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: All chilled water piping 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. (need to specify where damage prone areas are. 6’ up in mechanical rooms, outside of buildings.)

   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. Minimum 2” thick foam glass, with Pittwrap, or equal, for water barrier. Conduit system which consists of 2” Polyurethane foam with a HDPE jacket. Acceptable Manufacturers: Rovanco, Parma-Pipe, Thermacor.

4. All piping runouts for gauges, thermometers, auto air vents, drains, etc. shall be insulated and sealed with rubber insulating material.

B. DOMESTIC WATER PIPING: All domestic water piping and equipment shall be labeled as “Domestic Water” and 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.

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. 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.

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. Conduit system which consists of 2” mineral wool, internal centering guides. System shall have a steel outer conduit casing powder coated or hot dipped galvanized. Calcium silicate is not allowed on steam supply or condensate return piping underground. Pre-insulated piping and conduit shall have either calcium silicate insulation, minimum 3” thick for steam piping and minimum 2” thick for condensate piping or foam glass insulation wrapped with glass fabric cloth and with proper mastics.

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 to prevent moisture condensation on surrounding surfaces.

1. Nominal wall (insulation) thickness not less than 3/4”.

H. RESTRICTION: Do not use any rubber insulation on any piping above 1/4” in diameter unless specifically approved by the Facilities Services Division.
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.

C. RESTRICTION: Do not use any rubber insulation on any piping above 1/4” in diameter unless specifically approved by the Physical Plant Division.

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 swats 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.

D. All internally lined ductwork shall be removed when encountered in a renovation project.
   a. If connecting new ductwork to existing, internally lined ductwork an astragal (bull nose) at the joint shall be used and attached with screws.

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