

230700 HVAC INSULATION

Cornell’s Design and Construction Standards provide mandatory design constraints and acceptable or required products for all construction at Cornell University. These standards are provided to aid the design professional in the development of contract documents and are not intended to be used verbatim as a contract specification nor replace the work and best judgement of the design professional. Any deviation from the Design and Construction standards shall only be permitted with approval of the University Engineer.

PART 1: GENERAL

1.01 RELATED SECTIONS

- A. Section 232300 – Refrigeration
- B. Section 233100 – Air Distribution

1.02 INSULATION

- A. General Requirements for Flexible Elastomeric Insulation:
 1. Acceptable for use in lieu of fiberglass on cold piping (roof leaders, chilled water, condensate drains from cooling units).
 2. Material must meet ASTM E84 25/50 flame spread/smoke developed index.
 3. Use pre-molded roll on pipe sizes 3.5" and below.
 4. Use either pre-molded roll or sheet on pipe sizes 4" and above, adhere insulation on 100% of the pipe. This requirement exceeds the typical industry standard of adhering to lower one-third of pipe on horizontal runs.
 5. Match thickness of fiberglass insulation on all pipe sizes. For piping requiring 1.5" thick insulation using sheet product, provide 2 layers of 3/4" thick insulation.
 6. No exposed cross section edges are permitted.
- B. Insulation for cold piping shall be complete with a continuous vapor barrier.

1.03 PIPE INSULATION JACKETS

- A. Jackets for hot piping shall be factory applied, white, all service jackets composed of reinforced kraft paper and a self-sealing, pressure sensitive longitudinal lap seal.

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- B. Jackets for cold piping shall be the same as for hot piping with the addition of a vapor barrier. Seal all butt joints with 4" wide strips of vapor barrier sealed with vapor barrier adhesive. This requirement exceeds the typical industry standard of using 3" wide strips.
- C. Jacketing in high traffic areas shall be covered with aluminum or PVC.

1.04 FITTINGS, VALVES AND SPECIALTIES

- A. Insulation shall be specified to be installed throughout the length of equipment and piping, including fittings, valves and specialties.
- B. Except for removable covers on pumps, Cornell prefers that insulation be permanently installed on piping specialties such as steam PRV stations, strainers and unions. A label shall be provided identifying the location of the pipe specialty.
- C. When available, insulate fittings with factory pre-molded fittings of the same thickness as adjoining pipe insulation.
- D. When pre-molded fittings are unavailable, use a hydraulic setting cement paste.
- E. Clamps and anchors on cold piping shall be insulated. Full taping of pre-molded fittings is required.
- F. Insulation at pipe strainer flanges shall be arranged for ease of servicing.
- G. Insulation and vapor barriers shall be properly protected at all hangers and penetrations.
- H. Insulated valves shall have extended handle stems so all operators or handles are outside of the insulation system. This is particularly true of high-pressure steam piping.

1.05 PUMPS

- A. Chilled water pumps shall be enclosed in a removable, insulated aluminum box that allows access to the pump with no disruption of piping or electrical connections, or with minimum 1-inch thick, flexible elastomeric insulation (25/50 flame spread/smoke developed index).

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1.06 DUCT INSULATION

- A. All duct insulation shall be complete with a factory applied reinforced aluminum foil vapor barrier, suitably anchored and sealed at all points.
- B. Dedicated outside air system supply ductwork installed in non-conditioned spaces shall be insulated, even if the design temperature difference between the operating temperature and duct plenum is within 15°F. This will allow future operation at lower system discharge air temperatures if needed to provide additional zone humidity control.

1.07 EQUIPMENT INSULATION

- A. Insulate equipment to match adjoining piping insulation.

PART 2: PRODUCTS

2.01 PREFERRED MANUFACTURERS:

- A. Fiberglass Insulation
 - 1. CertainTeed
 - 2. Johns Manville
 - 3. Knauf
 - 4. Manson
 - 5. Owens Corning
- B. Flexible Elastomeric
 - 1. Aeroflex
 - 2. Armacell LLC
 - 3. RBX Corporation

PART 3: EXECUTION

3.01 INSTALLATION SCHEDULE

- A. In addition to the piping system, Cornell requires the consultant to ensure insulation is designed and subsequently installed on the following specialty devices and equipment; which typically exceeds the requirements found in industry master specification documents:
 - 1. Piping specialties, such as valves, flanges, unions and temperature/pressure test ports.
 - 2. Strainers, including the whole body and blowdown valve.

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3. Steam PRV stations
4. Heads/bodies on steam to hot water converters and water-to-water heat exchangers.
5. Steam traps
6. Control valves, including actuators and gearboxes.
7. Low point drain valves
8. Pumps
9. Expansion/compression tanks
10. Air separators

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