

## **Design Standard HVAC Insulation**

### **Purpose:**

The heating, ventilating, and air-conditioning insulation is an essential element of the mechanical systems. This design standard has the purpose of creating a consistent application of insulation requirements throughout the East Side Union High School District therefore achieving a standard of quality for maintenance, energy efficiency, and reliability throughout all renovation and new building projects.

### **Design Standard:**

Design and specify work to include materials and installation of insulation, jackets and accessories for a complete and operable system.

- General:
  - Adhere to the requirements of the California Energy Code – Title 24, latest edition and CBC.
  - Insulation shall be applied on clean, dry surfaces and only after tests and approvals required by the specifications have been completed.
  - All pipe insulation on piping operating below ambient temperature shall be continuous through wall and ceiling openings and sleeves.
  - Insulation on all cold surfaces must be applied with a continuous, unbroken vapor seal. Hangers, supports, anchors, etc., that are secured directly to cold surfaces shall be adequately insulated and vapor sealed to prevent condensation.
  - Specified adhesives, mastics, and coatings shall be applied at the manufacturer's recommended minimum coverage per gallon.
  - Edges of vapor barrier insulation at valve stems, instrument wells, unions, and other raw edges shall be sealed adequately to prevent moisture from penetrating the insulation.
- Fire Hazard Ratings: All insulation shall have composite (insulation jacket and adhesive used to adhere the jacket to the insulation) Fire and Smoke Hazard ratings as tested under procedure ASTM E 84, NFPA 225, and UL 723.
- Insulation Protection Shields
  - To prevent crushing of insulation, insulation protection shields shall be installed at all pipe hangers and supports. Shields shall span an arc of 180°. Provide full size diameter hangers and shields (18 gauge minimum) for piping. Provide 18-inch long, non-compressible insulation section at insulation shields for lines 2 inches and larger.

- Insulation Jacketing
  - Provide aluminum jacketing for all piping located aboveground, outdoors. Jacketing shall be secured to prevent removal without the use of tools.
- Ductwork
  - In general, duct system shall be insulated with fiberglass blanket. Insulation on all cold surfaces shall be provided with a vapor barrier jacket.
  - Ductwork requiring sound attenuation may utilize duct lining with mold, humidity, and erosion resistant surfaces compliant to UL 181.
- Piping
  - In general, piping systems shall be insulated with fiberglass piping insulation with an all-purpose jacket. Fittings, flanges, and valves shall be insulated with fiberglass inserts and premolded polyvinyl or PVC jackets.
  - Refrigerant piping systems shall be insulated with elastomeric pipe insulation.
  - Calcium silicate or high-temperature fiberglass shall be used in high temperature applications.
  - Special insulation protection shall be considered for areas subject to abuse and moisture, such as outside areas, wash-down areas, public areas, and classrooms.
  - Removable insulated jackets shall be provided on all valves.
- Equipment: At a minimum, the following equipment shall be provided with insulation:
  - Air eliminators
  - Boilers
  - Chilled water pump bodies
  - Hot water storage tanks
  - Heat exchangers
  - Cold surfaces of chillers
  - Flue pipe
  - Engine exhaust
  - Pumps operating above or below ambient temperatures

### **Approved Manufacturers:**

- Armacell LLC Armaflex
- Certainteed
- Johns Manville
- Knauf
- Owens-Corning Brady

### **Substitutes Allowed:**

Yes, if performance and quality equivalency can be evidenced.

### **Associated Design Standards and Construction Specifications**

- Division 23 HVAC Design Standards

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