SECTION 233300

AIR DUCT ACCESSORIES

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**NOTE TO SPECIFIER**

*Use this Specification Section for Mail Processing Facilities.*

***This is a Type 1 Specification with completely editable text; therefore, any portion of the text can be modified by the A/E preparing the Solicitation Package to suit the project.***

*For Design/Build projects, do not delete the Notes to Specifier in this Section so that they may be available to Design/Build entity when preparing the Construction Documents.*

*For the Design/Build entity, this specification is intended as a guide for the Architect/Engineer preparing the Construction Documents.*

*The MPF specifications may also be used for Design/Bid/Build projects. In either case, it is the responsibility of the design professional to edit the Specifications Sections as appropriate for the project.*

*Text shown in brackets must be modified as needed for project specific requirements.* *See the “Using the USPS Guide Specifications” document in Folder C for more information.*

*The last date that USPS revised this standard specification section occurs in two places, at the end of this section and in the Table of Contents. If the date in this section matches the date in the Table of Contents, then you are using the latest version. Do not delete or revise the “last revised” date at the end of the section during the development of the Project Manual.*

*The footer in this section should be edited to replace the text, “USPS MPF SPECIFICATION” with the project name, and the blank date in the center should be replaced with the submission date, for interim design reviews, or the issue date of the completed Project Manual.*

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1. GENERAL
   1. SUMMARY
      1. Section Includes:
         1. Backdraft and pressure relief dampers.
         2. Manual volume dampers.
         3. Control dampers.
         4. Fire dampers.
         5. Smoke dampers.
         6. Flange connectors.
         7. Turning vanes.
         8. Duct-mounted access doors.
         9. Flexible connectors.
         10. Flexible ducts.
         11. Duct accessory hardware.
   2. SUBMITTALS
      1. Product Data: For each type of product indicated.
      2. 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:
            1. Special fittings.
            2. Manual volume damper installations.
            3. Control damper installations.
            4. Fire-damper and smoke-damper installations, including sleeves; and duct-mounted access doors.
            5. Wiring Diagrams: For power, signal, and control wiring.
      3. Operation and maintenance data.
   3. QUALITY ASSURANCE
      1. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
      2. Comply with AMCA 500-D testing for damper rating.
2. PRODUCTS
   1. MATERIALS
      1. 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. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
         1. Galvanized Coating Designation: G90.
         2. Exposed-Surface Finish: Mill phosphatized.
      3. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304, and having a No. 2 finish for concealed ducts and finish for exposed ducts.
      4. 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.
      5. Extruded Aluminum: Comply with ASTM B 221, Alloy 6063, Temper T6.
      6. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
      7. 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. BACKDRAFT AND PRESSURE RELIEF DAMPERS

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**NOTE TO SPECIFIER**

Delete section if backdraft and pressure relief dampers are not required.

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* + 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
       1. Air Balance Inc.; a division of Mestek, Inc.
       2. American Warming and Ventilating; a division of Mestek, Inc.
       3. Cesco Products; a division of Mestek, Inc.
       4. Duro Dyne Inc.
       5. Greenheck Fan Corporation.
       6. Lloyd Industries, Inc.
       7. Nailor Industries Inc.
       8. NCA Manufacturing, Inc.
       9. Pottorff; a division of PCI Industries, Inc.
       10. Ruskin Company.
       11. SEMCO Incorporated.
       12. Vent Products Company, Inc.
    2. Description: Gravity balanced.
    3. Frame: 0.052-inch- thick, galvanized sheet steel.
    4. Blades: Multiple single-piece blades, [center-pivoted,] maximum 6-inch width, 0.025-inch- thick, roll-formed aluminum with sealed edges.
    5. Blade Action: Parallel.
    6. Blade Seals: Neoprene, mechanically locked.
    7. Blade Axles:
       1. Material: Stainless steel
       2. Diameter: 0.20 inch.
    8. Tie Bars and Brackets: Galvanized steel.
    9. Return Spring: Adjustable tension.
    10. Bearings: [Steel ball] [Synthetic pivot bushings] [Steel ball or synthetic pivot bushings].
    11. Accessories:
        1. Adjustment device to permit setting for varying differential static pressure.
        2. Counterweights and spring-assist kits for vertical airflow installations.
        3. Electric actuators.
        4. Chain pulls.
        5. Screen Mounting: Front mounted in sleeve.
           1. Sleeve Thickness: 20-gage minimum.
           2. Sleeve Length: 6 inches minimum.
        6. Screen Mounting: Rear mounted.
        7. Screen Material: Aluminum.
        8. Screen Type: Bird.
        9. 90-degree stops.
  1. MANUAL VOLUME DAMPERS

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**NOTE TO SPECIFIER**

Show dampers on Drawings.

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* + 1. Standard, Steel, Manual Volume Dampers:
       1. 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. Air Balance Inc.; a division of Mestek, Inc.
          2. American Warming and Ventilating; a division of Mestek, Inc.
          3. Flexmaster U.S.A., Inc.
          4. McGill AirFlow LLC.
          5. METALAIRE, Inc.
          6. Nailor Industries Inc.
          7. Ruskin Company.
          8. Vent Products Company, Inc.
       2. Standard leakage rating, with linkage outside airstream.
       3. Suitable for horizontal or vertical applications.
       4. Frames:
          1. Hat-shaped, galvanized-steel channels, 0.064-inch minimum thickness.
          2. Mitered and welded corners.
          3. Flanges for attaching to walls and flangeless frames for installing in ducts.
       5. Blades:
          1. Multiple or single blade.
          2. Parallel- or opposed-blade design.
          3. Stiffen damper blades for stability.
          4. Galvanized-steel, 0.064 inch thick.
       6. Blade Axles: Stainless steel.
       7. Bearings:
          1. Molded synthetic.
          2. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
       8. Tie Bars and Brackets: Galvanized steel.
    2. Standard, Aluminum, Manual Volume Dampers:

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**NOTE TO SPECIFIER**

Specify aluminum dampers only when the excessive corrosion is expected.

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* + - 1. 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. Air Balance Inc.; a division of Mestek, Inc.
         2. American Warming and Ventilating; a division of Mestek, Inc.
         3. Flexmaster U.S.A., Inc.
         4. McGill AirFlow LLC.
         5. METALAIRE, Inc.
         6. Nailor Industries Inc.
         7. Ruskin Company.
         8. Trox USA Inc.
         9. Vent Products Company, Inc.
      2. Standard leakage rating[, with linkage outside airstream].
      3. Suitable for horizontal or vertical applications.
      4. Frames: Hat-shaped, 0.10-inch- thick, aluminum sheet channels; frames with flanges for attaching to walls and flangeless frames for installing in ducts.
      5. Blades:
         1. Multiple or single blade.
         2. Parallel- or opposed-blade design.
         3. Stiffen damper blades for stability.
         4. Roll-Formed Aluminum Blades: 0.10-inch- thick aluminum sheet.
      6. Blade Axles: Stainless steel.
      7. Bearings:
         1. Molded synthetic.
         2. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
      8. Tie Bars and Brackets: Aluminum.
    1. 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.
    2. 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.
  1. CONTROL DAMPERS

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**NOTE TO SPECIFIER**

If multiple control damper types are required, copy this article and re-edit for each type; assign each type a drawing designation; and indicate each type on Drawings. Delete if not used or if control dampers are specified elsewhere within the specifications.

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* + 1. 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. American Warming and Ventilating; a division of Mestek, Inc.
       2. Arrow United Industries; a division of Mestek, Inc.
       3. Flexmaster U.S.A., Inc.
       4. Greenheck Fan Corporation.
       5. Lloyd Industries, Inc.
       6. McGill AirFlow LLC.
       7. METALAIRE, Inc.
       8. Nailor Industries Inc.
       9. Ruskin Company.
       10. Vent Products Company, Inc.
       11. Young Regulator Company.

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**NOTE TO SPECIFIER**

Specify all stainless construction for corrosive environments.

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* + 1. Frames:
       1. Hat or U shaped.
       2. Galvanized-steel channels, 0.064 inch thick.
       3. Mitered and welded corners.
    2. Blades:
       1. Multiple blade with maximum blade width of 8 inches.
       2. Parallel- and opposed-blade design.
       3. Galvanized steel.
       4. 0.064 inch thick.
       5. Blade Edging: Closed-cell neoprene edging.
    3. Blade Axles: 1/2-inch- diameter; stainless steel; blade-linkage hardware of zinc-plated steel and brass; ends sealed against blade bearings.
       1. Operating Temperature Range: From minus 40 to plus 200 deg F.
    4. Bearings:
       1. Molded synthetic.
       2. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
       3. Thrust bearings at each end of every blade.
  1. FIRE DAMPERS
     1. 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. Air Balance Inc.; a division of Mestek, Inc.
        2. Arrow United Industries; a division of Mestek, Inc.
        3. Greenheck Fan Corporation.
        4. McGill AirFlow LLC.
        5. METALAIRE, Inc.
        6. Nailor Industries Inc.
        7. Prefco; Perfect Air Control, Inc.
        8. Ruskin Company.
        9. Vent Products Company, Inc.
        10. Ward Industries, Inc.; a division of Hart & Cooley, Inc.

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**NOTE TO SPECIFIER**

Edit for the types of dampers required and indicate each damper on Drawings.

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* + 1. Type: Static and dynamic; rated and labeled according to UL 555 by an NRTL.
    2. Closing rating in ducts up to 4-inch wg static pressure class and minimum 4000-fpm velocity.
    3. Fire Rating: 1-1/2 and 3 hours, as indicated.

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**NOTE TO SPECIFIER**

Type 304, stainless-steel dampers are available for corrosive atmospheres.

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* + 1. Frame: [Curtain type with blades inside airstream] [Curtain type with blades outside airstream] [Multiple-blade type] [Curtain type with blades outside airstream except when located behind grille where blades may be inside airstream]; fabricated with roll-formed, 0.034-inch- thick galvanized steel; with mitered and interlocking corners.
    2. 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. Exception: Omit sleeve where damper-frame width permits direct attachment of perimeter mounting angles on each side of wall or floor; thickness of damper frame must comply with sleeve requirements.
    3. Mounting Orientation: Vertical or horizontal as indicated.
    4. 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.
    5. Horizontal Dampers: Include blade lock and stainless-steel closure spring.
    6. Heat-Responsive Device: Replaceable, temperature rated, fusible links.
  1. SMOKE DAMPERS
     1. 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. Air Balance Inc.; a division of Mestek, Inc.
        2. Greenheck Fan Corporation.
        3. Nailor Industries Inc.
        4. Ruskin Company.
     2. General Requirements: Label according to UL 555S by an NRTL.
     3. Smoke Detector: Integral, factory wired for single-point connection.
     4. Frame: Fabricated with roll-formed, 0.034-inch- thick galvanized steel; with mitered and interlocking corners.
     5. Blades: Roll-formed, horizontal, interlocking, 0.034-inch- thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch- thick, galvanized-steel blade connectors.
     6. Rated pressure and velocity to exceed design airflow conditions.
     7. Mounting Sleeve: Factory-installed, 0.052-inch- thick, galvanized sheet steel; length to suit wall or floor application with factory-furnished silicone calking.
     8. Damper Motors: two-position action.
     9. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Division 23 Section "Common Motor Requirements for HVAC Equipment."
        1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
        2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Division 26 Sections.
        3. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
        4. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf and breakaway torque rating of 150 in. x lbf.
        5. Outdoor Motors and Motors in Outdoor-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at minus 40 deg F.
        6. Nonspring-Return Motors: For dampers larger than 25 sq. ft., size motor for running torque rating of 150 in. x lbf and breakaway torque rating of 300 in. x lbf.
        7. Electrical Connection: 115 V, single phase, 60 Hz.
     10. Accessories:
         1. Auxiliary switches for required signaling, controlling and monitoring.
  2. FLANGE CONNECTORS
     1. 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. Nexus PDQ; Division of Shilco Holdings Inc.
        3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
     2. Material: Galvanized steel.
     3. Gage and Shape: Match connecting ductwork.
  3. TURNING VANES
     1. 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.
     2. 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.
     3. 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."
     4. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions.
  4. DUCT-MOUNTED ACCESS DOORS
     1. 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. American Warming and Ventilating; a division of Mestek, Inc.
        2. Ductmate Industries, Inc.
        3. Flexmaster U.S.A., Inc.
        4. Greenheck Fan Corporation.
        5. McGill AirFlow LLC.
        6. Nailor Industries Inc.
        7. Ventfabrics, Inc.
        8. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
     2. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 2-10, "Duct Access Doors and Panels," and 2-11, "Access Panels - Round Duct."
        1. Door:
           1. Double wall, rectangular.
           2. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
           3. Vision panel.
           4. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
           5. 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:
           1. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
           2. Access Doors up to 18 Inches Square: Two hinges and two sash locks.
           3. Access Doors up to 24 by 48 Inches: Three hinges and two compression latches.
           4. Access Doors Larger Than 24 by 48 Inches: Four hinges and two compression latches with outside and inside handles.
  5. DUCT ACCESS PANEL ASSEMBLIES

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**NOTE TO SPECIFIER**

Retain this for access panels in fire-rated duct systems, such as exhaust ducts for commercial kitchen hoods.

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* + 1. 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. Flame Gard, Inc.
       3. 3M.
    2. Labeled according to UL 1978 by an NRTL.
    3. Panel and Frame: Minimum thickness 0.0428-inch stainless steel.
    4. Fasteners: Stainless steel. Panel fasteners shall not penetrate duct wall.
    5. Gasket: Comply with NFPA 96; grease-tight, high-temperature ceramic fiber, rated for minimum 2000 deg F.
    6. Minimum Pressure Rating: 10-inch wg, positive or negative.
  1. FLEXIBLE CONNECTORS
     1. 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. Ventfabrics, Inc.
        4. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
     2. Materials: Flame-retardant or noncombustible fabrics.
     3. Coatings and Adhesives: Comply with UL 181, Class 1.
     4. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to 2 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.
     5. 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.
     6. 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. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
        3. Service Temperature: Minus 50 to plus 250 deg F.
  2. FLEXIBLE DUCTS
     1. 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. Flexmaster U.S.A., Inc.
        2. McGill AirFlow LLC.
        3. Ward Industries, Inc.; a division of Hart & Cooley, Inc.
     2. Insulated, Flexible Duct: UL 181, Class 1, 2-ply vinyl film supported by helically wound, spring-steel wire; fibrous-glass insulation; aluminized vapor-barrier film.
        1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
        2. Maximum Air Velocity: 4000 fpm.
        3. Temperature Range: Minus 10 to plus 160 deg F.
     3. Flexible Duct Connectors:
        1. Clamps: [Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action] [Nylon strap] in sizes 3 through 18 inches, to suit duct size.
        2. Non-Clamp Connectors: [Adhesive] [Liquid adhesive plus tape] [Adhesive plus sheet metal screws].
  3. DUCT ACCESSORY HARDWARE
     1. 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.
     2. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

1. EXECUTION
   1. INSTALLATION
      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. 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.
      3. Install backdraft and control dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.

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**NOTE TO SPECIFIER**

To minimize duct noise generated by volume dampers, SMACNA recommends locating dampers at least two duct diameters from fittings and as far away as possible from outlets.

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* + 1. 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.
    2. Set dampers to fully open position before testing, adjusting, and balancing.
    3. Install test holes at fan inlets and outlets and elsewhere as indicated.
    4. Install fire and smoke dampers according to UL listing.
    5. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
       1. On both sides of duct coils.
       2. Upstream 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. 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.
    6. Install access doors with swing against duct static pressure.
    7. Access Door Sizes:
       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.
    8. Label access doors according to Division 23 Section "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.
    9. Install flexible connectors to connect ducts to equipment.
    10. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
    11. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws.
    12. Install duct test holes where required for testing and balancing purposes.
  1. FIELD QUALITY CONTROL
     1. 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 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.

END OF SECTION

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