SECTION 23 0713 - DUCT INSULATION

PART 1 - GENERAL

1.01 SECTION INCLUDES

A. Duct insulation.

B. Insulation jackets.

1.02 RELATED SECTIONS

A. Drawings and General Provisions of the Contract apply to this section.

1.03 REFERENCES

A. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

B. ASTM B 209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric).

C. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.

D. ASTM C 553 - Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.

E. ASTM C 612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.

F. ASTM C 1071 - Standard Specification for Fibrous Glass Duct Lining Insulation (Thermal and Sound Absorbing Material).

G. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

H. ASTM E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials.

I. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

J. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association.

K. SMACNA (DCS) - HVAC Duct Construction Standards - Metal and Flexible; Sheet Metal and Air Conditioning Contractors' National Association.

L. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.

M. NFPA 96 - Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations; National Fire Protection Association.

1.04 SUBMITTALS

A. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

B. Samples: Submit two samples of any representative size illustrating each insulation type.

C. Manufacturer's Instructions: Indicate installation procedures which ensure acceptable workmanship and installation standards will be achieved.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section with not less than three years of documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified in this section, with minimum three years of experience.

1.06 DELIVERY, STORAGE, AND PROTECTION

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.07 ENVIRONMENTAL REQUIREMENTS

A. Maintain ambient temperatures and conditions required by manufacturers of adhesives, mastics, and insulation cements.

B. Maintain temperature during and after installation for minimum period of 24 hours.

PART 2 - PRODUCTS

2.01 REQUIREMENTS FOR ALL PRODUCTS OF THIS SECTION

A. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E 84, NFPA 255, or UL 723.

2.02 GLASS FIBER, FLEXIBLE

A. Manufacturer:

1. Knauf Fiber Glass

2. Johns Manville Corporation

3. Owens Corning Corp

4. CertainTeed Corporation;

B. Insulation: ASTM C 553; flexible, noncombustible blanket.

1. 'K' value: 0.30 at 75 degrees F, when tested in accordance with ASTM C 518.

2. Maximum Service Temperature: 450 degrees F.

3. Maximum Water Vapor Sorption: 5.0 percent by weight.

C. Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.

2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E 96/E 96M.

3. Secure with pressure sensitive tape.

D. Vapor Barrier Tape:

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive. Compatible with insulation manufacturer's vapor barrier.

E. Outdoor Vapor Barrier Mastic:

1. Manufacturers:

a. Foster Model Safetee HI.

2. Vinyl emulsion type acrylic or mastic, compatible with insulation, black color.

F. Tie Wire: Annealed steel, 16 gage.

2.03 GLASS FIBER, RIGID

A. Manufacturer:

1. Knauf Fiber Glass

2. Johns Manville Corporation

3. Owens Corning Corp

4. CertainTeed Corporation;

B. Insulation: ASTM C 612; rigid, noncombustible blanket.

1. 'K' value: 0.24 at 75 degrees F, when tested in accordance with ASTM C 518.

2. Maximum service temperature: 450 degrees F.

3. Maximum Water Vapor Sorption: 5.0 percent.

4. Maximum Density: 8.0 lb./cu. ft.

C. Vapor Barrier Jacket:

1. Kraft paper with glass fiber yarn and bonded to aluminized film.

2. Moisture Vapor Permeability: 0.02 perm inch, when tested in accordance with ASTM E 96/E 96M.

3. Secure with pressure sensitive tape.

D. Vapor Barrier Tape:

1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive. Compatible with insulation manufacturer's vapor barrier.

2.04 KITCHEN GREASE HOOD EXHAUST DUCT INSULATION

A. All kitchen grease hood exhaust ducts shall be insulated with lightweight, non-asbestos, inorganic foil encapsulated ceramic fiber blanket duct wrap. The thickness of the duct wrap shall be as recommended by the manufacturer to provide the equivalent resistance characteristics of a 2-hour fire-rated shaft enclosure.

B. The duct wrap system shall be UL listed, and shall provide "zero inch" clearance to combustible materials in conformance with the latest edition of NFPA 96.

C. The duct wrap shall be installed in accordance with the manufacturer's instructions, and the requirements of NFPA 96.

D. The grease hood exhaust duct wrap system shall be 3M Fire Barrier Duct Wrap 15A, or similar product by CertainTeed, Pyroscat, or approved equal.

2.05 JACKETS

A. Canvas Jacket: UL listed 6 oz./sq. yd. plain weave cotton fabric treated with dilute fire retardant lagging adhesive.

1. Lagging Adhesive:

a. Compatible with insulation.

B. Aluminum Jacket: ASTM B 209 (ASTM B 209M).

1. Thickness: 0.016 inch or 0.020 inch sheet.

2. Finish: Smooth.

3. Joining: Longitudinal slip joints and 2 inch laps.

4. Fittings: 0.016 inch thick die shaped fitting covers with factory attached protective liner.

5. Metal Jacket Bands: 3/8 inch wide; 0.015 inch thick aluminum.

6. Metal Jacket Bands: 3/8 inch wide; 0.010 inch thick stainless steel.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Verify that ducts have been tested before applying insulation materials.

B. Verify that surfaces are clean, foreign material removed, and dry.

3.02 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install in accordance with NAIMA National Insulation Standards.

C. Insulated ducts conveying air below ambient temperature:

1. Provide insulation with vapor barrier jackets.

2. Finish with tape and vapor barrier jacket.

3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.

4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

5. Insulate body of all supply air diffusers and registers.

D. Insulated ducts conveying air above ambient temperature:

1. Provide with standard vapor barrier jacket.

2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

E. Ducts Exposed in Mechanical Equipment Rooms or Finished Spaces: Finish with canvas jacket sized for finish painting or aluminum jacket.

F. Exterior Applications: Provide insulation with vapor barrier jacket. Cover with caulked aluminum jacket with seams located on bottom side of horizontal duct section.

G. External Duct Insulation Application:

1. Secure insulation with vapor barrier with wires and seal jacket joints with vapor barrier adhesive or tape to match jacket.

2. Seal joints, pins and washers with vapor barrier compound equal to Foster 60-25, reinforced with open mesh glass fiber, or approved method.

3. Install without sag on underside of duct. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift duct off trapeze hangers and insert spacers.

4. Seal vapor barrier penetrations by mechanical fasteners with vapor barrier adhesive.

5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

H. Metal Corner Reinforcement:

1. Provide insulation stops and metal corner reinforcement at all openings in insulation for access doors, panels, control instruments, and damper operators.

2. Fabricate from galvanized steel, and finish with no raw edges showing.

I. Kitchen Grease hood Exhaust Duct Insulation: Apply ceramic fiber duct wrap in multiple layers, with staggered joints and continuous vapor barrier seal.

J. Provide 20-mil thickness PVC jacket on all ductwork, color as directed.

3.03 SCHEDULES

A. Combustion Air Duct:

1. Rigid Glass Fiber Duct Insulation: 3 inches thick.

2. Rigid Glass Fiber Duct Liner Insulation: 3 inches thick.

B. Exhaust Ducts Within 10 feet of Exterior Openings: Flexible wrap, 1-1/2 inches thick.

C. Exhaust Ducts Exposed to Outdoor Air: Rigid board, 2 inches thick.

D. Outside Air Intake Ducts: Rigid board, 3 inches thick.

E. Plenums: Rigid board, 2 inches thick.

F. Plenums (Cooling System): Rigid board, 2 inches thick.

G. Ventilation Equipment Casings: Rigid board, 2 inches thick.

H. Supply, Relief and Return Ducts in Mechanical Rooms: Rigid board, 2 inches thick.

I. Supply and Return Ducts From Fans to Vertical Ducts in Shafts: Rigid board, 2 inches thick.

J. Supply and Return Ducts in Vertical Shafts: Rigid board, 2 inches thick.

K. Supply ducts After Heat Pumps: Flexible wrap, 1-1/2 inches thick.

L. Low Temperature Supply Ducts (below 52 degrees F): Flexible wrap, 2-1/2 inches thick.

M. Ducts Exposed to Outdoors: Rigid board, 3 inches thick.

N. Return Ducts Above Ceilings: Flexible wrap, 1-1/2 inches thick.

O. Existing Insulation Damaged by New Work: Repair and seal to match existing thickness and conditions.

END OF SECTION 23 0713