Laminar Flow Diffuser with Integrated High Efficiency Filter **LFDCX Series**

Product Information

Models

Aluminum Construction **LFDCX**

Price LFDCX Series HEPA/ULPA Filter Modules are lightweight, low profile ducted supply modules that are designed for critical environments where ultraclean air is required. To achieve this, the LFDCX uses an integrated Dimple Pleat® media pack that is available in 2" and 4" depths depending on performance requirements.

The unit has an adjustable distribution plate that allows for minor adjustments of room-side air flow. An anodized extruded aluminum center divider provides access to this distribution plate, and also allows for the measurement of resistance and challenge aerosol. A painted expanded metal faceguard on the downstream side protects the media.

All Price LFDCX units are factory tested for filter leakage to ensure they meet the highest standards of performance and safety.

Features

- Anodized extruded aluminum frame with one-piece aluminum top/inlet collar
- Dimple Pleat® filter pack for lightweight, low profile design.
- Fire retardant solid urethane sealant to seal media pack to frame.
- UL 900 Class 1 listed and Factory Mutual approved.
- Available filter efficiencies:

  HEPA 99.99% at 0.3 µm

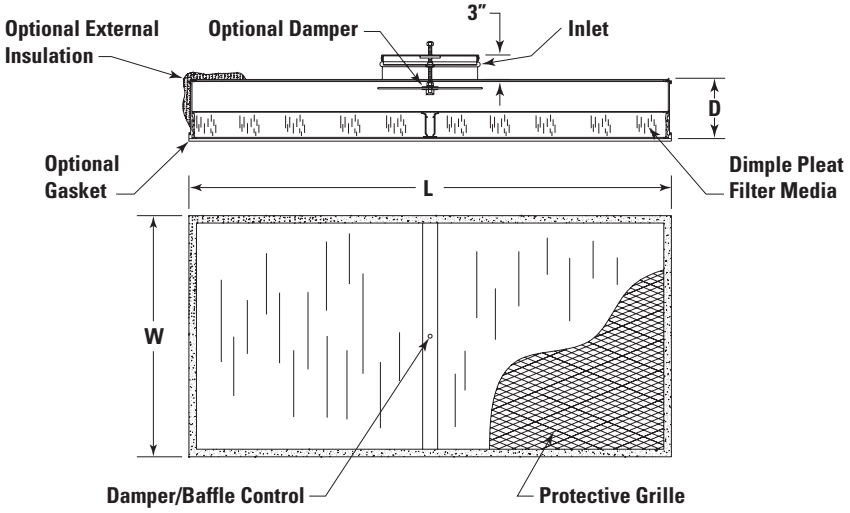
  ULPA 99.9995% at 0.12 µm

Application

The LFDCX Series is used in ducted supply applications where HEPA/ULPA filtration is required. The filter frame has a flat flange to mount in a gasketed T-bar ceiling system, such as the Price HDCR and CR Series ceiling systems.

They typically operate at a velocity of 100 fpm. If necessary, filters of standard construction can be operated up to 150 fpm face velocity and a static pressure of 2.0 in. w.g. As with all HEPA/ULPA filters, high efficiency ASHRAE-rated pre-filters are recommended.

The flexibility of the LFDCX means that it is suited to a variety of clean space environments. This includes the semiconductor industry, aerospace industry, pharmaceutical/biotechnology industry, food processing industry and the compact disc/disc drive manufacturing industry.



Filter Sizes:

Nominal Module Size	Width (W)	Length (L)	Filter Area
24" x 24"	23.625" (600)	23.625" (600)	3.594 ft²
24" x 36"	23.625" (600)	35.625" (905)	5.490 ft²
24" x 42"	23.625" (600)	41.625" (1057)	6.438 ft²
24" x 48"	23.625" (600)	47.625" (1210)	7.386 ft²

Nominal Pack Depth	Depth (D)
2" Dimple Pleat	5.531"
4" Dimple Pleat	7.188"

All Metric dimensions ( ) are soft conversion.
Imperial dimensions are converted to metric and rounded to the nearest millimeter.

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Product Options

Inlet Sizes
LFDCX Series Modules are available with an 8", 10", 12" or 14" diameter inlet. The inlet collars are designed with a continuous rib to help retain the ductwork on the collar.

Adjustable Distribution Plate
- Allows air flow to be fine-tuned from roomside.

Butterfly Damper
- Permits a wider adjustment of air flow from roomside
- Includes a fixed distribution plate and swaged inlet.

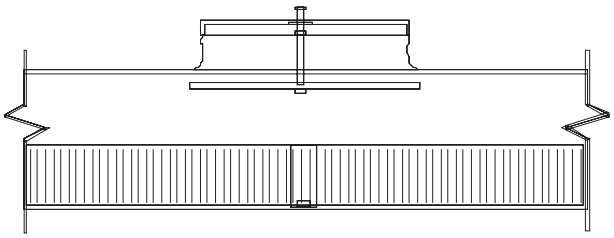
Fixed Distribution Plate
- For applications where no roomside air flow adjustment is required.

Insulated Housing
- Controls moisture condensation or thermal gain
- 2" fiberglass with aluminum foil backing
- For modules installed side-by-side, insulation only covers the top
- For modules installed separately, insulation also covers the sides
- Insulation meets ASTM E 84 and UL 723 requirements.

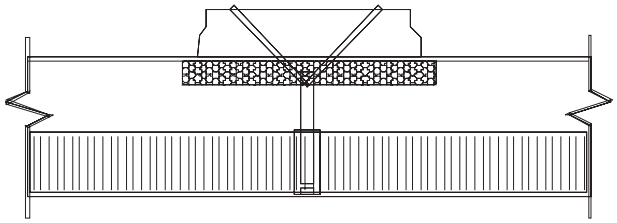
Protective Grilles
- Standard grille is 65% open expanded metal painted white
- Other options include:
  - Anodized aluminum with 40% open circular perforations
  - Type 304 stainless steel with 40% open circular perforations

Gaskets
- Gasket material can be requested to be installed in ungasketed T-bar installations
- White or black 1/4" EPT polyethylene butyl tape

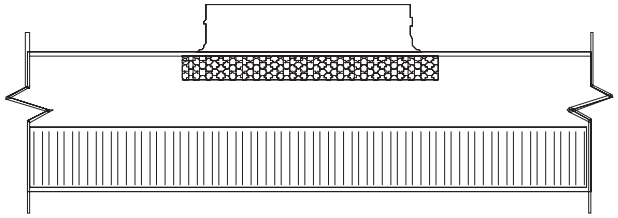
Adjustable Distribution Plate



Butterfly Damper



Fixed Distribution Plate



Filter Testing Process

ULPA Efficiency Testing

Each ULPA filter module is tested for efficiency and resistance by a Dual Laser Spectrometer. The spectrometer simultaneously takes samples from the upstream and downstream sides of the filter to determine the percentage of penetration. The standard test challenge is an aerosol of PSL (polystyrene latex) spheres. The laser instrument detects the size of each penetrating sphere in seven particle size classes from 0.07 µm to 1.0 µm. Static pressure readings are taken according to volumetric parameters (i.e., 100 cfm per square foot of media face area) and are expressed in inches of water gauge.

Standard Scan Testing of HEPA and ULPA Modules

Every module is scan tested per Section 6.2 of IEST-RP-CC-034.1 for "pinhole" leaks in the media, edge sealant and frame. As the filter is challenged with the PSL aerosol, the test operator scans the face and edge with a probe attached to a laser particle counter. Any reading greater than .01% of the upstream concentration is unacceptable, and the filter must either be rejected, or repaired and retested.

AutoScan Testing Option for ULPA Modules

Manual scan testing is a reliable quality assurance tool, but the most sensitive applications may benefit from computer controlled automatic scan testing. Because the test operator is removed as a variable in the observation and evaluation of signals produced by the particle counter, the AutoScan is considered to be a more objective test process. The leak rates exceed the requirements of Section 6.2 of IEST-RP-CC-034.1.

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Performance Data

Face Velocity	Filter Module Size				HEPA 99.99% (.3 mm) 2" Pack Depth	HEPA 99. 99% (.3 mm) 4" Pack Depth	ULPA 99.9995% (.12 mm) 2" Pack Depth	ULPA 99.9995% (.12 mm) 4" Pack Depth
	24"x24"	24"x36"	24"x42"	24"x48"				
	CFM	CFM	CFM	CFM	sp	sp	sp	sp
70	220	345	410	475	0.42	0.28	0.48	0.32
90	285	445	525	610	0.52	0.37	0.61	0.40
100	315	495	585	680	0.57	0.40	0.68	0.45

Values shown may be averages or estimates typical of product styles.

Performance Notes:

1. sp = Static Pressure, in. w.g., required at inlet for the listed cfm.
2. cfm = Air flow in cubic feet per minute, cfm.

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Products with HE/HEPA/ULPA Filters

LFDCX – Laminar Flow Diffuser with Integrated High Efficiency Filter

DIVISION 23 – HEATING VENTILATING AND AIR CONDITIONING
SECTION 23 37 13 – DIFFUSERS, REGISTERS AND GRILLES

PART 1 – GENERAL

1.01 Special perforated laminar flow diffuser with integrated high efficiency filters are used in a variety of cleanroom applications shall be lightweight, low profile, and disposable ducted supply modules.

PART 2 – PRODUCTS

2.01 Price LFDCX filter modules shall be used in a gasketedT-grid, operate at 100 fpm (typical), and are suited for laminar or non-laminar type applications, where ultraclean supply air is required.

A. General

1. Supply and install Price LFDCX Laminar Flow Diffuser with Integrated High-Efficiency Filters of the sizes and capacities indicated on the drawings or diffuser schedule.
2. Modules shall be UL 900 Class 1 listed and Factory Mutual approved.

B. Construction

1. The LFDCX shall be an anodized extruded aluminum module frame with a flat flange to fit in a conventional gasketed Tee Grid System. The diffuser top plate shall be a single sheet of aluminum with an integral (8", 10", 12" or 14") inlet collar. The diffuser shall have a distribution plate adjustable from the room side through an access port with a removable plug located within the center divider.
2. The filter pack shall be 2" or 4" deep Dimplepleat® Separatorless design with a water repellent binder. The filter pack shall have raised impressions on the media that shall align against each other when pleated to support adjacent folds without the use of dissimilar materials such as media strips, strings or glue filaments as separators. The filter pack shall be sealed to the module frame with a fire retardant solid urethane.
3. The diffusers protective grille shall be expanded metal, painted white. Perforated stainless steel or anodized aluminum options are available.
4. All LFDCX diffusers shall be factory tested for filter leakage to ensure they meet the highest standards of performance and safety.

C. Performance

1. Initial and final resistances shall not exceed the scheduled values.
2. Each filter module shall have a barcode label applied at the beginning of manufacture to document the media lot used and testing results.
3. HEPA Filters shall have a rated minimum efficiency of 99.99% on 0.30 micrometer size particles and shall be scan tested per Section 6.2 of IEST - RP - CC034.1 for pinhole leaks in the media by challenging the module with a high concentration of PSL Spheres using a particle counter. The media pack and the pack to frame seal shall be scanned to insure there are no leaks greater than .01% of the upstream concentration at 100 fpm face velocity.
4. ULPA Filter Modules shall have a minimum efficiency of 99.9995%on 0.12 micrometer size particles when tested with a laser test system using a PSL challenge. Each ULPA Filter Module shall be scan tested per section 6.2 of IEST – RP - CC0341 for pinhole leaks in the media by challenging the module with a high concentration of PSL Spheres using a particle counter. The media pack and the pack to frame seal shall be scanned to insure that there are no leaks greater than .01% of the upstream concentration at 100 fpm face velocity.