

SECTION 233300 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Backdraft dampers.
 - 2. Manual volume dampers.
 - 3. Fire dampers.
 - 4. Radiation Dampers
 - 5. Wall Caps
 - 6. Roof Caps
 - 7. Domestic Clothes Dryer Wall Boxes
 - 8. Flange connectors.
 - 9. Duct-mounted access doors.
 - 10. Flexible connectors.
 - 11. Flexible ducts.
 - 12. Duct accessory hardware.

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. Control damper installations.
 - b. Radiation 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."
- B. Comply with AMCA 500-D testing for damper rating.

PART 2 - PRODUCTS

2.1 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. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653.
 - 1. Galvanized Coating Designation: G90.
 - 2. Exposed-Surface Finish: Mill phosphatized.
- C. Stainless-Steel Sheets: Comply with ASTM A 480/A, Type 304.
- 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 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.

2.2 BACKDRAFT DAMPERS

- A. Gravity balanced rectangular backdraft dampers.
 - 1. Maximum Air Velocity: 2000 fpm.
 - 2. Maximum System Pressure: 1-inch wg.
 - 3. Frame: 0.052-inch-thick, galvanized sheet steel, with welded corners.
 - 4. Blades: Multiple single-piece blades, maximum 6-inch width, 0.025-inch-thick roll formed aluminum sheet with sealed edges.
 - 5. Blade Action: Parallel.
 - 6. Blade Seals: Felt or vinyl.
 - 7. Blade Axles:
 - a. Material: Zinc plated steel.
 - b. Diameter: 3/16 inch.
 - 8. Return Spring: Adjustable tension.
 - 9. Bearings: Synthetic pivot bushings.
 - 10. Design Basis: Greenheck Model WD100.

2.3 MANUAL VOLUME DAMPERS

- A. Standard rectangular and round manual volume dampers.
 - 1. Standard leakage rating.
 - 2. Suitable for horizontal or vertical applications.
 - 3. Frames: Galvanized steel channels, 22 ga minimum thickness.
 - 4. Blades:

- a. Multiple or single blade.
 - b. Parallel- or opposed-blade design.
 - c. Stiffen damper blades for stability.
 - d. Galvanized steel, 20 ga minimum thickness.
5. Blade Axles: Galvanized steel.
6. Bearings: Synthetic
7. Jackshaft: Galvanized steel.
8. Damper Hardware:
 - a. 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.
 - b. Include center hole to suit damper operating-rod size.
 - c. Include elevated platform for insulated duct mounting. Damper actuator shall completely clear installed insulation.

2.4 FIRE DAMPERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Greenheck Fan Corporation.
 2. METALAIRE, Inc.
 3. Nailor Industries Inc.
 4. Pottorff; a division of PCI Industries, Inc.
 5. Ruskin Company.
- B. General Requirements:
 1. Type: 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 hours.
 4. Frame: Curtain type with blades outside airstream (Type B) 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.
 5. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.
 - a. Minimum Thickness: Minimum 20 gauge and of length to suit application.
 - b. 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.
 6. Mounting Orientation: Vertical or horizontal as indicated.
 7. Horizontal Dampers: Include blade lock and stainless-steel closure spring.
 8. Heat-Responsive Device: Replaceable, 165 deg F rated, fusible links.
 9. Design Basis: Greenheck Model DFD-150

2.5 RADIATION DAMPERS

- A. Radiation Damper for Ductwork
 1. Damper Rating: As required for the project specific ceiling assembly.
 2. Damper Construction:
 - a. UL 555C ceiling damper

- b. Minimum 22 gauge frame
 - c. Minimum 22 gauge roll formed, galvanized steel blades, butterfly type, insulated with ceramic refractory material for dampers larger than 144 in².
 3. Damper Closure Device: Fusible link.
 4. Damper Closure Temperature: 165 deg F.
 5. Accessories:
 - a. Duct access door for inspecting and/or replacing fusible link.
 6. Design Basis: Aire Technologies, Inc. Series 50
- B. Radiation Damper with Air Device Boot
 1. Damper Rating: As required for the project specific ceiling assembly.
 2. Damper Construction:
 - a. UL 555C ceiling damper
 - b. Minimum 22 gauge frame
 - c. Minimum 22 gauge roll formed, galvanized steel blades, butterfly type, insulated with ceramic refractory material for dampers larger than 144 in².
 3. Damper Closure Device: Fusible link.
 4. Damper Closure Temperature: 165 deg F.
 5. Duct Boot Construction:
 - a. Minimum 28 gauge galvanized steel.
 - b. Connection Type: Round duct connections installed at a 90 degree angle ("L") with the air device.
 6. Accessories:
 - a. Thermal blankets where required to protect exposed portion of steel backed diffusers.
 7. Design Basis: Aire Technologies, Inc. Series 50 with Boot

2.6 WALL CAPS

- A. Exhaust Fan Wall Caps:
 1. Material: Galvanized steel.
 2. Style: Hooded.
 3. Connection: Same size as connected duct.
 4. Accessories:
 - a. Backdraft damper
 - b. Bird screen
 5. Finish: Prime and paint to match adjacent wall color.
- B. Domestic Clothes Dryer Wall Caps:
 1. Material: Galvanized steel.
 2. Style: Hooded with 4" deep (wide-mouth) hood outlet as opposed to the standard 2-1/2" deep hood outlet.
 3. Connection: 4-inch round.
 4. Accessories:
 - a. Backdraft damper
 5. Finish: Prime and paint to match adjacent wall color.
 6. Note: Do not install a screen on dryer outlets.

2.7 ROOF CAPS

- A. Exhaust Fan Roof Caps:
 - 1. Material: Galvanized steel.
 - 2. Style: Hooded.
 - 3. Connection: Same size as connected duct.
 - 4. Accessories:
 - a. Backdraft damper
 - b. Bird screen
 - 5. Finish: Prime and paint to match adjacent roof color.
- B. Domestic Clothes Dryer Wall Caps:
 - 1. Material: Galvanized steel.
 - 2. Style: Hooded with 4" deep (wide-mouth) hood outlet as opposed to the standard 2-1/2" deep hood outlet.
 - 3. Connection: 4-inch round.
 - 4. Accessories:
 - a. Backdraft damper
 - 5. Finish: Prime and paint to match adjacent roof color.
 - 6. Note: Do not install a screen on dryer outlets.

2.8 DOMESTIC CLOTHES DRYER WALL BOXES

- A. General:
 - 1. UL Classified for a 1-hour F-Rating in accordance with ANSI/UL 1479 (ASTM E 814).
 - 2. Top duct connection.
 - 3. Fabricated using a deep drawn aluminum manufacturing process.
 - 4. Extension rim protrudes from nailing flange 7/8 inch.
 - 5. Fabricated with eight 1/4 inch mounting holes (4 on each side).
 - 6. Provided with surface that is clean of any oil residue and will adhere paint.
 - 7. Provided with a Gas Port knock-out.
 - 8. Design Basis: In-O-Vate Technologies, Inc. Recessed Dryer Vent Box

2.9 FLANGE CONNECTORS

- A. General:
 - 1. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
 - 2. Material: Galvanized steel.
 - 3. Gage and Shape: Match connecting ductwork.

2.10 DUCT-MOUNTED ACCESS DOORS

- A. 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 sash locks.
 - b. Access Doors up to 18 Inches Square: Piano hinge and two sash locks.

2.11 FLEXIBLE CONNECTORS

- A. General:
1. Materials: Flame-retardant or noncombustible fabrics.
 2. Coatings and Adhesives: Comply with UL 181, Class 1.
 3. Flexible Connector Fabric: Glass fabric double coated with neoprene.
 - a. Minimum Weight: 26 oz./sq. yd..
 - b. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
 - c. Service Temperature: Minus 40 to plus 200 deg F.

2.12 FLEXIBLE DUCTS

- A. Insulated, Flexible Duct: UL 181, Class 1, black polymer film supported by helically wound, spring-steel wire; fibrous-glass insulation; aluminized vapor-barrier film.
1. Pressure Rating: 4-in.w.g. positive; 0.5-in.w.g. negative.
 2. Maximum Air Velocity: 4000 fpm.
 3. Temperature Range: Minus 20 to plus 175 deg F.
 4. Surface Burning Characteristics:
 - a. Flame Spread: Less than 25
 - b. Smoke Developed: Less than 50
 5. Insulation R-Value:
 - a. Supply Ductwork
 - 1) Unventilated Attic Above Insulated Ceiling: Minimum R = 8.0
 - 2) All Other Locations: Minimum R = 6.0
 - b. Return Ductwork
 - 1) All Locations: Minimum R = 4.2
- B. Flexible Duct Connectors:
1. Adhesive, nylon strap, and exterior of connection sealed with mastic.

2.13 DUCT ACCESSORY HARDWARE

- A. Adhesives: High strength, quick-setting, neoprene based, waterproof, and resistant to gasoline and grease.

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.
- C. Install backdraft dampers at outlet of exhaust fans unless damper is integral to exhaust fan or if indicated otherwise.
- D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts.
 - 1. Install steel volume dampers in steel ducts.
- E. Set dampers to fully open position before testing, adjusting, and balancing.
- F. Install test holes at fan inlets and outlets and elsewhere as indicated.
- G. Install fire and radiation dampers according to UL listing.
- H. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
 - 1. Adjacent to and close enough to fire or radiation dampers, to reset or reinstall fusible links.
 - 2. Control devices requiring inspection.
 - 3. Elsewhere as indicated.
- I. Install access doors with swing against duct static pressure.
- J. Access Door Sizes:
 - 1. One-Hand or Inspection Access: Minimum 8 by 5 inches.
 - 2. Two-Hand Access: Minimum 12 by 6 inches.
 - 3. Head and Hand Access: Minimum 18 by 10 inches.
- K. Install flexible connectors to connect ducts to equipment.
- L. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws and finished with a complete coat of mastic.
- M. Install duct test holes where required for testing and balancing purposes.
- N. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop of fans.

3.2 INSTALLATION – WALL VENTS AND ROOF VENTS

- A. Flash and seal all building penetrations weather-tight. Refer to Architectural details for specific requirements.
- B. Do not install any screens on dryer wall or roof outlets.

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 and radiation dampers to verify full range of movement and verify that proper heat-response device is installed.

END OF SECTION 233300