

CHAPTER 15C

MECHANICAL INSULATION

15C-01 GENERAL

This chapter covers field-applied insulation. Factory applied insulation is specified under the equipment, duct, or piping to be installed, as detailed in the specification.

15C-02 IDENTIFICATION OF MATERIAL

All packages or standard container of insulation, jacket material, cements, adhesives, and coatings delivered for use, and all samples shall have a manufacturer\*s stamp or label attached giving the name of the manufacturer, brand, and a description of the material.

15C-03 SHOP DRAWINGS

a. It is the inspector\*s responsibility to determine that all insulation related materials are approved well in advance of their actual need on the job.

b. After approval of materials and prior to insulating any pipe the contractor will submit for approval sample insulation boards, or approved standards, showing his proposed methods of mechanical insulation, including cut-a-way sections, insulation, coverings, and finish of completed work. Approved sample boards will be maintained by the contractor at the jobsite for the duration of the work.

15C-04 SURFACE BURNING CHARACTERISTICS

a. Check underwriters labels and test certificate of all insulating materials and accessories for not exceeding a flame spread rating of 25 or a smoke developed rating of 50, as determined by ASTM E 84.

b. Check specification for limitations on surface burning characteristic.

15C-05 MECHANICAL INSULATION

a. Ductwork insulation

(1) Distinguish between areas requiring flexible type insulation and those requiring rigid or semi-rigid type insulation.

(2) Check the type and thickness of insulation and requirements for vapor barrier.

(3) Check the method of fastening insulation to exterior or interior of duct.

(a) If metal pins are used, check the type and spacing.

(b) If wire is used, see that corners of insulation are protected from possible damage.

(c) Verify adhesive materials are correct, and area specified receives proper coverage.

1 Dec 92

(4) Make a careful check for breaks in insulation and vapor barriers.

(5) See that materials are fire-retardant or noncombustible as required by the specifications.

(6) When equipment casings are required to be insulated, check for proper application. See that application is firm.

(7) Where insulation is subject to mechanical damage, check for protection requirements.

(8) Check for continuity of insulation through walls and floor, if required.

(9) Check for proper sealing of insulation to diffusers, grills, and fire dampers.

b. Pipe Insulation

(1) Determine whether the material on the job has been approved for the particular piping being installed. Make sure insulations, vapor barriers, adhesives and sealers are noncombustible or fire retardant as specified.

(2) Note that heated water piping is insulated differently from chilled water piping and from combination chilled and heated water piping.

(3) Check thickness of insulation and of vapor barrier.

(4) Determine that insulation jackets which are exposed to view are paintable.

(5) Examine the requirements for the insulation of flangers, fittings, and valves, and assure compliance with the requirements.

(6) Check the lap and the sealing at joints.

(7) Be very careful to see that there are no breaks in the vapor barrier. Watch for later damages during construction.

(8) Check specification requirements for extending through sleeves in walls, floors, and ceilings; chilled water lines inside cabinets of fan coil units should be covered as required to prevent condensate dripping on floor.

(9) Make sure that pipe hangers are installed over insulation. Metal shields to be provided between hanger ring and insulation. High density insulation inserts shall be installed with a length equal to length of metal shield.

(10) Check for the neat termination and seal of insulation at the end of insulation.

(11) Know the special requirements for insulation and jacketing of piping exposed to weather.

(12) Check the installation, the width, and the spacing of the bands used on pipe jacketing.

(13) In chilled-water and hot-water combination piping check for vapor seal requirement on boiler piping.

15C-06 DUCTS NOT REQUIRING INSULATION

a. Site-erected casings and plenums constructed of factory insulated sheet metal panels.

b. Ducts shown to be acoustically lined, provided sufficient thickness of liner is specified.

c. Supply and return ducts in air conditioned or heated spaces, unless otherwise shown.

d. Return ducts in ceiling spaces when roofing is insulated. Ceiling space shall be defined as those spaces between the ceiling and bottom of floor deck or roof deck inside the heated space insulated envelope.

e. Supply and Return Ducts made out of faced fiber glass insulating board. Check on sealing joints between individual duct sections, thickness, and connections.

15C-07 INSULATION FOR RECTANGULAR AND ROUND DUCTS

a. Check flexible type insulation used on concealed ducts for specified minimum density, usually 3/4 pcf for rectangular ducts.

b. Check rigid type insulations used on exposed ducts for specified minimum density, usually 3 pcf for rectangular ducts.

c. Check for flexible type insulation specified for round duct, usually a minimum density 3/4 pcf.

d. Check for specified vapor barrier jacket on exposed insulation, either factory applied or field applied.

e. Check specification for requirement for factory applied or field applied vapor barrier on insulation on concealed duct.

f. Check rigid fiber glass duct installation method to insure accessibility for maintenance of coils, vanes, and fan motors used in the HVAC duct system.

15C-08 INSULATION FOR HOT EQUIPMENT

a. Check specification to determine if insulation is required to be rigid block or semi-rigid board.

b. Check for specified type of material and thickness of insulation being installed.

c. Form or fabricate insulation to fit equipment.

d. On round equipment insulation edges will be beveled to insure tight joints.

e. Check joints for being tightly butted, being filled with mineral fiber, or insulation cement.

f. Check specifications and manufacturers recommendation on spacing of bands. Spacing will not be less than 12 inches on centers.

1 Dec 92

g. Check for excessive use of wires in lieu of bands. Check for insulation corner protectors under wires.

h. Check hot ducts and equipment for specified finish

i. Check for continuity of insulation thru walls and floors.

#### 15C-09 INSULATION FOR COLD EQUIPMENT

a. Check dual temperature equipment, which operates at 60F or below at any time, for insulation as specified for cold equipment. Check specification for pump insulation. It may vary from flexible, rigid, or semi-rigid type insulation. Check all other equipment for specified insulation..

b. Check insulation for thickness specified.

c. Check installation of vapor barrier.

d. Check drain pans under pumps for insulation underneath.

a. Check cold duct and equipment insulation. finish, in accordance with specifications.

#### 15C-10 ABOVE GROUND PIPE INSULATION

a. Check contract specifications to determine type of insulation required on pipelines within the structure.

(1) Normally, domestic hot water, steam, condensate, hot water heating, heated oil, and water defrost lines are insulated as hot pipelines.

(2) Normally domestic cold water, interior roof drains, refrigerant suction lines, chilled water and dual temperature water line, air-conditioner condensate drain pipelines, exposed to weather drainage piping, and piping which operates at 60F or below at any time, are insulated as cold pipelines.

b. Check exterior piping for being insulated as required by specifications for piping exposed to weather.

c. Check specifications for areas which are to receive factory-applied vapor barrier jackets, field applied aluminum jackets, and field applied vapor barrier.

#### 15C-11 PIPING EXPOSED TO WEATHER

a. Check to see that pipe is insulated and jacketed for applicable service. Note that vapor barrier is not normally specified for hot pipelines.

b. Check to see if specified jacket is aluminum.

c. Check to see if jacket is required to be factory applied or field applied.

(1) Check to see if aluminum jacket laps not less than 2 inches at all joints.

(2) Check banding requirements for the jacket.

(3) Check to see that horizontal joints are lapped downward to shed water, and that vertical joints are sealed with a water proof coating.

(4) Check specifications for special treatment of flanges, couplings, unions, valves, fittings and anchors.

#### 15C-12 BELOW GROUND PIPE INSULATION

a. Check all below ground domestic hot water heating, heating hot water to 200F, dual temperature water, and chilled water piping for specified insulation. Generally the insulation is 1 1/2-inch thick cellular glass.

b. Cellular glass insulation.

(1) Check to see that bore surfaces of insulation are coated with a thin application of high strength gypsum cement, as recommended by manufacturer.

(2) Check to see that insulation joints are

(a) Staggered, one-half overlapping the next opposite half section.

(b) All joints are tightly butted and seated with bedding compound.

(c) Insulation secured with 2 stainless steel bands per section of insulation.

(d) Insulation termite at anchor blocks.

(e) Insulation is continuous thru sleeves and manhole.

(f) Backfill around and three inches above the insulation to be free of stones larger than 1/4 in any dimension.

(g) Insulation extends two inches inside of building\*s interior and tightly butted, sealed, and vapor barrier coated to interior piping.

(h) Check for special insulation requirements for flanges, couplings, unions, valves and fittings.

c. Check finish of insulation for 2 coats of mastic with glass cloth or tape embedded between coats. Check for proper overlap at all joints.

(1) Check wet film thickness of both coats of mastic to meet specifications requirements.

(2) Check termination points to see that mastic and cloth or tape covers the end of of the insulation and extends along the base pipe as required by the specifications.