SECTION 233300 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manual balancing dampers.
2. Backdraft dampers.
3. Fire dampers.
4. Smoke dampers.
5. Combination fire-smoke dampers.
6. Pressure Differential gauges.
7. Turning vanes.
8. Duct-mounted access doors.
9. Flexible connectors.
10. Flexible ducts.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details, and attachments to other work.

1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances, and method of field assembly into duct systems and other construction. Include the following:

a. Special fittings.
b. Manual volume damper installations.
c. Fire-damper and smoke-damper installations, including sleeves; and duct-mounted access doors.
d. Wiring Diagrams: For power, signal, and control wiring.

C. Operation and maintenance data.

1.3 QUALITY ASSURANCE

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 AMCA 500-D testing for damper rating.

PART 2 - PRODUCTS

2.1 MANUAL BALANCING DAMPERS

A. Balancing dampers shall be single cross-blade up to 12 blade widths and in larger sizes, multiple blade type 6" maximum width with opposed blade arrangement. Dampers shall be controlled by a locking quadrant positioner with handle equal to vent fabrics "Ventlock" #641 and for externally insulated ducts #644

2.2 BACKDRAFT DAMPERS

A. Backdraft dampers shall be adjustable counterbalanced type with extruded aluminum frame and blades and extruded vinyl edge seals. Dampers shall be equal to Ruskin CBD6.

2.3 FIRE DAMPERS

A. Dampers shall be constructed and tested to conform with UL 555 and shall be UL listed.

B. Dampers shall be dynamic rated, folded blade curtain type with blades folded in the head of the damper housing and shall be equipped with a 165 degree (unless otherwise noted) fusible link. Dampers installed to a horizontal air stream shall be gravity drop type. Dampers in a vertical air stream shall be spring loaded type.

C. The following is a description of the fire damper types as indicated on the plans:

1. TYPE “A”
   a. Low velocity (below 2000 fpm) with blades stored in the air stream.

2. TYPE “B”
   a. Low velocity with blades stored out of the air stream.

3. TYPE “C”
   a. High velocity with blades stored out of the air stream and rectangular, round, or oval duct collar each side.

4. Fire dampers located at double wall locations shall be provided with a closed position proving micro-switch. Switch shall change state if the fusible link releases and closes the fire damper. The switch shall be equal to Honeywell BX-2RW863-A2.

2.4 COMBINATION FIRE-SMOKE DAMPERS (Addendum 1 7/31/2023)

A. Combination fire-smoke dampers shall be UL labeled and meet both UL 555 and 555S requirements.

1. Fire Resistance rating or 1.5 hours
2. 165 degree F fusible link.
3. Elevated temperature rating of 350 degrees F.
4. Leakage Class I.

5. Differential Pressure rating of 4 in. wg.
6. Velocity rating of 2,000 fpm.

B. Damper frame shall be 16 ga. Galvanized steel formed into a 5" x 1" structural hat channel. Top and bottom frame members on dampers 17" high shall be low profile design to maximize the free area.

C. Damper blades shall be 16 ga. galvanized steel with full length structural reinforcement and double skin airfoil shape. Provide symmetrical blades of varying size as required to completely fill the damper opening. Blade edge seals shall be extruded silicone rubber permanently bond to the appropriate blades edges.

D. Linkage shall be concealed in the jamb.

E. Damper shall be supplied with factory retaining angles sized to provide installation overlap in accordance with the manufacturer's UL listing.

F. Actuators:

1. Electric 120V, 60Hz – 2-position, fail close.
2. External Mounting.

2.5 PRESSURE DIFFERENTIAL GAUGES

A. Pressure differential gauges for air filter application shall be Dwyer "Magnehelic" Series 2000 dial type gauges. Range shall be appropriate for the application. Each gauge shall be furnished with vent valves, aluminum or plastic tubing, static pressure tips and mounting bracket or flange.

2.6 TURNING VANES

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate Industries, Inc.
2. Duro Dyne Inc.
3. METALAIRE, Inc.
4. SEMCO Incorporated.
5. Ward Industries, Inc.; a division 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. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

D. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-3, "Vanes and Vane Runners," and 2-4, "Vane Support in Elbows."

E. Vane Construction: Single wall for ducts up to 36 inches wide and double wall for 36” wide and larger dimensions.

2.7 DUCT-MOUNTED ACCESS DOORS

A. Duct Access Doors – Doors shall be factory fabricated with following characteristics:
   1. Construction Material – Constructed of the same material as the ductwork system served (except galvanized sheet metal for fiberglass duct).
   2. Door Thickness – Doors located in:
      a. Insulated ductwork (internal and/or external) shall have double-wall insulated doors, thickness as required per the insulation schedule.
      b. Uninsulated ductwork shall have single-wall construction.
   3. Hinge – Continuous Piano Hinge. 1.5” wide steel construction, zinc plate.
      a. Ventfabrics #Ventlok 157 or equal.
   4. Latches – Provide the following type of latch for each application:
      a. Low pressure ductwork (1” w.c. or less) – Cam lock type latches.
      b. High Pressure ductwork (greater than 1” w.c.) – Heavy duty handle type latches.
   5. Frame & Seal – Frame and neoprene gasket between door and frame.
   6. Size – Access doors shall be 18” x 16” minimum except smaller where duct size will not permit such size.
   7. Pressure Application – Access doors and panels shall be designed to provide tight seal commensurate with the duct system operating pressure. Apply duct sealer or rubber gasket between frame and duct and on ducts of 3” S.P. and higher construction class, mechanical fastening of the frame and rubber gasket shall be provided.
   8. Removable Sash Access Door – Where sufficient clearance is not available to allow the door to swing open 90 degrees or for round ductwork, a removable access panel with neoprene gasket, frame and cam lock latches on all four sides shall be provided in lieu of the hinged door.

B. Large Plenum Access Doors – doors shall be factory fabricated and as described for duct access doors except that doors shall be 18” x 48” (unless otherwise noted) with overlapping frame,
   1. Construction Material – Constructed of the same material as the ductwork system served (except galvanized sheet metal for fiberglass duct).
   2. Door Thickness – Doors located in:
      a. Insulated ductwork (internal and/or external) shall have double-wall insulated doors, thickness as required per the insulation schedule.
      b. Uninsulated ductwork shall have single-wall construction.
   3. Hinge – Continuous piano hinge. 2” wide steel construction, zinc plated. Ventfabrics #Ventlok 167 or equal.
   4. Latches – Heavy duty type. Lever both outside and inside. Ventfabrics #Ventlok No. 310 or equal.
   5. Latch Quantity – Two latches shall be provided, except on doors 50” and higher three shall be provided.
   6. Frame & Seal - Shall be mechanically fastened to the plenum wall.
   7. Pressure Application – Access doors and panels shall be designed to provide tight seal commensurate with the duct system operating pressure. Apply duct sealer or rubber

gasket between frame and duct and on ducts of 3” S.P. and higher construction class, mechanical fastening of the frame and rubber gasket shall be provided.

2.8 FLEXIBLE CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Ductmate Industries, Inc.
2. Duro Dyne Inc.
3. Ventfabrics, Inc.
4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

B. Materials: Flame-retardant or noncombustible fabrics.

C. Coatings and Adhesives: Comply with UL 181, Class 1.

D. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.

1. Minimum Weight: 30 oz./sq. yd.
2. Net Fabric Width: 4” wide.
3. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
4. Service Temperature: Minus 40 to plus 200°F.

E. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.

1. Minimum Weight: 24 oz./sq. yd.
2. Net Fabric Width: 4” wide.
3. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
4. Service Temperature: Minus 50 to plus 250°F.

2.9 FLEXIBLE DUCTS

A. Flexible insulated duct shall be constructed of galvanized steel spiral wire mechanically locked to an airtight aluminum or polyester inner core, 1" thick 3/4 lb. density fibrous glass insulation and a polyethylene or reinforced metalized vapor barrier outer jacket equal to Flexmaster Type 5 or 5M. Duct shall be rated at a minimum of 6” positive and 4" negative static pressure and shall be listed as Class 1 Air Duct or Air Duct Connector with 25-50 flame-smoke ratings per UL 181 and comply with NFPA 90A.

B. Non-insulated flexible duct equal to Flexmaster NI-85 may be used on duct systems not specified to be insulated, with similar restriction stated above.

C. Flexible duct shall be used at final connections to air control terminal units and ceiling air diffusers except as limited in Part 3.

PART 3 - EXECUTION

3.1 INSTALLATION

A. GENERAL

1. 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.

2. Materials - Install duct accessories of materials suited to duct materials use:
   a. Galvanized-steel accessories in galvanized-steel and fibrous-glass ducts,
   b. Stainless-steel accessories in stainless-steel ducts,
   c. Aluminum accessories in aluminum ducts.

B. FIRE AND SMOKE DAMPERS

1. Fire and smoke dampers shall be installed in conformance with the manufacturer’s instructions and SMACNA recommendations.

2. Dampers shall be installed in sheet metal wall or floor sleeves along with retaining angles and duct access doors or panels. Sleeve and duct connections shall be breakaway type or rigid type with corresponding gauge requirements in accordance with SMACNA recommendations.

C. VOLUME DAMPERS

1. Locations:
   a. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts.
   b. Install volume damper upstream/downstream of each supply, return or exhaust air device, register or grille.
   c. Volume dampers shall be located in accessible locations for testing, balancing and adjusting purposes. Coordinate with reflected ceiling plans.
2. 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.
3. Install steel volume dampers in steel ducts.
4. Install aluminum volume dampers in aluminum ducts.
5. Set dampers to fully open position before testing, adjusting, and balancing.

D. PRESSURE DIFFERENTIAL GAUGES

1. Install air filter pressure differential gauges in a readable location on or near the air handling unit, filter housing or as otherwise indicated on the drawings.

E. ACCESS DOORS

1. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:

a. On both sides of duct coils.
b. Upstream / and downstream from duct filters.
c. At outdoor-air intakes and mixed-air plenums.
d. At drain pans and seals.
e. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
f. Adjacent to and close enough to fire or smoke dampers, to reset or reinstall fusible links. Access doors for access to fire or smoke dampers having fusible links shall be pressure relief access doors; and shall be outward operation for access doors installed upstream from dampers and inward operation for access doors installed downstream from dampers.
g. Control devices requiring inspection.
h. Elsewhere as indicated.

2. Label access doors according to Division 23 Section "Identification for HVAC System" to indicate the purpose of access door.

F. FLEXIBLE CONNECTORS

1. Location: Install flexible connectors to connect ducts to equipment.

2. For fans developing static pressures of 5-inch w.g. and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.

G. FLEXIBLE DUCTS

1. Connect flexible ducts to metal ducts with Panduit straps or stainless-steel clamps. End of the insulation and jacket shall be sealed to the metal duct with double wrapped duct tape. Maximum length of flexible duct shall be:

a. Terminal units to supply ducts – 3 ft.
b. Air devices to ducts – 7 ft.

2. Flexible duct installation locations:
a. Shall be installed:
1) At final air devices above accessible ceilings.

b. Shall *not* be installed:
1) Where ductwork is exposed.
2) Above inaccessible ceilings – coordinate with reflected ceiling plan.
3) Thru any wall, ceiling, floor or fire rated assembly.
4) In the immediate vicinity of, and connecting to, air devices in fire rated ceilings where the assembly details require steel ductwork.

END OF SECTION 23 3300

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