

SECTION 233116 - NONMETAL DUCTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Fibrous-glass ducts and fittings.

1.2 PERFORMANCE REQUIREMENTS

- A. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.3 SUBMITTALS

- A. Product Data: For each type of duct.
- B. Shop Drawings:
 - 1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
 - 2. Duct layout indicating sizes and pressure classes.
 - 3. Fittings.
 - 4. Seam and joint construction.
 - 5. Penetrations through fire-rated and other partitions.
- C. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
 - 1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
 - 2. Suspended ceiling components.
 - 3. Structural members to which duct will be attached.
 - 4. Penetrations of smoke barriers and fire-rated construction.
 - 5. Items penetrating finished ceiling including the following:
 - a. Lighting fixtures.
 - b. Air outlets and inlets.
 - c. Speakers.
 - d. Sprinklers.
 - e. Access panels.
 - f. Perimeter moldings.

1.4 QUALITY ASSURANCE

- A. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-Up."
- B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."
- C. NFPA Compliance: NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."

PART 2 - PRODUCTS

2.1 FIBROUS-GLASS DUCTS AND FITTINGS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. CertainTeed Corporation; Insulation Group.
 - 2. Johns Manville.
 - 3. Knauf Insulation.
 - 4. Owens Corning.
- B. Fibrous-Glass Duct Materials: Resin-bonded fiberglass, faced on the outside surface with fire-resistive FSK vapor retarder and with a smooth fiberglass mat finish on the air-side surface.
 - 1. Duct Board: Factory molded into rectangular boards.
 - 2. Temperature Limits: 40 to 250 deg F inside ducts; 150 deg F ambient temperature surrounding ducts.
 - 3. Maximum Thermal Conductivity: 0.24 Btu x in./h x sq. ft. x deg F 75 deg F mean temperature.
 - 4. Moisture Absorption: Not exceeding 5 percent by weight at 120 deg F and 95 percent relative humidity for 96 hours when tested according to ASTM C 1104/C 1104M.
 - 5. Permeability: 0.02 perms maximum when tested according to ASTM E 96/E 96M, Procedure A.
 - 6. Antimicrobial Agent: Compound shall be tested for efficacy by an NRTL, and registered by the EPA for use in HVAC systems.
 - 7. Noise-Reduction Coefficient: 0.65 minimum when tested according to ASTM C 423, Mounting A.
 - 8. Required Markings: EI rating, UL label, and other markings required by UL 181 on each full sheet of duct board.
- C. Closure Materials:
 - 1. Two-Part Tape Sealing System: Comply with UL 181A; imprinted by the manufacturer with the coding "181A-M," the manufacturer's name, and a date code.
 - a. Tape: Woven glass fiber impregnated with mineral gypsum.
 - b. Minimum Tape Width: 3 inches.
 - c. Sealant: Modified styrene acrylic.
 - d. Water resistant.
 - e. Mold and mildew resistant.

- f. For indoor applications, use sealant that has a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
 - g. Sealant shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. Fabrication:
 - 1. Select joints, seams, transitions, elbows, and branch connections and fabricate according to SMACNA's "Fibrous Glass Duct Construction Standards," Chapter 2, "Specifications and Closure," and Chapter 4, "Fittings and Connections".
 - 2. Fabricate 90-degree mitered elbows to include turning vanes.
 - 3. Reinforcements: Comply with requirements in SMACNA's "Fibrous Glass Duct Construction Standards," Chapter 5, "Reinforcement" for channel- and tie-rod reinforcement materials, spacing, and fabrication.

2.2 HANGERS AND SUPPORTS

- A. Hanger Rods: Cadmium-plated steel rods and nuts.
- B. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

- A. Install ducts with fewest possible joints.
- B. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- C. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- D. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- E. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Division 23 Section "Air Duct Accessories" for fire and smoke dampers.
- F. Protect duct interiors from the moisture, construction debris and dust, and other foreign materials.

- G. Install fibrous-glass ducts and fittings to comply with SMACNA's "Fibrous Glass Duct Construction Standards."

3.2 HANGER AND SUPPORT INSTALLATION

- A. Install hangers and supports for fibrous-glass ducts and fittings to comply with SMACNA's "Fibrous Glass Duct Construction Standards," Chapter 6, "Hangers and Supports."
- B. Building Attachments: Concrete inserts or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 - 1. Install concrete inserts before placing concrete.
- C. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

3.3 DUCT CLEANING

- A. Clean the following components by removing surface contaminants and deposits:
 - 1. Air outlets and inlets (registers, grilles, and diffusers).

3.4 DUCT SCHEDULE

- A. Apartment Units:
 - 1. Supply Ducts:
 - a. Material: Fibrous-Glass Duct Board
 - b. Pressure Class: Positive or Negative 2-inch wg.
 - c. Minimum SMACNA Seal Class: A.
 - d. SMACNA Leakage Class for Rectangular: 6.
 - e. Minimum Board Thickness: Minimum thickness required to obtain the R-values indicated below, but no less than 1-1/2 inches thick.
 - 1) Unventilated Attic Above Insulated Ceiling: Minimum R = 8.0
 - 2) All Other Locations: Minimum R = 6.0
 - 2. Return Ducts:
 - a. Material: Fibrous-Glass Duct Board
 - b. Pressure Class: Positive or Negative 2-inch wg.
 - c. Minimum SMACNA Seal Class: A.
 - d. SMACNA Leakage Class for Rectangular: 6.
 - e. Minimum Board Thickness: Minimum thickness required to obtain the R-values indicated below, but no less than 1-1/2 inches thick.
 - 1) All Locations: Minimum R = 6.0
 - 3. Exhaust Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air:
 - a. Material: Galvanized Steel – See Section 233113 “Metal Ducts.”
 - 4. Exhaust Ducts Connected to Clothes Dryers:
 - a. Material: Galvanized Steel – See Section 233113 “Metal Ducts.”

B. Clubhouses and Ancillary Buildings:

1. Supply Ducts:
 - a. Material: Fibrous-Glass Duct Board
 - b. Pressure Class: Positive or Negative 2-inch wg.
 - c. Minimum SMACNA Seal Class: A.
 - d. SMACNA Leakage Class for Rectangular: 6.
 - e. Minimum Board Thickness: Minimum thickness required to obtain the R-values indicated below, but no less than 1-1/2 inches thick.
 - 1) Unventilated Attic Above Insulated Ceiling: Minimum R = 8.0
 - 2) All Other Locations: Minimum R = 6.0
2. Return Ducts from Air Devices to Ductwork Upstream of Outdoor Air Duct Connection:
 - a. Material: Fibrous-Glass Duct Board
 - b. Pressure Class: Positive or Negative 2-inch wg.
 - c. Minimum SMACNA Seal Class: A.
 - d. SMACNA Leakage Class for Rectangular: 6.
 - e. Minimum Board Thickness: Minimum thickness required to obtain the R-values indicated below, but no less than 1-1/2 inches thick.
 - 1) All Locations: Minimum R = 6.0
3. Return Ducts from Minimum 1 foot Upstream of Outdoor Air Duct Connection to the Air Handler Connection:
 - a. Material: Galvanized Steel – See Section 233113 “Metal Ducts.”
4. Exhaust Ducts Connected to Fans Exhausting (ASHRAE 62.1, Class 1 and 2) Air and Transfer Air Ducts:
 - a. Material: Galvanized Steel – See Section 233113 “Metal Ducts.”
5. Outdoor Air Ducts:
 - a. Material: Galvanized Steel – See Section 233113 “Metal Ducts.”

END OF SECTION 233116