

SECTION 230713 - DUCT INSULATION

PART 1 - GENERAL

1.1 SUBMITTAL REQUIREMENTS

A. Product Data

1. For each type of product indicated. Include thermal conductivity, water-vapor permeance thickness, and jackets (both factory- and field-applied if any).
2. Schedule: Submit schedule showing insulation products which will be used for each application, indicating thickness, density, and accessories.
3. Zero Clearance, Fire Rated Ductwork Fire Wrap product shall include an ICC-ES Report (International Code Council -Evaluation Service) including installation instructions for the product being submitted for use.

B. Shop Drawings

1. Include plans, elevations, sections, details, and attachments to other work.
2. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
3. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
4. Detail application at linkages of control devices.
5. Schedule: Submit schedule showing insulation products which will be used for each application, indicating thickness, density, installed R-values and accessories.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ANSI/ASTM E 84 and NFPA 255, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
- B. Installed R-Values for insulation on ducts shall comply with local mechanical and energy code as required for indoor applications.
- C. Kitchen exhaust duct wrap shall meet ICC ASTM E 2336.

2.2 INSULATION MATERIALS

A. Manufacturers

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corp..
 - b. Johns Manville.
 - c. Knauf Insulation.
 - d. Owens Corning.

B. Interior (indoor) ductwork insulation shall have a minimum installed thermal resistance value of R6 or code minimum, whichever higher.

C. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, without facing and with vapor barrier Type II with factory-applied kraft paper, reinforcing scrim, aluminum foil and vinyl jackets.

D. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IB. For duct and plenum applications, provide insulation without facing and with vapor barrier with factory-applied kraft paper, reinforcing scrim, aluminum foil and vinyl jacket.

E. Vapor Barrier Material for Ductwork: Paper-backed aluminum-foil, except as otherwise indicated; strength and permeability rating equivalent to factory-applied vapor barriers on adjoining ductwork insulation, where available; with following additional construction characteristics:

1. High Puncture Resistance: Low vapor transmission (for ducts in exposed, high traffic areas susceptible to damage: Mech. Rooms, etc.)
2. Moderate Puncture Resistance: Medium vapor transmission (for ducts in concealed areas).

2.3 ZERO CLEARANCE, FIRE RATED DUCTWORK WRAP

A. Manufacturers

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corp.; FlameChek.
 - b. Johns Manville; Firetemp Wrap.
 - c. 3M; Fire Barrier Wrap Products.
 - d. Unifrax Corporation; FyreWrap.

- B. Fire-Rated Board: Structural-grade, press-molded, xonolite calcium silicate, fireproofing board suitable for operating temperatures up to 2000 degrees F. Comply with ASTM C 656, Type II, Grade 6. Tested and certified to provide a 2-hour fire rating by an NRTL acceptable to authorities having jurisdiction.
- C. Provide flexible fire resistive duct enclosure/wrap per ASTM E2336. Insulation shall be a lightweight non-asbestos, high temperature, inorganic, ceramic fiber blanket totally encapsulated in foil/scrim having a service temperature range up to 2000 degrees F. Insulation is a 2 hour fire resistive rating, by an NRTL acceptable to authorities having jurisdiction.
- D. Use as a Type 1 kitchen exhaust air duct enclosure as a shaft alternative and a method for providing zero inch clearances around commercial kitchen grease duct exhaust systems to combustible materials. Provide 2 layers of insulation per code.
- E. For access doors that are part of the tested enclosure systems, FireMaster F2-HT-XL3, or approved equal access doors, are acceptable.

2.4 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated and provided per the field-applied jacket manufacturer's recommendations.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Johns Manville; Zeston.
 - b. P.I.C. Plastics, Inc.; FG Series.
 - c. Proto Corporation; LoSmoke.
 - d. Speedline Corporation; SmokeSafe.
 - 2. Color: White.

2.5 FIELD APPLIED JACKET CORNER ANGLES

- A. Aluminum Corner Angles: 0.040 inch thick, minimum 1 by 1 inch, aluminum according to ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. Extend ductwork insulation without interruption through walls, floors and similar ductwork penetrations, except where otherwise indicated

- B. Lined Ductwork: Except as otherwise indicated, omit insulation on ductwork where internal insulation or sound absorbing linings have been installed. Duct lining thermal resistance value shall comply with external duct wrap requirements.
- C. Seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
 - 1. Install insulation continuously through hangers and around anchor attachments.
 - 2. Extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
 - 3. Install insert materials and install insulation to tightly join the insert.

3.2 DUCT INSULATION SCHEDULE

- A. All ductwork shall be insulated except:
 - 1. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
 - 2. Factory-insulated flexible ducts.
 - 3. Factory-insulated plenums and casings.
 - 4. Flexible connectors.
 - 5. Vibration-control devices.
 - 6. Factory-insulated access panels and doors.
 - 7. Supply ductwork exposed in conditioned spaces. Supply ductwork in mechanical rooms, plenums, server rooms and electric equipment rooms shall be insulated.
 - 8. Toilet exhaust, general exhaust and return ductwork in an insulated joist space, insulated attic space or exposed in conditioned spaces.
- B. Ductwork penetrating building envelope
 - 1. Insulate all ductwork penetrations at the building envelope. Insulate all interior ductwork from the envelope penetration back to ten feet minimum. Insulate all exterior ductwork from the envelope penetration to the terminus with 2" thick elastomeric insulation with aluminum jacket.
- C. Grilles, Registers, and Diffusers:
 - 1. Provide insulation on collar and backside of supply diffusers in all ceiling spaces. Provide insulation on plenum box of all supply grilles & registers in all ceiling spaces.
 - 2. All transfer air ducts shall be provided with acoustic lining unless otherwise noted on drawings.

3.3 KITCHEN TYPE 1 EXHAUST DUCTWORK REQUIRED TO BE FIRE WRAPPED

- A. Insulate with two (2) layers of 1-1/2" thickness foil encapsulated fire resistive duct wrap, total thickness is 3".
- B. Install with 1" high performance filament and 3" aluminum foil tape to seal blanket edges. Provide 304 Carbon Steel banding for 2 hour ratings, steel angle opening frame, 16 gage access cover 1/4" diameter thread rods 5" long and fire stop materials. Install according to manufacturer's installation instructions.
- C. Secure system to ducts and duct hangers and supports to maintain a continuous fire rating.
- D. Insulate duct access panels and doors to achieve same fire rating as duct.
- E. Install firestopping at penetrations through fire-rated assemblies.

3.4 PENETRATIONS

- A. Insulation installation through assemblies: Provide insulation continuously through assembly penetrations.
 - 1. For applications requiring only indoor insulation, terminate insulation beyond exterior surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
 - 2. Seal penetrations to maintain assembly rating.

END OF SECTION 230713