

SECTION 15610

DUCTWORK ACCESSORIES

PART 1 - GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Accessories for ductwork serving HVAC systems.
 - a) Flexible connectors.
 - b) Duct mounted access doors.
 - c) Volume control dampers.
 - d) Fire dampers.
 - e) Fire/smoke dampers.
 - f) Turning vanes.
 - g) Accessories hardware.

- B. Related Sections:
 - 1. Section 00700 "General Conditions."
 - 2. Section 00800 "Supplementary Conditions."
 - 3. Section 15100 "Mechanical Materials & Methods."
 - 4. Section 15600 "Ductwork."

1.02 REFERENCES

- A. Comply with the following standards:
 - 1. SMACNA "HVAC Duct Construction Standards - Metal & Flexible", 2d ed., 1995.
 - 2. NFPA 90A "Installation of Air Conditioning & Ventilating Systems", 1993 ed.
 - 3. U.L. Standard 555-1990 "Standard for Fire Dampers", 4th ed.
 - 4. U.L Standard 555S-1990 "Standard for Fire/Smoke Dampers", 4th ed.

1.03 SUBMITTALS

- A. Product Data:
 - 1. Flexible connectors.
 - 2. Access doors.
 - 3. Fire dampers.
 - 4. Fire/smoke dampers.
 - 5. Turning vanes.

- B. Shop Drawings:
 - 1. Fire dampers
 - 2. Fire/smoke dampers

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Fire Dampers, Fire/Smoke Dampers
 - 1. Ruskin Manufacturing Co.
 - 2. Air Balance, Inc.

2.02 EQUIPMENT

- A. Flexible Connectors:
 - 1. Flexible connectors shall be constructed of flame-retardant, non combustible fabrics, coatings and adhesives complying with U.L. Standard 181, class 1. Standard metal-edge connectors shall be factory fabricated with a flexible, fabric strip 3 inches wide minimum, 10 inches maximum, attached to two strips of three inch wide 24 gauge galvanized sheet steel or 0.032 gauge sheet aluminum. Select metal that is compatible with the duct system. Edges of metal strips shall be hemmed on the sides that connect to ducts. Fabric shall be fastened to metal similar to SMACNA "HVAC Duct Construction Standards," 2d ed., 1995, figure 2-17.
- B. Duct Mounted Access Doors:
 - 1. Frame:
 - a. Frame shall be galvanized sheet steel of the thickness as specified. Frame shall have foam or neoprene gasket to provide and airtight seal.
 - 2. Door:
 - a. Door shall be double-wall, galvanized sheet steel construction, one inch by one inch butt hinges and sash locks as specified. Door shall have a continuous foam or neoprene gasket to prevent leakage.
 - 3. Insulation:
 - a. Insulation shall be one inch thick fiberglass or polystyrene foam board.
 - 4. General:
 - a. Access door assembly shall be constructed in accordance with the following table:

	Door Size	No. Hinges	No. Locks	Metal Gage		
				Frame	Door	Back
2" w.g. Static and Less	12" x 12"	2	1-S	24	26	26
	16" x 20"	2	2-S	22	24	26
	24" x 24"	3	2-S	22	22	26
3" w.g. Static	12" x 12"	2	1-S	22	22	26
	26" x 20"	2	1-S, 1-T, 1-B	20	20	26
	24" x 24"	3	2-S, 1-T, 1-B	20	20	24
4" w.g. to	12" x 12"	2	1-S, 1-T, 1-B	20	20	26
	16" x 20"	3	2-S, 1-T, 1-B	20	18	24

10" w.g.	24" x 24"	3	2-S, 2-T, 2-B	18	18	24
S = Side opposite hinges, T = Top, B = Bottom						

A. Volume Control Dampers:

1. Single-Blade Type:

- a. Dampers up to 12 inches in height and 18 inches in width shall be constructed of 22 gauge minimum galvanized sheet steel. All damper edges shall be hemmed. Damper shall be sized to provide one-eighth inch clearance on all edges as installed in the duct. Damper shall have a three-eighths inch locking quadrant on one end and a three-eighths inch pin on the other end. Stiffen damper as required to prevent deflection and unwanted vibration.
- b. Dampers up to 12 inches in height and 48 inches in width shall be constructed of 18 gauge minimum galvanized sheet steel. All damper edges shall be hemmed. Damper shall be sized to provide one-eighth inch clearance on all sides. Damper shall have one-half inch locking quadrant and a one-half inch diameter continuous rod and end bearing. Damper shall be stiffened as required to prevent deflection and unwanted vibration.
- c. Dampers in round ducts shall be single-blade type, constructed of 24 gauge minimum or two sheet metal gauges larger than the duct it is installed in, whichever is greater. Damper shall have three-eighths inch pins on two opposite quadrants for mounting. Dampers larger than 12 inches diameter shall have a continuous three-eighths inch rod. Damper shall have an adjusting arm and wingnut to permit locking. Damper shall be stiffened as required to prevent deflection and unwanted vibration.

2. Opposed-Blade Type:

- a. Dampers over 12 inches in height shall be opposed-blade design. Dampers shall incorporate a steel channel frame, angle stops, three-eighths inch diameter shafts, 18-gauge neoprene gasketed blades, nylon or bronze bushings, and connecting linkage. Provide shaft extension on installations where the damper is inaccessible.

B. Fire Dampers:

- 1. Fire dampers shall be listed to meet U.L. Standard 555-1990, "Standard for Fire Dampers."
- 2. Fire dampers shall be rated as indicated on the contract documents.
- 3. Fire dampers shall provide 100% free-area of the nominal duct dimensions in which it is installed. Dampers shall be curtain-type with blades constructed of 22 gauge minimum galvanized steel. Frame shall be type "A", one-piece roll formed 22 gauge galvanized steel.

Damper shall have a U.L. listed, replaceable fused link with a 165°F rating unless noted otherwise. Damper shall include a factory made and installed sleeve of two sheet metal gauges larger than the duct it is installed in but not less than 20 gauge.

Sleeve shall not extend over six inches beyond the rated opening. Dampers installed in the horizontal position shall have a constant force, coiled negator type 301 stainless steel spring.

C. Fire/Smoke Dampers:

1. Fire/Smoke dampers shall be listed to meet U.L. Standard 555-1990 "Standard for Fire Dampers," fourth edition and U.L. Standard 555S-1983 "Standard for Leakage Rated Dampers for use in Smoke Control Systems."
2. Fire/Smoke dampers shall be rated as indicated on the contract documents for fire resistance and leakage class.
3. Fire/Smoke dampers shall be constructed as follows:
 - a. Frame: 16 gauge minimum galvanized steel hat channel.
 - b. Blades: 16 gauge minimum galvanized steel, eight inches maximum width, parallel action.
 - c. Axles: one-half inch square solid steel.
 - d. Bearings: oil impregnated bronze.
 - e. Linkage: on-blade fixed type, located within the airstream, galvanized steel angle interconnect with plated steel brackets and pivots.
 - f. Stops: 18 gauge minimum steel.
 - g. Blade Seals: elastomer material.
 - h. Side Jamb Seals: stainless steel.
 - i. Sleeve: 20 gauge minimum or two gauges larger than the duct, whichever is greater.
 - j. Caulking: Hardcast Irongrip 601 or U.L. listed equivalent.
 - k. Finish: mill galvanized steel.
 - l. Actuator: electric with 165°F thermal disc or pneumatic with 165°F fusible link. Select actuator type compatible with building control system.
4. Fire/Smoke damper sleeves shall be sized so the sleeve does not extend more than six inches beyond the rationed opening except on the actuator side where the sleeve may extend to a maximum of sixteen inches beyond the rated opening.

D. Turning Vanes:

1. Turning Vanes shall be single-thickness type, welded to their runners.
 - a. Small Vanes shall have a radius of two inches, one and one half inch spacing and be constructed of 24 gauge minimum galvanized sheet steel.

E. Grilles, Registers and Diffusers: Aluminum, non rusting fully insulated.

1. General: All registers and grilles shall be product of a single manufacturer; shall be provided with factory applied baked enamel finish to match adjacent surfaces, except as otherwise specified. Where lay-in type panels and frames are specified,

Check ceiling suspension system and coordinate interfacing. All grilles, diffusers and registers shall be mounted with countersunk screws with finish to match respective items.

2. Manufacturers representative shall verify that grilles, registers and diffusers shall not exceed a NC level of 25 at airflow rate indicated.
3. Square and Rectangular Ceiling Diffusers (CD): Titus Model TDC, aluminum construction with standard off white finish, designed for one, two, three, and four-way diffusion as indicated on plans. Where lay-in ceilings occur, mount each diffuser in a 2' x 2' lay-in ceiling panels with finish to match diffuser. Where plaster or gypsum board ceiling occur use type 1 border with plaster frame. Provide diffuser with square/rectangular to round adapter where required. Provide opposed blade damper where fire damper is not indicated. Where fire damper is indicated, provide minimum 1-1/2 hour damper as specified herein before under "SHEET METAL DUCTWORK". Entire assembly shall be UL labeled and classified-coordinate with fire damper manufacturer as required.
4. Wall Supply Register (WSR): Double deflection, 3/4-inch blade spacing, aluminum construction, equal to Titus Model 300FS. Provide opposed blade damper and white finish.
5. Ceiling Return Grille (CRG): Shall be eggcrate style grille with 1/2" x 1/2" x 1/2" aluminum grid, 1-1/4 inch aluminum border. Construction shall be aluminum. Provide with standard white enamel finish. Grille shall be to Titus Model 50R.
6. Ceiling Exhaust Grille(CEG): Same as specified above for ceiling return grille.
7. Ceiling Transfer Grille (CTG): Same as specified above for ceiling return grille.
8. Wall Return Register (WRR): Wall return registers shall be aluminum construction, 1/2" blade spacing, 30 degree deflection, equal to Titus Model 25R. Provide with opposed blade volume damper and white finish. Select such that blades are parallel to floor.
9. Wall Return Grille (WRG): Wall return grilles shall be the same as the wall return registers specified above except omit opposed blade damper.
10. Wall Transfer Grille (WTG): Same as wall return registers specified above except omit opposed blade damper.

F. Brick Vents

1. General: Furnish performance ratings for approval.
2. Brick Vents: Brick vents shall be extruded aluminum construction with blades set at 45 degrees and with built-in continuous drip and water stop to provide maximum protection against water entry. Provide with prime coat. Brick vents shall be equal to Titus Brick 'n Block Vent.
3. Acceptable Manufacturers for brick vents are Titus, Reliable, Ruskin or Industrial Louvers.

G. Electric Duct Heaters

1. Electric Duct Heater (EDH): Elements shall be made of alloy resistor wire, centered and permanently encased within refractory material, surrounded by steel sheath. Helical fins shall be brazed to the sheath to increase heat transfer. Sheath and fins shall be permanently coated with a high temperature ceramic for corrosion resistance. Safety controls shall include primary fail safe type capillary cut-out with automatic reset, secondary over-temperature protection consisting of sufficient number of fail safe, trip free capillary type manual resets controlling back-up contractors. Manual resets shall be resettable without opening cover. Units shall be UL listed and equal to Markel CHMS series. Provide with built-in differential pressure switch, control transformer, staging controller with low voltage thermostat, and other appurtenances as required to make for a complete heating system except for field wiring. Acceptable Manufacturers for electric duct heaters are Markel and Warren.

PART 3 - EXECUTION

3.01 EXECUTION

- A. Flexible Connectors:
 1. Install in accordance with the manufacturers instructions.
 2. The flexible connector, in the final installed state shall not have any tensile or compressive forces imposed on the connector.
- B. Duct Mounted Access Doors:
 1. Install access doors square and parallel to duct edges in a location which permits servicing of the equipment the access door is intended to serve.
 2. Secure access doors as recommended by the manufacturer.
- C. Volume Control Dampers:
 1. Install dampers as close as possible to the branch take-off from the duct main.
- D. Install fire dampers as detailed on the contract documents and as recommended by the manufacturer. Installation shall comply with U.L. Standard 555-1990.
- E. Fire/Smoke Dampers
 1. Install Fire/Smoke dampers as detailed on the contract documents and as recommended by the manufacturer. Installation shall comply with U.L. Standard 555S-1990.
- F. Install turning vanes where shown on the contract documents. Secure vane assemblies by means of sheet-metal screws or spot welds not more than 6 inches on center.

END OF SECTION