

SECTION 23 33 00 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Backdraft dampers.
2. Volume dampers.
3. Turning vanes.
4. Duct-mounting access doors.
5. Flexible connectors.
6. Duct accessory hardware.

B. See Division 28 Section "Fire Alarm/Security System" for duct-mounting fire and smoke detectors.

C. See Division 23 Section "Instrumentation and Control Devices for HVAC" for electric and pneumatic damper actuators.

1.2 SUBMITTALS

A. Product Data: For the following:

1. Backdraft dampers.
2. Volume 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. Wiring Diagrams: Power, signal, and control wiring.

1.3 QUALITY ASSURANCE

A. SMACNA Compliance: Comply with applicable portions of Sheet Metal and Air Conditioning Contractor's National Association (SMACNA) "HVAC Duct Const. Standards, Metal & Flexible".

B. Industry Standards: Comply with American Society of Heating Refrigeration, and Air Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to construction of duct accessories except as otherwise indicated.

- C. NFPA Compliance: Comply with applicable provisions of ANSI/NFPA 90A "Air Conditioning and Ventilating Systems", pertaining to installation of duct accessories.

PART 2 - PRODUCTS

2.1 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 **G60 (Z180)** 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 (ASTM B 209M)**, alloy 3003, temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
- E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- F. Tie Rods: Galvanized steel, **1/4-inch (6-mm)** minimum diameter for lengths **36 inches (900 mm)** or less; **3/8-inch (10-mm)** minimum diameter for lengths longer than **36 inches (900 mm)**.

2.2 BACKDRAFT DAMPERS

- A. Manufacturers:
 - 1. Air Balance, Inc.
 - 2. American Warming and Ventilating.
 - 3. Greenheck.
 - 4. Penn Ventilation Company, Inc.
 - 5. Ruskin Company.
- B. Description: Multiple-blade, parallel action gravity balanced, with center-pivoted blades of maximum **6-inch (150-mm)** width, with sealed edges, assembled in rattle-free manner with 90-degree stop, steel ball bearings, and axles; adjustment device to permit setting for varying differential static pressure.
- C. Frame: **0.052-inch (1.3-mm)** thick, galvanized sheet steel, with welded corners and mounting flange.
- D. Blades: **0.050-inch (1.2-mm-)** thick aluminum sheet.
- E. Blade Seals: Vinyl.
- F. Blade Axles: Galvanized steel.
- G. Tie Bars and Brackets: Galvanized steel.

- H. Return Spring: Adjustable tension.

2.3 VOLUME DAMPERS

A. Manufacturers:

1. Air Balance, Inc.
2. American Warming and Ventilating.
3. METALAIRE, Inc.
4. Penn Ventilation Company, Inc.
5. Ruskin Company.
6. Vent Products Company, Inc.
7. Air Balance, 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.

- 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 (1.62 mm) 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- (1.62-mm-) thick, galvanized sheet steel.
3. Blade Axles: Galvanized steel.
4. Bearings: Oil-impregnated bronze.
5. Tie Bars and Brackets: Galvanized steel.

- D. Jackshaft: 1-inch- (25-mm-) 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.

- E. Damper Hardware: Zinc-plated, die-cast core with dial and handle made of 3/32-inch- (2.4-mm-) thick zinc-plated steel, and a 3/4-inch (19-mm) hexagon locking nut. Include center hole to suit damper operating-rod size. Include elevated platform for insulated duct mounting.

2.4 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- (38-mm-) wide, single-vane, curved blades of galvanized sheet steel set 3/4 inch (19 mm) o.c.; support with bars perpendicular to blades set 2 inches (50 mm) 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.

2.5 DUCT-MOUNTING ACCESS DOORS

- A. General Description: Fabricate doors airtight and suitable for duct pressure class.
- B. Door: 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 (25-by-25-mm)** butt or piano hinge and cam latches.
 1. Manufacturers:
 - a. American Warming and Ventilating.
 - b. Ductmate Industries, Inc.
 - c. Flexmaster U.S.A., Inc.
 - d. Greenheck.
 - e. McGill AirFlow Corporation.
 - f. Ventfabrics, Inc.
 - g. Ward Industries, Inc.
 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 (300 mm)** Square: Secure with two sash locks.
 - b. Up to **18 Inches (450 mm)** Square: Two hinges and two sash locks.
 - c. Up to **24 by 48 Inches (600 by 1200 mm)**: Three hinges and two compression latches.
 - d. Sizes **24 by 48 Inches (600 by 1200 mm)** and Larger: One additional hinge.
- C. Door: Double wall, duct mounting, and round; fabricated of galvanized sheet metal with insulation fill and **1-inch (25-mm)** 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. Seal around frame attachment to duct and door to frame with neoprene or foam rubber.
- E. Insulation: **1-inch- (25-mm-)** thick, fibrous-glass or polystyrene-foam board.

2.6 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. Flexible Connector Fabric: Glass fabric double coated with neoprene.
1. Minimum Weight: 26 oz./sq. yd. (880 g/sq. m).
 2. Tensile Strength: 480 lbf/inch (84 N/mm) in the warp and 360 lbf/inch (63 N/mm) in the filling.
 3. Service Temperature: Minus 40 to plus 200 deg F (Minus 40 to plus 93 deg C).

2.7 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 and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass 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 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, turning vanes, and equipment.

3. To interior of ducts for cleaning; before and after each change in direction, at maximum 50-foot (15-m) spacing.
 4. On sides of ducts where adequate clearance is available.
- H. Install the following sizes for duct-mounting, rectangular access doors:
1. One-Hand or Inspection Access: 8 by 5 inches (200 by 125 mm).
 2. Two-Hand Access: 12 by 6 inches (300 by 150 mm).
 3. Head and Hand Access: 18 by 10 inches (460 by 250 mm).
 4. Head and Shoulders Access: 21 by 14 inches (530 by 355 mm).
 5. Body Access: 25 by 14 inches (635 by 355 mm).
 6. Body Plus Ladder Access: 25 by 17 inches (635 by 430 mm).
- I. Install the following sizes for duct-mounting, round access doors:
1. One-Hand or Inspection Access: 8 inches (200 mm) in diameter.
 2. Two-Hand Access: 10 inches (250 mm) in diameter.
 3. Head and Hand Access: 12 inches (300 mm) in diameter.
 4. Head and Shoulders Access: 18 inches (460 mm) in diameter.
 5. Body Access: 24 inches (600 mm) in diameter.
- J. Install flexible connectors immediately adjacent to equipment in ducts associated with fans and motorized equipment supported by vibration isolators.
- K. For fans developing static pressures of 5-inch wg (1250 Pa) and higher, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- L. Connect terminal units to supply ducts directly or with maximum 12-inch (300-mm) lengths of flexible duct. Do not use flexible ducts to change directions.
- M. Connect diffusers or light troffer boots to low pressure ducts directly or with maximum 60-inch (1500-mm) lengths of flexible duct clamped or strapped in place.
- N. 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 and smoke dampers for proper action.
 - C. Final positioning of manual-volume dampers is specified in Division 23 Section "Testing, Adjusting, and Balancing for HVAC."

END OF SECTION 23 33 00