

## SECTION 23 33 00 - AIR DUCT ACCESSORIES

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. Section Includes:
  - 1. Backdraft and pressure relief dampers.
  - 2. Barometric relief dampers.
  - 3. Manual volume dampers.
  - 4. Louvers.
  - 5. Turning vanes.
  - 6. Duct-mounted access doors.
  - 7. Duct access panel assemblies.
  - 8. Flexible connectors.
  - 9. Duct accessory hardware.
  - 10. Take off fitting

### PART 2 - PRODUCTS

#### 2.1 ASSEMBLY DESCRIPTION

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

#### 2.2 MATERIALS

- A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
  - 1. Galvanized Coating Designation: G90.
  - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304, and having a No. 2 finish for concealed ducts and No. 3 or 4 finish for exposed ducts.

- C. Aluminum Sheets: Comply with ASTM B 209, Alloy 3003, Temper H14; with mill finish for concealed ducts and standard, 1-side bright finish for exposed ducts.
- D. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.
- 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 minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

## 2.3 MANUAL VOLUME DAMPERS

### A. Standard, Steel, Manual Volume Dampers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Aire Technologies.
  - b. American Warming and Ventilating; a Mestek Architectural Group company.
  - c. Flexmaster U.S.A., Inc.
  - d. Flex-Tek Group.
  - e. McGill AirFlow LLC.
  - f. Nailor Industries Inc.
  - g. Pottorff.
  - h. Ruskin Company.
  - i. Trox USA Inc.
  - j. Vent Products Co., Inc.
  - k. Young Regulator Company. (Basis of Design)
2. For rectangular duct, opposed blade volume dampers constructed with triple V-blades, hat channel frame with linkage concealed in frame. For round duct, single blade volume dampers with linkage outside the frame.
3. Operating temperature: minus 40 degrees F to 180 degrees F. Maximum system pressure 5-inches wg.
4. Suitable for horizontal or vertical applications.
5. Materials to match duct system where dampers are installed.
6. Frames:
  - a. Frame: Hat-shaped, 0.094-inch- thick, galvanized sheet steel or 0.05-inch- thick stainless steel or 0.10-inch- thick, aluminum sheet channels.
  - b. Mitered and welded corners.
  - c. Flanged connections
7. Blades:
  - a. Multiple or single blade.
  - b. Opposed-blade design for multiple blade dampers.
  - c. Stiffen damper blades for stability.
  - d. Galvanized or Stainless-steel, 0.064 inch thick or Extruded-Aluminum, 0.050-inch-thick.

8. Blade Axles: Galvanized steel, Stainless steel or Nonferrous metal to match installed duct system.
9. Bearings: Molded synthetic.
10. Tie Bars and Brackets: Galvanized steel, Stainless steel or Aluminum to match installed duct system.
11. Maximum single section damper size: 48 inch by 48 inch. For larger duct sizes furnish multiple damper sections.
12. Furnish damper with adjustable quadrant regulator and lock.
13. On externally-insulated ducts, mount quadrant regulators on stand-off brackets to accommodate thickness of insulation.

B. Jackshaft:

1. Size: 1-inch diameter.
2. Material: Galvanized-steel pipe rotating within pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
3. Length and Number of Mountings: As required to connect linkage of each damper in multiple-damper assembly.

C. Damper Hardware:

1. 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.
2. Include center hole to suit damper operating-rod size.
3. Include elevated platform for insulated duct mounting.

## 2.4 LOUVERS

A. Stationary Waterproof Louver

1. Acceptable Manufacturer: American Warming & Ventilating, or Louvers and Dampers, Airstream, Ruskin, Pottorff.
2. Construction: 6 inch deep all welded extruded aluminum.
3. Frame: Not less than .081 inch thick 6063 T5 alloy.
4. Blades: 3-1/2 inch to 4-1/2 inch centers with two reinforcing V's and integral downspouts to drain water from louver blades.
5. Finish: Kynar 500, color as selected by Architect.
6. Certification: AMCA certified for air and water penetration.
7. Accessories: 1/2 inch mesh aluminum birdscreen.

## 2.5 TURNING VANES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Ductmate Industries, Inc.
2. Duro Dyne Inc.
3. Elgen Manufacturing.
4. Hardcast, Inc.
5. METALAIRE, Inc.
6. SEMCO LLC.
7. Ward Industries; a brand of Hart & Cooley, Inc.

- B. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
  - 1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- C. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vanes and Vane Runners," and 4-4, "Vane Support in Elbows."
- D. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions. Vanes shall be securely fastened to runners and runners securely fastened to ductwork. For lined ductwork, runners shall be raised hat style to prevent damage to duct liner. Turning vanes greater than 36 inches in length shall be braced at intermediate points with tie rods.

## 2.6 DUCT-MOUNTED ACCESS DOORS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Aire Technologies.
  - 2. American Warming and Ventilating; a Mestek Architectural Group company.
  - 3. Cesco Products; a division of MESTEK, Inc. (Basis of Design, HDD)
  - 4. CL WARD & Family Inc.
  - 5. Ductmate Industries, Inc.
  - 6. Elgen Manufacturing.
  - 7. Flexmaster U.S.A., Inc.
  - 8. Greenheck Fan Corporation.
  - 9. McGill AirFlow LLC.
  - 10. Nailor Industries Inc.
  - 11. Pottorff.
  - 12. Ventfabrics, Inc.
  - 13. Ward Industries; a brand of Hart & Cooley, Inc.
- B. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2, "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct."
  - 1. Door:
    - a. Double wall, rectangular.
    - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
    - c. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
    - d. Fabricate doors airtight and suitable for duct pressure class.
  - 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
  - 3. Number of Hinges and Locks:
    - a. Access Doors Less Than 12 Inches Square: No hinges and two cam locks.
    - b. Access Doors up to 18 Inches Square: Continuous hinge and two cam locks.
    - c. Access Doors up to 24 by 36 Inches: Continuous hinge and two cam locks.

## 2.7 FLEXIBLE CONNECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Ductmate Industries, Inc.
  - 2. Duro Dyne Inc. (Basis of Design)
  - 3. Elgen Manufacturing.
  - 4. Ventfabrics, Inc.
- B. Materials: Flame-retardant or noncombustible fabrics.
- C. Coatings and Adhesives: Comply with UL 181, Class 1.
- D. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch- wide, 0.028-inch- thick, galvanized sheet steel or 0.032-inch- thick aluminum sheets. Provide metal compatible with connected ducts.
- E. 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.
- F. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone or Durodon.
  - 1. Minimum Weight: 24 oz./sq. yd..
  - 2. Tensile Strength: 225 lbf/inch in the warp and 300 lbf/inch in the filling.
  - 3. Service Temperature: Minus 40 to plus 250 deg F.

## 2.8 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.

## 2.9 TAKE OFF FITTINGS FOR ROUND FLEXIBLE DUCTWORK

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Buckley Associates, Inc.
  - 2. Ductmate Industries, Inc.
  - 3. Flexmaster USA (Basis of Design SOG)
- B. Spin-in fitting with straight collar manufactured to SMACNA Standards for commercial construction. Contains 1-inch (25-mm) flange and stick on gasket for attachment to duct main.

1. Where duct height will not allow a spin-in fitting with 1-inch (25-mm) flange, provide a side take off fitting with integral transition from reduced height rectangular duct to round duct.
- C. Materials: 22 gauge thickness, galvanized, stainless steel or aluminum to match duct system material.
- D. Volume Damper: Integral with locking quadrant, 3/8" aluminum square shaft, nylon bushing and 2-inch (50-mm) build out for insulation thickness.
- E. Options:
  1. Insulation guard.
  2. All seams sealed.

### PART 3 - EXECUTION

#### 3.1 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. Install 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. Compliance with ASHRAE/IESNA 90.1-2004 includes Section 6.4.3.3.3 - "Shutoff Damper Controls," restricts the use of backdraft dampers, and requires control dampers for certain applications. Install control dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
  1. Install steel volume dampers in steel ducts.
  2. Install aluminum volume dampers in aluminum ducts.
- E. Where rectangular manual volume dampers are indicated on the Contract Drawings with a height 10-inches (250-mm) and larger, provide multiple blade volume dampers.
- F. Where round manual volume dampers are indicated on the Contract Drawings, provide manufactured manual volume dampers.
- G. Set dampers to fully open position before testing, adjusting, and balancing.
- H. Install test holes at fan inlets and outlets and elsewhere as indicated.
- I. Install fire dampers according to UL listing.

- J. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
  - 1. Upstream of duct coils.
  - 2. Upstream and downstream from duct filters.
  - 3. At outdoor-air intakes and mixed-air plenums.
  - 4. At drain pans and seals.
  - 5. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
  - 6. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links.
  - 7. Control devices requiring inspection.
  - 8. Elsewhere as indicated.
- K. Install access doors with swing against duct static pressure.
- L. Where ductwork systems are fire rated or grease containing exhaust, utilize Duct Access Panel Assemblies.
- M. Access Door Sizes:
  - 1. For ductwork smaller than 16-inches high: 12- by 12-inches (300 by 300 mm).
  - 2. For ductwork smaller than 24-inches high but larger than 18-inches: 16- by 20-inches (400- by 500-mm)
  - 3. For ductwork larger than 24-inches high: 24- by 24-inches (600- by 600-mm)
- N. Label access doors according to Section 23 05 53 "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.
- O. Install flexible connectors to connect ducts to any motor driven equipment.
- P. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- Q. Where indicated on Contract Drawings, connect diffusers to duct mains with take off fitting with integral volume damper and flexible ductwork. Flexible ductwork shall be no longer than length indicated on detail on the Contract Drawings. Extend flexible duct insulation and vapor barrier over completed joint and tape securely.
- R. Install duct test holes where required for testing and balancing purposes.
- S. Protect open ends of ductwork and air duct accessories during construction, either stored or installed, with plastic covering.

### 3.2 FIRE DAMPER APPLICATION

- A. For fire dampers installed behind grilles provide A-Style fire dampers which have the blades and frame in the airstream.
- B. For fire dampers installed in low pressure ductwork systems provide B-Style fire dampers which have the blades out of the airstream but frame in the airstream.
- C. For fire dampers installed in medium and high pressure ductwork systems provide C-Style fire dampers which have the blades and frames out of the airstream.

- D. For fire dampers where the rated assembly will not allow the blades and frame to be out of the airstream, provide out of the wall style to sit adjacent to the rated assembly but allow the blades and frame to remain out of the airstream.

### 3.3 FIELD QUALITY CONTROL

#### A. Tests and Inspections:

1. Operate dampers to verify full range of movement.
2. Inspect locations of access doors and verify that purpose of access door can be performed.
3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
4. Inspect turning vanes for proper and secure installation.
5. Operate remote damper operators to verify full range of movement of operator and damper.

END OF SECTION