

SECTION 15820

AIR DUCT ACCESSORIES

PART 1 –GENERAL

1.1 SUMMARY

- A. Section includes back-draft dampers, combination fire-and-smoke dampers, duct access doors, fire dampers, smoke dampers, volume control dampers, flexible duct connections and duct test holes.

1.2 REFERENCES

- A. NFPA 90A (National fire Protection Association) – Installation of Air Conditioning and Ventilating Systems
- B. NFPA 92A (national Fire Protection Association) – Smoke Control Systems
- C. SMACNA (Sheet Metal Air conditioning Contractors’ National Association) – HVAC Duct Construction Standards – Metal and Flexible
- D. UL 33 (Underwriters Laboratories, Inc.) – Heat Responsive Links for Fire-Protection Service
- E. UL 555 (Underwriters Laboratories, Inc.) – Fire Dampers and Ceiling Dampers
- F. UL 555S (Underwriters Laboratories, Inc.) Leakage Rated Dampers for Use in Smoke Control Systems.

1.3 SUBMITTALS

- A. Section 01330 – Submittal Procedures: Submittal Procedures
- B. Shop Drawings: Indicate for shop fabricated assemblies including volume control dampers, duct access doors and duct test holes
- C. Product Data: Submit data for shop fabricated assemblies including volume control dampers, duct access doors, duct test holes and hardware used. Include electrical characteristics and connection requirements
- D. Manufacturer’s Installation Instructions: Submit for Fire and Combination Smoke and Fire Dampers.

- E. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Section 01770 – Execution Requirements: Closeout procedures
- B. Project Record Documents: Record actual locations of access doors test holes, damper, controls and any other flow control device.
- C. Operation and Maintenance Data: Submit for Combination Smoke and Fire Dampers.

1.5 QUALITY ASSURANCE

- A. Perform Work in accordance with applicable codes and laws as well as the Stanford University Facilities Design Guidelines and all Stanford University Contract documents.
- B. Maintain one copy of each document on site.

1.6 QUALIFICATIONS

- A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum three years documented experience.

1.7 PRE-INSTALLATION MEETING

- A. Section 01330 – Administrative Requirements: Pre-installation meeting
- B. Convene minimum one week prior to commencing work of this section.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Store and protect equipment.
- B. Protect dampers from damage to operating linkages and blades.

1.9 FIELD MEASUREMENTS

- A. Verify field measurements prior to fabrication.

1.10 COORDINATION

- A. Section 01330 – Administrative Requirements: Coordination and project conditions.

- B. Coordinate work where appropriate with building control work.

1.11 WARRANTY

- A. Section 01770 – Execution Requirements: Product warranties and product bonds
- B. Provide manufacturer warranty for duct accessories.

1.12 EXTRA MATERIALS

- A. Section 01770 – Execution Requirements: Spare parts and maintenance products

PART 2 –PRODUCTS

2.1 BACKDRAFT DAMPERS

- A. Product Description: Gravity Back-draft Dampers, size 18 x 18 inches or smaller, furnished with air moving equipment: Air moving equipment manufacturers standard construction.
- B. Multi-Blade-back-draft dampers: Parallel-action, gravity-balanced, Galvanized 16 gage thick steel. Blades, maximum 6 inch width, center pivoted, with felt or flexible vinyl sealed edges. Blades linked together in rattle-free manner with 90-degree stop, steel ball bearings and plated steel pivot pin. Provide dampers with adjustment device to permit setting for varying differential static pressure.

2.2 COMBINATION FIRE AND SMOKE DAMPERS

- A. Dampers are as manufactured by Ruskin Manufacturing, Greenheck, or approved equal.
- B. Fabricate and install in accordance with NFPA 90A, UL 555 and UL 555S.
- C. Multiple-Blade Dampers: Fabricate with 14 gage galvanized steel frame and blades. Provide oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, stainless steel jamb seals, 1/8 x 1/2 inch plated steel concealed linkage, stainless steel closure spring, blade stops and lock, and 1/2 inch actuator shaft. Operators; UL listed and labeled spring return (pneumatic type suitable for operation on 0-20 psig instrument air or electric type suitable for 120 volts, single phase, 60 Hz. Provide end switches to indicate damper position. A green LED pilot light indicates damper fully open, a red LED pilot light indicates damper fully closed. A keyed switch for testing the damper shall be installed. Locate damper operator on exterior of duct and link to damper operating shaft or install directly on the shaft accessible for maintenance in either position. Operators are as manufactured by Honeywell or

Belimo for this service unless approved otherwise in writing by Stanford responsible Engineer.

- D. Normally Closed Smoke Responsive Fire Dampers: Curtain type, opening by gravity upon actuation of Electro-thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure.
- E. Normally Open Smoke Responsive Fire Dampers: Curtain type, closing upon actuations of Electro-thermal link, flexible stainless steel blade edge seals to provide constant sealing pressure, stainless steel springs with locking devices to ensure positive closure for units mounted horizontally.
- F. Thermal Link: Fusible link melting at 165 degrees F.

2.3 DUCT ACCESS DOORS

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards – Metal and Flexible and as indicated.
- B. Fabrication: Rigid and close fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum 1-inch thick insulation with sheet metal cover.
 - 1. Less than 12 inches square, secure with sash locks
 - 2. Up to 18 inches square: Provide two hinges and two sash locks.
 - 3. Up to 24 x 48 inches: Three hinges and two compression latches (with outside and inside handles).
 - 4. Larger sizes: Provide an additional hinge.
 - 5. Access panels with sheet metal screw fasteners are not acceptable.

2.4 FIRE DAMPERS

- A. Provide in accordance with NFPA 90A and UL 555 and manufacturer's condition of listing. Dampers shall be permanently marked for use in static or dynamic systems.
- B. Ceiling Dampers: Galvanized steel, 22 gage frame and 16 gage flap, two layers 0.125 inch ceramic fiber on top side, and one layer on bottom side for round flaps, with locking clip.
- C. Horizontal Dampers: Galvanized steel, 22-gage frame, stainless steel closure spring, and lightweight heat retardant non-asbestos fabric blanket.
- D. Curtain Type Dampers: Galvanized steel with interlocking blades. Provide stainless steel closure springs and latches for horizontal installations or closure under airflow conditions. Configure with blades out of air stream except for 1.0 inch pressure class ducts up to 12 inches in height.

- E. Multiple Blade Dampers: 14 gage galvanized steel frame and blades, oil-impregnated bronze or stainless steel sleeve bearings and plated steel axles, 1/8 x1/2 inch plated steel concealed linkage, stainless steel closure spring, blade stops and lock.
- F. Fusible links: UL 33, separate at 160 degree F with adjustable link straps for combination fire/balancing dampers.

2.5 SMOKE DAMPERS

- A. Fabricate in accordance with NFPA 90A and UL 555S and as indicated.
- B. Dampers: UL Class 1 curtain or multiple blade type fire damper, normally open or closed automatically operated by pneumatic or electric actuator depending on design and application.
- C. Thermal Link: Fusible link melting at 165 degree F.

2.6 VOLUME CONTROL DAMPERS

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards – Metal and Flexible and as indicated.
- B. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inches. Assemble center and edge crimped blades in prime coated or galvanized frame channel with suitable hardware.
- C. End Bearings: Except in round ductwork 12 inches and smaller, provide end bearings. On multiple blade dampers, provide oil impregnated nylon or sintered bronze, or stainless steel bearings. Provide closed end bearings on all ducts having a pressure classification over 2 inches wg.
- D. Quadrants:
 - 1. Provide locking, indicating quadrant regulators on single and multi-blade dampers, indicate position by marking at end of shaft.
 - 2. On insulated ducts mount quadrant regulators on standoff mounting brackets bases or adapters.
 - 3. Where rod lengths exceed 39 inches provide regulator at both ends.

2.7 FLEXIBLE DUCT CONNECTIONS

- A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards – Metal and Flexible and as indicated.
- B. Connector: Fabric crimped into metal edging strip.

1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric conforming to NFPA 90A, minimum density 30 oz per sq yd.
 2. Net Fabric Width: Approximately 2 inches wide.
 3. Metal: 3 inches wide, 24 gage galvanized steel.
- C. Leaded Vinyl Sheet: Minimum 0.55 inch thick, 0.87 lbs per sq ft, 10 dB attenuation in 10 to 10,000 Hz range.

2.8 VARIABLE AIR VOLUME (VAV) BOXES.

- A. Use Titus, Metal Aire or approved equal.
Each assembly shall be pressure independent. It will provide air flow regulation with +50 fpm, regardless of duct pressure fluctuation, through its entire rated cfm range. Each assembly shall reset to any air flow between zero and the maximum cfm without changing orifices or any other parts. CFM limitations will not be accepted. At 2000 fpm inlet velocity the differential static pressure for any size shall not exceed 0.15" w.g. for the basic assembly or 0.45" w.g. with the sound attenuator added. For control of VAV boxes refer to Controls section of the FDG.

2.9 DUCT TEST HOLES

- A. Temporary Test Holes: Cut or drill in ducts as required. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist on metal caps.
- B. Permanent Test Holes: Factory fabricated air tight flanged fittings with screw cap. Provide extended neck fittings to clear insulation.

PART 3 –EXECUTION

3.1 EXAMINATION

- A. Section 01330 – Administrative Requirements: coordination and project conditions
- B. Verify rated walls are ready for fire damper installation
- C. Verify installed ductwork and equipment is ready for accessories.

3.2 INSTALLATION

- A. Install in accordance with NFPA 90A and follow SMACNA HVAC Duct Construction Standards – Metal and Flexible.
- B. Install work in accordance with applicable codes and laws as well as the Stanford University Facilities Design Guidelines and all Stanford University Contract documents.

- C. Provide back-draft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated. Do not install on fume exhaust fans.
- D. Provide duct access doors for inspection and cleaning before and after filters, coils, fans, automatic dampers, at fire dampers combination fire and smoke dampers and elsewhere as indicated. Provide for cleaning kitchen exhaust ductwork in accordance with NFPA 96. Provide minimum 8 x 8 inch size for hand access, 24 x 24 inch size for shoulder access and as indicated. Review locations prior to fabrication.
- E. Provide duct test holes where indicated and required for testing and balancing purposes.
- F. Provide fire dampers, combination fire and smoke dampers or smoke dampers as required by design and application at locations indicated on contract drawings. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.
- G. Install smoke dampers and combination smoke and fire dampers in accordance with NFPA 92A.

3.3 DEMONSTRATION AND TESTING

- A. Demonstrate re-setting of fire dampers to Owner's representative.

END OF SECTION