 DUCTWORK INSULATION

- A. Insulation on duct work shall be installed with both adhesive and pins.
 - a. Adhere insulation to the duct with 50% coverage using approved insulation adhesive applied in 6" wide swaths with 6-inch spaces between swaths.
 - b. Secure insulation with perforated pins and Tuff-Bond or by self-sticking pins with a 3/8" self-tapping screw. Space on 12-inch centers and 3-inches from all edges. Ducts up through 24-inch wide only require one row of pins. Ducts over 24-inch wide shall have pins spaced as described above.
- B. Insulation: Use 1 1/2" fiberglass exterior insulation, with vapor barrier as a minimum. Cover all joint, rips, tears, punctures and breaks in vapor barrier jacket with 4" wide woven glass fabric tape embedded in vapor barrier, fire resistant adhesive (such as Foster 20-80 vapor barrier). Use of pressure sensitive tape is allowed if covered with mastic
- C. All supply and return air ductwork must be insulated with a minimum value of R-4.
 - a. This encompasses all areas including ceiling cavities. There will be no deviation accepted.
 - b. Ductwork that is greater than 40" wide horizontally shall be insulated with fiberglass insulation board with vapor barrier and pined as described above. Ductwrap insulation (non rigid) shall not be allowed.

D. Internally lined duct work

- a. All internally lined ductwork shall be removed when encountered in a renovation project.
 - i. If connecting new ductwork to existing, internally lined ductwork an astragal (bull nose) at the joint shall be used and attached with screws.
- b. Internally lined duct work is not allowed for normal installation on campus.
 - i. For applications where internally lined duct work is required to meet the requirements of the project:
 - 1. Its use must be approved in writing by the Director of the maintenance organization responsible for the duct work.
 - 2. The only allowed internally lined duct is one with a metal liner over the insulation. Metal liner is allowed to be perforated for noise control.
- E. Supply air grills. Shall be specified as insulated from the factory.
 - a. The preferred type has a lip that connects to the ceiling grid.

1.5 PROTECTION OF MECHANICAL ROOM PIPING AND OUTSIDE PIPING INSULATION:

Provide heavy-duty jacket for all insulated piping (chilled water supply and return, steam, steam condensate, HHW supply and return, AHU condensate, DX system refrigerant, etc.) in all mechanical rooms up to six (6) feet above finish floor elevation. This jacket shall be smooth aluminum (.016" minimum thickness) for straight runs and aluminum, heavy-duty fire retardant material with glass fiber reinforcing or fire retardant PVC (.060" minimum thickness) for preformed fitting covers.

END OF SECTION