

SECTION 233300 - DUCT ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Volume dampers.
 - 2. Fire dampers.
 - 3. Turning vanes.
 - 4. Duct-mounting access doors.
 - 5. Flexible connectors.
 - 6. Flexible ducts.
 - 7. Duct accessory hardware.
- B. Related Sections include the following:
 - 1. Division 23 Section "HVAC Instrumentation and Controls" for damper actuators.

1.3 SUBMITTALS

- A. Product Data: For the following:
 - 1. Volume dampers.
 - 2. Fire dampers.
 - 3. Turning vanes.
 - 4. Duct-mounting access doors.
 - 5. Flexible connectors.
 - 6. Flexible ducts.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Special fittings.
 - 2. Manual-volume damper installations.
 - 3. Fire-damper installations, including sleeves and duct-mounting access doors.
 - 4. Wiring Diagrams: Power, signal, and control wiring.
- C. Coordination Drawings: Reflected ceiling plans, drawn to scale and coordinating penetrations and ceiling-mounting items. Show ceiling-mounting access panels and access doors required for access to duct accessories.

1.4 QUALITY ASSURANCE

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

1.5 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 SHEET METAL MATERIALS

- A. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods, unless otherwise indicated.
- B. Galvanized Sheet Steel: Lock-forming quality; complying with ASTM A 653/A 653M and having G90 coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.
- C. Stainless Steel: ASTM A 480/A 480M.
- D. Aluminum Sheets: ASTM B 209, alloy 3003, temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
- E. Extruded Aluminum: ASTM B 221, alloy 6063, temper T6.
- F. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- G. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.3 VOLUME DAMPERS

- A. Manufacturers:
 - 1. Air Balance, Inc.
 - 2. American Warming and Ventilating.
 - 3. Flexmaster U.S.A., Inc.
 - 4. McGill AirFlow Corporation.
 - 5. METALAIRE, Inc.
 - 6. Nailor Industries Inc.

7. Penn Ventilation Company, Inc.
 8. Ruskin Company.
 9. Vent Products Company, Inc.
- B. General Description: Factory fabricated, with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.
1. Pressure Classes of 3-Inch wg or Higher: End bearings or other seals for ducts with axles full length of damper blades and bearings at both ends of operating shaft.
- C. Standard Volume Dampers: Multiple- or single-blade, parallel- or opposed-blade design as indicated, standard leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
1. Steel Frames: Hat-shaped, galvanized sheet steel channels, minimum of 0.064 inch thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls and flangeless frames where indicated for installing in ducts.
 2. Roll-Formed Steel Blades: 0.064-inch-thick, galvanized sheet steel.
 3. Blade Axles: Galvanized steel.
 4. Bearings: Molded synthetic.
 5. Tie Bars and Brackets: Galvanized steel.
- D. Spin Ins:
1. Branch duct connections for connecting round low pressure duct to rectangular low-pressure ducts.
 2. Galvanized steel, straight spin-in with beaded collar, integral damper and quadrant stand-off. Minimum 26 gage.
 3. Manufacturer: Flexmaster FL with stand-off or equivalent.
- E. Jackshaft: 1-inch- diameter, galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
1. Length and Number of Mountings: Appropriate to connect linkage of each damper in multiple-damper assembly.
- F. Damper Hardware: Zinc-plated, die-cast core with dial and handle made of 3/32-inch-thick zinc-plated steel, and a 3/4-inch hexagon locking nut. Include center hole to suit damper operating-rod size. Include elevated platform for insulated duct mounting.

2.4 FIRE DAMPERS

- A. Manufacturers:
1. Air Balance, Inc.
 2. Greenheck.
 3. METALAIRE, Inc.
 4. Ruskin Company.
- B. Fire dampers shall be labeled according to UL 555.

- C. Fire Rating: 1-1/2 hours.
- D. Frame: Curtain type with blades outside airstream; fabricated with roll-formed, 0.034-inch- thick galvanized steel; with mitered and interlocking corners.
- E. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.
 - 1. Minimum Thickness: 0.052 or 0.138 inch thick as indicated and of length to suit application.
 - 2. Exceptions: Omit sleeve where damper frame width permits direct attachment of perimeter mounting angles on each side of wall or floor, and thickness of damper frame complies with sleeve requirements.
- F. Mounting Orientation: Vertical or horizontal as indicated.
- G. Blades: Roll-formed, interlocking, 0.034-inch- thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch- thick, galvanized-steel blade connectors.
- H. Horizontal Dampers: Include blade lock and stainless-steel closure spring.
- I. Fusible Links: Replaceable, 165 deg F rated.

2.5 TURNING VANES

- A. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for vanes and vane runners. Vane runners shall automatically align vanes.
- B. Manufactured Turning Vanes: Fabricate 1-1/2-inch- wide, single-vane, curved blades of galvanized sheet steel set 3/4 inch o.c.; support with bars perpendicular to blades set 2 inches o.c.; and set into vane runners suitable for duct mounting.
 - 1. Manufacturers:
 - a. Ductmate Industries, Inc.
 - b. Duro Dyne Corp.
 - c. METALAIRE, Inc.
 - d. Ward Industries, Inc.
- C. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.

2.6 DUCT-MOUNTING ACCESS DOORS

- A. General Description: Fabricate doors airtight and suitable for duct pressure class.
- B. Door for Low Pressure Ducts: Double wall, duct mounting, and rectangular; fabricated of galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class. Include vision panel where indicated. Include 1-by-1-inch butt or piano hinge and cam latches.
 - 1. Manufacturers:
 - a. American Warming and Ventilating.

- b. CESCO Products.
 - c. Ductmate Industries, Inc.
 - d. Flexmaster U.S.A., Inc.
 - e. Greenheck.
 - f. McGill AirFlow Corporation.
 - 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
 - 3. Provide number of hinges and locks as follows:
 - a. Less Than 12 Inches Square: Secure with two sash locks.
 - b. Up to 18 Inches Square: Two hinges and two sash locks.
 - c. Up to 24 by 48 Inches: Three hinges and two compression latches.
 - d. Sizes 24 by 48 Inches and Larger: One additional hinge.
- C. Door: Double wall, duct mounting, and round; fabricated of galvanized sheet metal with insulation fill and 1-inch thickness. Include cam latches.
 - 1. Manufacturers:
 - a. Ductmate Industries, Inc.
 - b. Flexmaster U.S.A., Inc.
 - 2. Frame: Galvanized sheet steel, with spin-in notched frame.
- D. Pressure Relief Access Door for Use in Medium Pressure Ducts: Double wall and duct mounting; fabricated of galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class. Include vision panel, latches, and retaining chain.
 - 1. Manufacturers:
 - a. American Warming and Ventilating.
 - b. CESCO Products.
 - c. Ductmate Industries, Inc.
 - d. Greenheck.
 - e. KEES, Inc.
 - f. McGill AirFlow Corporation.
 - 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
- E. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.
- F. Insulation: 1-inch- thick, fibrous-glass or polystyrene-foam board.

2.7 FLEXIBLE CONNECTORS

- A. Manufacturers:
 - 1. Ductmate Industries, Inc.
 - 2. Duro Dyne Corp.
 - 3. Ventfabrics, Inc.
 - 4. Ward Industries, Inc.
- B. General Description: Flame-retardant or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.

- C. Metal-Edged Connectors: Factory fabricated with a fabric strip 5-3/4 inches wide attached to two strips of 2-3/4-inch- wide, 0.028-inch- thick, galvanized sheet steel sheets. Select metal compatible with ducts.
- D. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
 - 1. Minimum Weight: 26 oz./sq. yd..
 - 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 - 3. Service Temperature: Minus 40 to plus 200 deg F.

2.8 FLEXIBLE DUCTS

- A. General: Comply with UL 181, Class 1.
- B. Insulated Flexible Ducts Located Downstream of AC Units (Low Pressure):
 - 1. Manufacturers:
 - a. Flex Master Type 5.
 - b. Technaflex WK.
 - c. Thermoflex M-KE.
 - 2. UL 181, Class 1, aluminum laminate and polyester film with latex adhesive supported by helically wound spring coated or galvanized steel wire; fiberglass insulation; polyethylene vapor barrier film.
 - 3. Pressure Rating: 6 inches WG positive and 4.0 WG negative (4-16 inch ID).
 - 4. Maximum Velocity: 4000 fpm.
 - 5. Temperature Range: 20 degrees F to 210 degrees F.
- C. Flexible Duct Clamps Downstream of AC Units: Nylon strap, in sizes 3 through 18 inches to suit duct size.

2.9 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct insulation thickness.
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

PART 3 - EXECUTION

3.1 APPLICATION AND INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts.
- B. Provide duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Install backdraft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated.

- D. Install volume dampers in ducts with liner; avoid damage to and erosion of duct liner.
- E. Provide balancing dampers at points on supply, return, and exhaust systems where branches lead from larger ducts as required for air balancing. Install at a minimum of two duct widths from branch takeoff.
- F. Provide test holes at fan inlets and outlets and elsewhere as indicated.
- G. Install fire dampers, with fusible links, according to manufacturer's UL-approved written instructions.
- H. Install duct access doors to allow for inspecting, adjusting, and maintaining accessories and terminal units as follows:
 - 1. On both sides of duct coils.
 - 2. Downstream from volume dampers and equipment.
 - 3. Adjacent to fire dampers, providing access to reset or reinstall fusible links.
 - 4. To interior of ducts for cleaning; before and after each change in direction, at maximum 50-foot spacing.
 - 5. On sides of ducts where adequate clearance is available.
- I. Install the following sizes for duct-mounting, rectangular access doors:
 - 1. One-Hand or Inspection Access: 8 by 5 inches.
 - 2. Two-Hand Access: 12 by 6 inches.
 - 3. Head and Hand Access: 18 by 10 inches.
 - 4. Head and Shoulders Access: 21 by 14 inches.
 - 5. Body Access: 25 by 14 inches.
 - 6. Body Plus Ladder Access: 25 by 17 inches.
- J. Install the following sizes for duct-mounting, round access doors:
 - 1. One-Hand or Inspection Access: 8 inches in diameter.
 - 2. Two-Hand Access: 10 inches in diameter.
 - 3. Head and Hand Access: 12 inches in diameter.
 - 4. Head and Shoulders Access: 18 inches in diameter.
 - 5. Body Access: 24 inches in diameter.
- K. Install the following sizes for duct-mounting, pressure relief access doors:
 - 1. One-Hand or Inspection Access: 7 inches in diameter.
 - 2. Two-Hand Access: 10 inches in diameter.
 - 3. Head and Hand Access: 13 inches in diameter.
 - 4. Head and Shoulders Access: 19 inches in diameter.
- L. Install flexible connectors immediately adjacent to equipment in ducts associated with fans and motorized equipment supported by vibration isolators.
- M. For fans developing static pressures of 5-inch w.g. and higher, cover flexible connectors with loaded vinyl sheet held in place with metal straps.

- N. Connect diffusers to low pressure ducts with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- O. Connect flexible ducts to metal ducts with draw bands. Nylon for low pressure.
- P. Install duct test holes where indicated and required for testing and balancing purposes.

3.2 ADJUSTING

- A. Adjust duct accessories for proper settings.
- B. Adjust fire dampers for proper action.
- C. Final positioning of manual-volume dampers is specified in Division 23 Section "Testing, Adjusting, and Balancing."

END OF SECTION 233300