**Price LFD Laminar Flow Diffuser**

***Division 23 – Heating, Ventilating, and Air Conditioning***

***Section 23 37 13 – Diffusers, Registers, and Grilles***

The following specification is for a defined application. Price would be pleased to assist in developing a specification for your specific need.

**PART 1 – GENERAL**

**1.01 Section includes**:

1. Laminar Flow Diffuser.

**1.02 Related Requirements**

1. Section 01 30 00 – Administrative Requirements
2. Section 01 40 00 – Quality Requirements
3. Section 01 60 00 – Product Requirements
4. Section 01 74 21 – Construction/Demolition Waste Management and Disposal
5. Section 01 78 00 – Closeout Submittals
6. Section 01 79 00 – Demonstration and Training
7. Section 23 31 00 – HVAC Ducts and Casings
8. Section 23 32 00 – Air Plenums and Chases

**1.03 Reference Standards**

A. ASHRAE Standard 55 – Thermal Environmental Conditions for Human Occupancy; 2013

B. ASHRAE Standard 70 – Method of Testing the Performance of Air Outlets and Air Inlets; 2006

C. ASHRAE Standard 170 – Ventilation of Health Care Facilities; 2013

D. ASTM Standard E84 – Standard Test Method for Surface Burning Characteristics of Building Materials; 2016

E. ASTM D1308 – Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Organic Finishes; 2013

F. ASTM D4752 – Standard Practice for Measuring MEK Resistance of Ethyl Silicate (Inorganic) Zinc-Rich Primers by Solvent Rub; 2015

G. CSA Standard Z317.2-10 – Special Requirements for Heating, Ventilation, and Air-conditioning (HVAC) Systems in Health Care Facilities; 2010

H. NFPA Standard 90A – Standard for the Installation of Air-Conditioning and Ventilating Systems; 2015

I. SMACNA (SRM) – Seismic Restraint Manual Guidelines for Mechanical Systems; Sheet Metal and Air Conditioning Contractors’ National Association; 2008

J. UL Standard 723 – Standard for Test for Surface Burning Characteristics of Building Materials; 2008

**1.04 Administrative Requirements**

A. Pre-installation Meeting: Conduct a pre-installation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

B. Sequencing: Ensure that utility connections are achieved in an orderly and efficient manner.

**1.05 Submittals**

A. See Section 01 30 00 – Administrative Requirements for submittal procedures.

B. Product Data: Provide data indicating configuration, general assembly, and materials used in fabrication. Include catalog performance ratings that indicate air flow, static pressure, and NC designation.

C. Shop Drawings: Indicate configuration, general assembly, and materials used in fabrication.

D. Certificates: Certify that air capacities, pressure drops, and selection procedures meet or exceed specified requirements.

E. Manufacturer's Installation Instructions: Indicate support and hanging details, installation instructions, recommendations, and service clearances required.

F. Project Record Documents: Record actual locations of units and control components.

G. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts lists.

H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements for additional provisions.

2. Extra Filters: Furnish one spare filter as required per component originally supplied with filters.

**1.06 Quality Assurance**

1. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section, with minimum ten years of documented experience.
2. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

**1.07 Warranty**

1. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
2. Price Industries warrants that, at the time of shipment, the LFD will be free from defects arising from manufacturing, workmanship, or a failure to adhere to Price Industries’ published catalog specifications and specified material. If Price Industries is notified in writing of any such defect within (1) year from the date of shipment, Price Industries will, at its sole option, repair, replace, or refund the purchase price paid by the Representative for the Product. Such remedies are the exclusive remedies available under this warranty.

**PART 2 – PRODUCTS**

**2.01** **Laminar Flow Diffuser**

1. Basis of Design: Price Industries, Inc.
2. Laminar flow diffusers: Model LFD
3. General:
4. The laminar flow diffusers shall be non-aspirating, unidirectional type, providing a uniform vertical projection of air at controlled low velocities and minimal entrainment of room air, satisfying the requirements of ASHRAE Standard 170.
5. Laminar Flow Diffusers [Price Model LFD]:
	1. Plenum material shall be one of the following options:
		1. Aluminum
		2. 304 Stainless steel
		3. Steel
	2. Face and frame material shall be one of the following options:
		1. Aluminum
		2. 304 stainless steel
	3. Construction
		1. Plenum shall be [spot welded] or [continuously welded – aluminum or stainless steel units only].
		2. Plenum shall be divided into an upper and lower chamber utilizing an internal pressure equalization baffle to promote uniform face velocity.
		3. Air shall be admitted to the top plenum chamber through an inlet collar and an optional butterfly style volume control damper.
		4. The diffuser plenum shall feature four (4) integral hanger tabs for securing the unit to structural supports above the ceiling.
		5. Mounting frames shall utilize corner alignment brackets.
		6. The 13% free-area perforated distribution plate shall be secured to the face using stainless steel quarter-turn fasteners with anti-slip, snap-in retainers and stainless steel retainer cables for ease of installation and removal.
	4. Plenum Finish shall be one of the following:
		1. All steel and aluminum plenums shall have a white [B12 Standard White] or [B11 Pure White] baked-on powder coat finish.
			1. The paint finish must demonstrate no degradation when tested in accordance with ASTM D1308 (covered and spot immersion) and ASTM D4752 (MEK double rub) paint durability tests.
			2. The paint film thickness shall be a minimum of 2.0 mils.
			3. The finish shall have a hardness of 2H.
			4. The finish shall withstand a minimum salt spray exposure of 1000 hours.
			5. The finish shall have an impact resistance of 80 in-lb.
		2. All steel and aluminum plenums shall have a baked-on powder coat finish in a color to match a customer supplied sample.
		3. Stainless steel plenums shall have a mill finish.
	5. Face and frame finish shall be one of the following:
		1. All aluminum components shall have a white [B12 Standard White] or [B11 Pure White] baked-on powder coat finish.
			1. The paint finish must demonstrate no degradation when tested in accordance with ASTM D1308 (covered and spot immersion) and ASTM D4752 (MEK double rub) paint durability tests.
			2. The paint film thickness shall be a minimum of 2.0 mils.
			3. The finish shall have a hardness of 2H.
			4. The finish shall withstand a minimum salt spray exposure of 1000 hours.
			5. The finish shall have an impact resistance of 80 in-lb.
		2. All aluminum components shall have a baked-on powder coat finish in a color to match a customer supplied sample.
		3. Stainless steel with #4 brushed finish on all exposed surfaces.
	6. Options:
		1. External Insulation
			1. The diffuser plenum shall be externally insulated with [½”] or [1&½”] aluminum foil-backed fiberglass insulation
			2. Insulation shall not contain formaldehyde.
			3. Insulation and adhesive surface burning characteristics shall have a maximum flame/smoke spread of 25/50 when tested in accordance with ASTM E84. Secure insulation with adhesive. Coat edges exposed to airstream with NFPA 90A approved sealant.
			4. Insulation shall meet the requirements of ASTM-84 and UL 723.
		2. The butterfly style damper shall be supplied with one of the following finishes:
			1. Standard white baked-on powder finish.
			2. Brushed stainless steel.
		3. Protective Film:
			1. The diffuser face and inlet shall be covered with a protective film, to be removed at time of installation.
		4. Secondary Plenum with Side Inlet:
			1. The secondary plenum shall be spot welded and secured to top of primary plenum via [fasteners - aluminum or steel units only] or [spot welded - stainless steel units only)
			2. Secondary Plenum will retain same finish as primary plenum.
			3. Secondary Plenum shall feature an equivalent oval inlet on the [length side] or [width side] of the plenum.

**PART 3 – EXECUTION**

**3.01 Examination**

 A. Verify that conditions are suitable for installation.

 B. Verify that field measurements are as shown on the drawings.

**3.02 Installation**

1. Install in accordance with manufacturer’s instructions.
2. See drawings for the size(s) and locations of laminar flow diffuser inlets.
3. Support components individually from structure in accordance with SMACNA (SRM).
4. Do not support components from ductwork.
5. Connect to ductwork in accordance with Section 203 31 00.

**3.03 Adjusting**

1. Ensure supply air to the laminar flow diffusers by performing pitot traverse of the main supply duct.
2. Balance outlets according to manufacturer’s recommendations.
3. Verify that field measurements are as shown on the drawings.

**3.04 Field Quality Control**

1. See Section 01 40 00 – Quality Requirements for additional requirements.

**3.05 Cleaning**

1. See Section 01 74 19 – Construction Waste Management and Disposal for additional requirements.

**3.06 Closeout Activities**

1. See Section 01 78 00 – Closeout Submittals for closeout documentation requirements.
2. See Section 01 79 00 – Demonstration and Training for additional requirements.