SECTION 230910 DUCTWORK ACCESSORIES

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PART 1. - GENERAL

1.1. RELATED DOCUMENTS

Drawings and general provisions of the contract, including general and supplementary conditions and Division 01 specification sections, apply to this section.

1.2. RELATED SECTIONS

Division 28 Section “Fire Detection and Alarm” for duct mounted fire and smoke detectors.

1.3. QUALITY ASSURANCE

SMACNA Compliance: Comply with SMACNA “HVAC Duct Construction Standards, Metal and Flexible”.

Industry Standards: Comply with ASHRAE recommendations pertaining to construction of ductwork accessories, except as otherwise indicated. Comply with AMCA 500-D testing for damper rating.

UL Compliance: Construct, test, and label fire dampers in accordance with UL Standard 555 “Fire Dampers and Ceiling Dampers.” Leakage labeled under UL 555S.

NFPA Compliance: Comply with applicable provisions of NFPA 90A “Air Conditioning and Ventilating Systems,” NFPA92A pertaining to installation of ductwork accessories.

1.4. SUBMITTALS

Product Data: For each type of product indicated.

Shop Drawings: Indicate installation details in ductwork and other construction. Provide wiring diagrams.

PART 2. - PRODUCTS

2.1. ACCEPTABLE MANUFACTURERS

General: Ductwork Accessories are specified by manufacturer's numbers as to type and quality required. Subject to compliance with requirements, provide manufacturers or approved equivalent manufacturer products as indicated.

2.2. DAMPERS

2.2.1. General

Manual volume dampers shall have a velocity and pressure rating for the size of duct where utilized in duct system and duct rating as indicated in specification section "Metal Ductwork".

2.2.2. Manual Volume Dampers, Rectangular (For sizes 18"wx10"h and smaller)

Damper frame and blades shall be field fabricated and constructed of the same material as the duct in which it is installed. Dampers shall conform to SMACNA construction standards.

Damper blades shall be constructed with 22 gauge minimum, unless otherwise noted to be stainless steel, blades. Provide minimum 3/8" square steel end bearings. Provide Ventlock 635 manual locking dial regulator with tamper-resistant hexagonal lock nut, or approved equivalent. For insulated systems provide 2" hand quadrant standoff bracket.

2.2.3. Manual Volume Dampers, Round (For sizes 12" diameter and smaller)

Damper frame and blades shall be field fabricated and constructed of the same material as the duct in which it is installed. Dampers shall conform to SMACNA construction standards.

Dampers shall be constructed with 24 gauge minimum, unless otherwise noted to be stainless steel, blades but not less than two (2) gages more than the duct gage. Provide minimum 3/8" square steel end bearings. Provide Ventlock 635 manual locking dial regulator with tamper-resistant hexagonal lock nut, or approved equivalent. For insulated systems provide 2" hand quadrant standoff bracket.

2.2.4. Manual Volume Dampers, Rectangular (For sizes 18"wx10"h and larger)

Damper frame and blades shall be factory fabricated. Dampers shall conform to SMACNA construction standards.

Dampers shall consist of a 20 gauge galvanized steel, unless otherwise noted to be stainless steel, hat channel frame with 5" depth triple V type blades fabricated from 16 gauge galvanized steel; ½" plated steel axles; external (out of the airstream) blade to blade linkage. Testing shall be in accordance with AMCA standard 500. For insulated systems provide 2" hand quadrant standoff bracket. Basis of design is Greenheck model MBD-15.

Acceptable Manufacturers

- Greenheck
- Ruskin

2.2.5. Manual Volume Dampers, Round (For sizes 12" diameter to 24" diameter)

Damper frame and blades shall be factory fabricated. Dampers shall conform to SMACNA construction standards.

Damper shall consist of a 20-gauge galvanized steel frame with 6" depth; blades fabricated from 20 gauge galvanized steel; 3/8" plated steel axles. Testing and ratings shall be in accordance with AMCA Standard 500. For insulated systems provide 2" hand quadrant standoff bracket. Basis of design is Greenheck model MBDR-50.

Acceptable Manufacturers
- Greenheck
- Ruskin

2.2.6. Manual Volume Dampers, Rectangular (For Main duct medium pressure and velocities)

Damper frame and blades shall be factory fabricated. Dampers shall conform to SMACNA construction standards.

Dampers shall consist of a 16 gauge galvanized steel, unless otherwise noted to be stainless steel, hat channel frame with 5" depth triple V type blades fabricated from 14 gauge galvanized steel; ½" plated steel axles; external (out of the airstream) blade to blade linkage. Testing shall be in accordance with AMCA standard 500. For insulated systems provide 2" hand quadrant standoff bracket. Basis of design is Greenheck model VCD-33.

Acceptable Manufacturers
- Greenheck
- Ruskin

Manual Volume Dampers, Round (For Main duct medium pressure and velocities up to 24" diameter)

Damper frame and blades shall be factory fabricated. Dampers shall conform to SMACNA construction standards.

Damper shall consist of: a 16 gauge galvanized steel frame with 6" depth; blades fabricated from 16 gauge galvanized steel; 1/2" plated steel axles. Testing and ratings shall be in accordance with AMCA Standard 500. For insulated systems provide 2" hand quadrant standoff bracket. Basis of design is Greenheck model VCDR-50.

Acceptable Manufacturers
Greenheck
Ruskin

2.2.7. Bearing Seals

Ventlok, Inc. or approved equal damper bearing seals on all inboard and outboard bearings.

2.2.8. Remote Damper Operators

Young Regulator damper adjustment device, including rod, steel gear operator (Model 927-B), recessed access regulator (Model 301CDS).

2.2.9. Airtight Isolation Dampers

Dampers shall be round flat blade type tested to be (low leak, bubble-tight) per ASME N520-1995.

Construction: The damper shall be manufactured from 11-gauge and 7-gauge T-304 stainless steel sheet metal. The damper shall have 7-gauge stainless steel blades with a silicone gasket to seal against the inside wall of the damper. The damper shall have 7-gauge flanges on the inlet and outlet with predrilled mounting holes and ¼" neoprene gasket. The damper shall be adequately reinforced to withstand negative pressure listed in duct construction table in specification section 230891. All welding procedures, welders and welder operators shall be qualified in accordance with ASME Boiler and Pressure Vessel Code, Section IX. Basis of Design is Camfil Farr model 3440R-0103. Provide with locking handle for blade operation. Dampers shall be designed to prevent leakage of gas during room or hood decontamination.

Acceptable Manufacturers
- Greenheck

2.2.10. Rectangular Control Damper

Damper shall consist of: a 16-gauge galvanized steel, unless otherwise noted to be stainless steel, channel frame with a 5" depth; opposed blade, airfoil shaped, galvanized steel double skin construction blades (14-gauge equivalent thickness); ½" diameter plated steel axles; extruded silicon rubber or EPDM blade seals; flexible aluminum jamb seals; and external (out of the airstream) blade-to-blade linkage.
Damper shall leak no more then 6 cfm/ft^2 at 4 inwg.
Testing and ratings shall be in accordance with AMCA Standard 500. Provide with 24-volt modulating electric actuator, which uses a 4-20 ma signal. Actuators shall be by Valvcon, Belimo, or approved equivalent. Basis of Design is Greenheck model VCD-33.

Acceptable Manufacturers
- Greenheck
- Ruskin
- Air Balance
- Arrow United Industries
- Penn Ventilator

2.2.11. Round Control Damper

Dampers shall consist of a round channel frame, single axle, and single circular blade fabricated from 10-gauge steel, unless otherwise noted to be stainless steel. Damper axle shall be continuous pivoting in stainless steel sleeve bearings pressed into each side of the damper frame. Provide EPDM seals with blade stops. Testing and ratings shall be in accordance with AMCA Standard 500. Provide with 24-volt modulating electric actuator, which uses a 4-20 ma signal. Actuators shall be by Valvcon, Belimo, or approved equivalent. Basis of Design is Greenheck model HCDR-150.

Acceptable Manufacturers
- Greenheck
- Ruskin
- Air Balance
- Penn Ventilator

2.2.12. Butterfly Backdraft Dampers

Provide stainless steel heavy-duty backdraft damper with one (1) continuous rod in the center and neoprene seals at the edge of the damper to prevent air leakage.

Acceptable Manufacturers
- Cook
- Ruskin
- Air Balance

2.3. TURNING VANES

2.3.1. Turning Vanes

Factory manufactured turning vanes constructed of material to match ductwork, 1-1/2" wide, 24-gauge minimum, curved airfoil double wall blades, supported with bars perpendicular to blades, and set into side strips suitable for screw or pop rivet mounting on opposite sides of duct. Seal over screws or rivets with sealant to make airtight.

2.4. DUCT ACCESS DOORS

Provide for access to all automatic dampers, temperature sensing or control devices, fire dampers, damper motors, plenums, air filters, and all other items within the ductwork or housing which require inspection, service or adjustment, or where indicated.

Access doors in round ductwork shall be 12" x 16" minimum for ductwork 14" diameter and larger; and shall be 8" x 12" for ductwork 12" diameter or less. Rectangular ductwork and plenum doors shall be 12" x 16" minimum and shall be 8" x 12" for ductwork with 12" dimension or less.

Access doors less than 12” square shall have no hinges and two cam locks. Access doors up to 18” shall have continuous hinge and two cam locks. Access doors 18” and larger shall have no hinges and two cam locks per side.

Fabricate doors in conformance with SMACNA details and shall be pressure rated for the installed duct system and be airtight. All gaskets shall be neoprene.

Provide flush frames for un-insulated ductwork and extended frames for externally insulated duct. Provide vision panels where indicated on drawings.

Acceptable Manufacturers

- Ruskin
- Air Balance
- Duro Dyne
- Karp

2.5. FLEXIBLE CONNECTIONS

Provide flexible duct connections wherever ductwork connects to vibration isolated equipment, or where shown. Construct flexible connections of neoprene-coated flameproof fabric crimped into duct flanges for attachment to duct and equipment. Make duct connection with flanges and neoprene gaskets for airtight joint. Provide adequate joint flexibility to allow for thermal, axial, transverse, and torsional movement, and also capable of absorbing vibrations of connected equipment.

Acceptable Manufacturers

- Duro Dyne, Metalfab Canvas
- Flow-Flex, Fabric Connections
- Ventfabrics, Ventfab Metaledge

PART 3. - EXECUTION

3.1. INSTALLATION OF DUCTWORK ACCESSORIES

Bearing Seals: Provide damper end bearings on the ends of all damper rods where they penetrate the duct, to seal and prevent air leakage. Exception: End bearing seals are not required in ductwork systems for warehouse and office areas where the duct pressure class is less than 2" wc.

Remote Damper Operators: Provide Young Regulator damper adjustment device for dampers located above all inaccessible ceilings. Seal airtight around recessed operator to prevent air leakage.

Controls: Install all control devices, sensors, etc. in ductwork or AHU systems where shown on drawings.

Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of construction details as shown in SMACNA standards, and with recognized industry practices to ensure that products serve intended function.

Coordinate with other work, including ductwork, as necessary to interface installation of ductwork accessories properly with other work.

Install access doors for access to all automatic dampers, temperature sensing or control devices, fire dampers, damper motors, plenums, air filters, humidifiers, and all other items within the ductwork or housing which require inspection, service or adjustment. Where items are installed in ductwork and located behind a removable air grille or register, an access door is not required in the ductwork.

Label access doors to indicate purpose.

Label exposed side of lay-in ceilings where access doors occur.

Fire and combination fire/smoke dampers shall be installed using a minimum 20-gauge galvanized steel sleeve, and galvanized steel angle frame (not less than 10-gauge) on each side of opening, attached to damper sleeve. Installation of dampers shall be in accordance with NFPA requirements, and manufacturer instructions, describing the UL approved installation procedure. Seal off space between sleeve and the building construction tightly with fire stopping.

Install turning vanes in all square or rectangular bends, elbows, and tees in supply, return, and exhaust air systems. Ensure that turning vanes are installed at the correct angle for the air turn.

3.2. FIELD QUALITY CONTROL

Operate installed ductwork accessories to demonstrate compliance with airtight construction. Test for air leakage while system is operating to obtain a total system leakage of one percent total design airflow. Repair or replace faulty accessories, to obtain proper operation and leak proof performance.

3.3. ADJUSTING AND CLEANING

Adjusting: Adjust ductwork accessories for proper settings and adjust for proper action.

Extra Stock

Furnish extra fusible links to Owner, one (1) link for every 10 installed of each temperature range; obtain receipt.

END OF SECTION