

Ideal for pharmaceutical and biotech applications

The Flanders ESD Model-22 is an ideal terminal filter hood for pharmaceutical and biotech cleanrooms, or wherever hoods are regularly validated for performance and leak-free operation. They may be installed in a variety of ceiling types, including tee-bar ceilings, gel-seal grid systems, and plaster ceilings. Ideally suited for Class 100 "spot" applications, they may also be used to create Class 10,000 to Class 100,000 areas by locating the appropriate number of units in the ceiling. Units may also be installed for 100% ceiling coverage to achieve cleanliness levels to Class 10.

Gel seal design assures the integrity of the filter seal.

The ESD Model-22 features a gel-seal design offering superior protection against bypass leakage. Invented by Flanders to overcome the leakage problems associated with gasket filter seals, the gel-seal interface assures a positive seal between the replaceable HEPA/ULPA filter and the hood. Its effectiveness has been proved in thousands of applications.

Convenient roomside access and service

The ESD Model-22 design allows access to the filters from roomside, without disturbance to the installed housing. Bottom-loading filters make roomside filter change-out quick and easy. Damper controls and

test ports are also easily accessed from roomside by simply removing the protective grille.

Aerosol injection system offers the industry's most uniform challenge for testing installed filters.

The ESD Model-22 aerosol injection system (an option) has become the industry standard for ease of use and reliability in conducting in-place filter testing. Working entirely from roomside, the test technician introduces a challenge aerosol into the hood, then scan-tests the filter. Because it creates a truly uniform test challenge, the Flanders aerosol injection system provides the highest degree of confidence in the results of the scan test.

Available with a wide range of options, including horizontal and reverse flow.

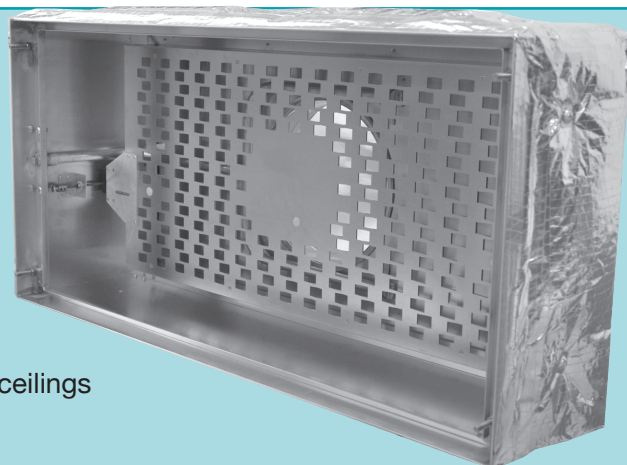
The Flanders ESD Model-22 is easily adapted for horizontal or reverse (exhaust) flow applications.

It is available with a wide range of standard options, allowing the unit to be customized to meet the requirements of almost any application.

For Special requirements not included in this bulletin, please contact the factory.

Important Features

- Low resistance design
- All-welded construction
- Filters replaceable from the roomside
- Gel-seal design to prevent bypass leakage
- Heavy-duty ESD damper adjustable from roomside
- Aerosol injection system accessible from roomside (optional)
- Designed for installation in tee-bar or gypsum board ceilings
- Excellent velocity uniformity



Seal welding eliminates leak paths, adds strength.
The body of the ESD Model-22 is continuously welded. This eliminates potential leak paths and produces a one-piece plenum of exceptional strength and durability.

Easy lay-in installation in a standard tee-bar ceiling is facilitated by a perimeter flange around the bottom of the unit. (Perimeter trim options are available when installing the hood in hard ceilings - see Options.)

Connection to the air supply is made simply by attaching flexible ducting to the top-mounted round 10 inch inlet. (Other inlet sizes are available as an option.)

Incoming airflow is distributed into the plenum area of the hood by a proprietary void design built into the ESD hood.

Airflow is adjustable from roomside.
The ESD damper is designed to allow for 100% shut-off and infinite adjustment capabilities.

Grille protects the filter and helps disperse airflow into the clean space. The grille is made of either cold rolled steel (painted white) or 304 stainless steel. Both grilles have a 40% open perforation and can be either flush mounted or extend 2 inches below the body of the hood. The grille is held in place with stainless steel acorn nuts and washers that are threaded on the ends of the filter retainer studs. The grille is easily removable from roomside.

Threaded studs simplify filter maintenance.
Filter retainers consist of aluminum tabs that are held captive on threaded studs. The studs are weld-mounted at each end of the unit without penetrating the pressure boundary, thus avoiding a potential leak path. The tabs hold the filter in place and are simply turned 90° to release the filter.

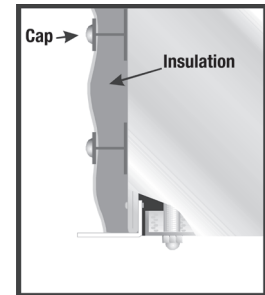
Filter pressure drop can be measured from roomside by taking a reading at the static pressure port. The port also provides a means of sampling the upstream aerosol concentration when scan testing the filter.

Insulation Options

Two-inch-thick fiberglass insulation with aluminum foil backing controls condensation and prevents heat loss. For side-by-side installations in a T-bar ceiling, insulation can be on top only. If units are located individually in the ceiling, insulation can cover top and sides. If a unit with top and side insulation is to be installed in a plaster ceiling, it must also have one or the wider perimeter trim options.

Select option code 1 for insulation on top only.

Select option code 2 for insulation on top and sides.



Aerosol Injection System (Option Code J)

Flanders aerosol injection system provides a reliable, proven method of conducting an in-place scan test of the filter in the ESD Model-22

Working from roomside, the test operator simply removes a plug from the aerosol injection port and introduces the aerosol into the system. By taking a reading at the sampling port, the operator can determine when the test challenge is at the correct concentration. A scan test of the HEPA/ULPA filter can then be conducted from roomside without moving or otherwise disturbing the installed hood. The performance of the aerosol injection system is a major factor in the reliability of the filter test. If the aerosol is unevenly concentrated in the plenum, false readings will result.

For this reason, Flanders submitted the aerosol injection system for independent laboratory testing. The test was conducted in accordance with criteria set forth in ASME N-510 1980 and determined that the injection system achieved a level of dispersion that was uniform within plus or minus 20% of the target concentration. The test report is available upon request.

FLANDERS ESD DAMPER DESIGN

Air control, distribution, and uniformity provided by the ATECS, Inc. patented design through a partnership with Flanders Corporation.

OPTIONS

Inlet Location Options	Option code
Top inlet:	T1
Side inlet on short side of hood. Hood height 18 Inches.	K1
Side inlet on long side of hood. Hood height 18 inches.	K2

Flanders Corporation ~ Foremost in Air Filtration

Toll Free: 1-800-637-2803

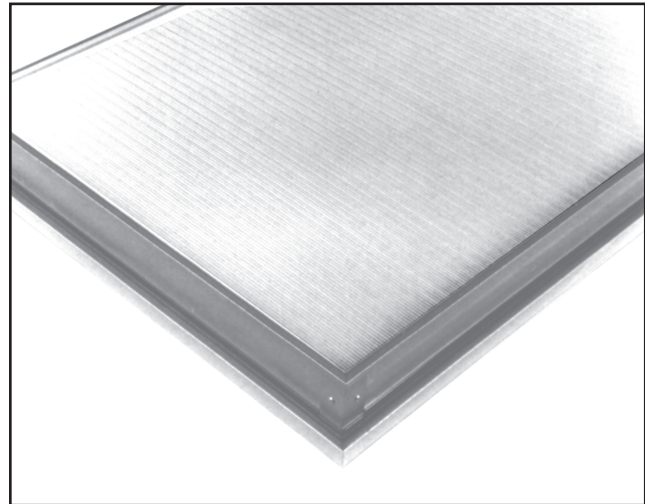
The Dimple Pleat® Advantage

The ESD Model-22 is designed to accept Flanders low-profile, lightweight Dimple Pleat® Filters. This unique filter utilizes a completely separatorless and self supporting media pack, requiring no glue, string or strips of media to hold adjacent folds of the media apart. Such separator materials are potential sources of off-gassing or particle generation and may not meet the stringent smoke and flame requirements of UL 900 Class 1. They can also block up to 10% of the filter's effective media area. The Dimple-Pleat eliminates these materials as a contamination concern while fully utilizing the filter's media content and providing a clean, streamlined appearance.

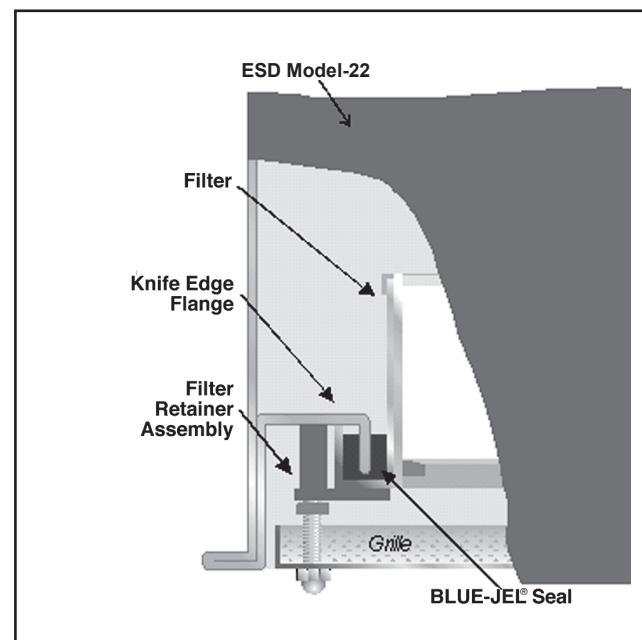
Dimple Pleat® Filters used in the ESD Model-22 employ Flanders gel-seal technique.

Instead of a gasket, the filter has a perimeter channel filled with Blu-Jel® Seal and a highly self-adhesive, self-healing silicone compound. When the filter is raised into position, a knife-edge flange in the hood mates into the gel channel, effecting a leak-tight interface. A simple retainer on 4 corners is turned 90° to hold the filter in place and the design of the retainer assembly will not allow the knife-edge to bottom out in the gel track of the filter.

Invented by Flanders to eliminate the bypass problems associated with conventional gasketed filters, the gel-seal technique provides superior leak protection for critical cleanroom installations.



No Strings, Glues or Strip



Filter Coverage Required to Achieve

Various Cleanliness Levels

Cleanroom Cleanliness Level	Coverage/Type of Filters Required in Total Ceiling	Number of Air Changes per Hour
ISO-4 (0.12 microns)	100% VLSI ©Filters	635
ISO-5 (0.5 microns)	100% HEPA filters	635
ISO-6 (0.5 microns)	20-60% HEPA Filters	125-380
ISO-7 (0.5 microns)	5-40% HEPA Filters	30-60
ISO-8 (0.5 microns)	5% in Remote Filter Bank	30

* Based on a ceiling height of 8.5 feet. Cleanliness levels are also dependent upon variables other than filter coverage, such as airflow velocity, filter distribution, particle generating activity, turbulent areas, and dead spots caused by sprinklers, filler panels, lights and other obstacles. This table is intended as a general guide.

ESD Model-22

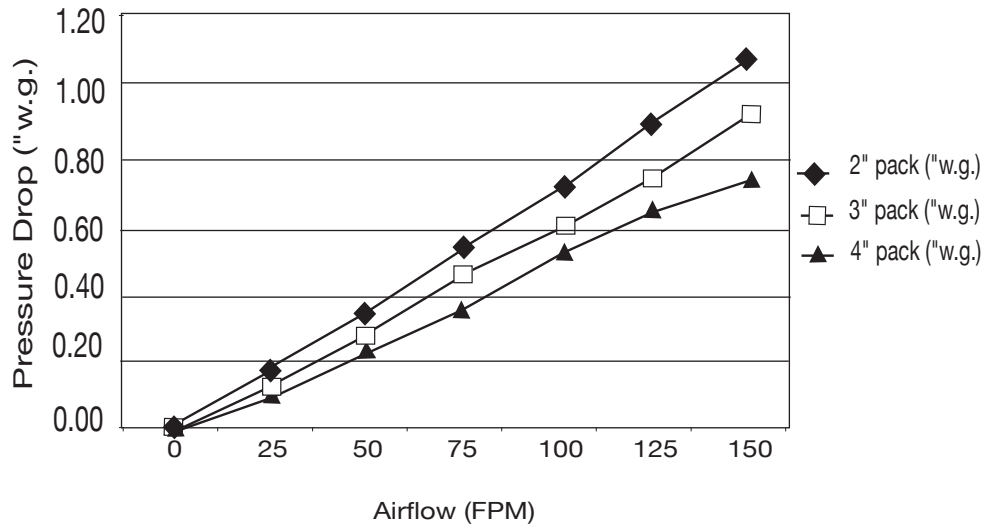
Pressure Drop as a Function of Air Velocity

ESD Model 22 performance with HEPA 99.99% on 0.3 particles (Type C) 100% open			
Air Flow (FPM)	2" pack ("w.g.)	3" pack ("w.g.)	4" pack ("w.g.)
0	0	0	0
25	0.17	0.15	0.14
50	0.34	0.30	0.26
75	0.51	0.45	0.38
100	0.68	0.60	0.50
125	0.85	0.75	0.62
150	1.02	0.90	0.74

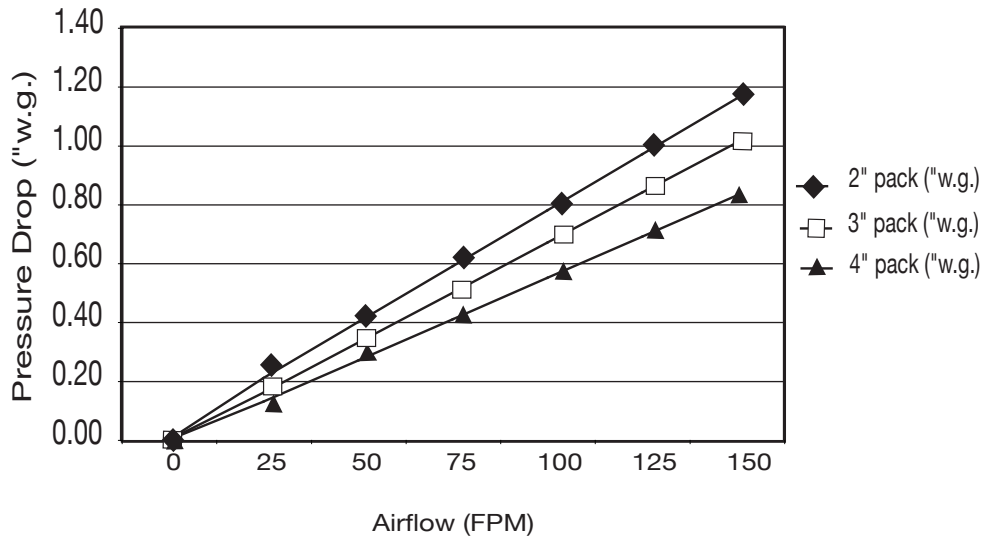
ESD Model 22 performance with ULPA 99.9995% on 0.12 particles (Type F) 100% open			
Air Flow (FPM)	2" pack ("w.g.)	3" pack ("w.g.)	4" pack ("w.g.)
0	0	0	0
25	0.21	0.16	0.13
50	0.40	0.33	0.27
75	0.59	0.50	0.41
100	0.78	0.67	0.55
125	0.97	0.84	0.69
150	1.16	1.01	0.83

Pressure drops shown are for hoods with filters

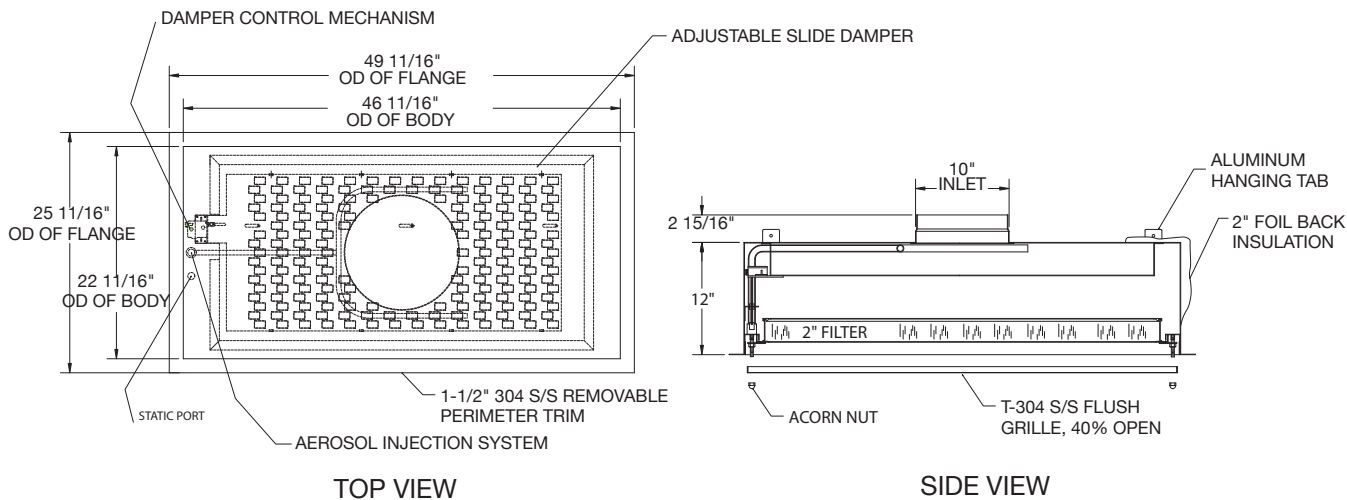
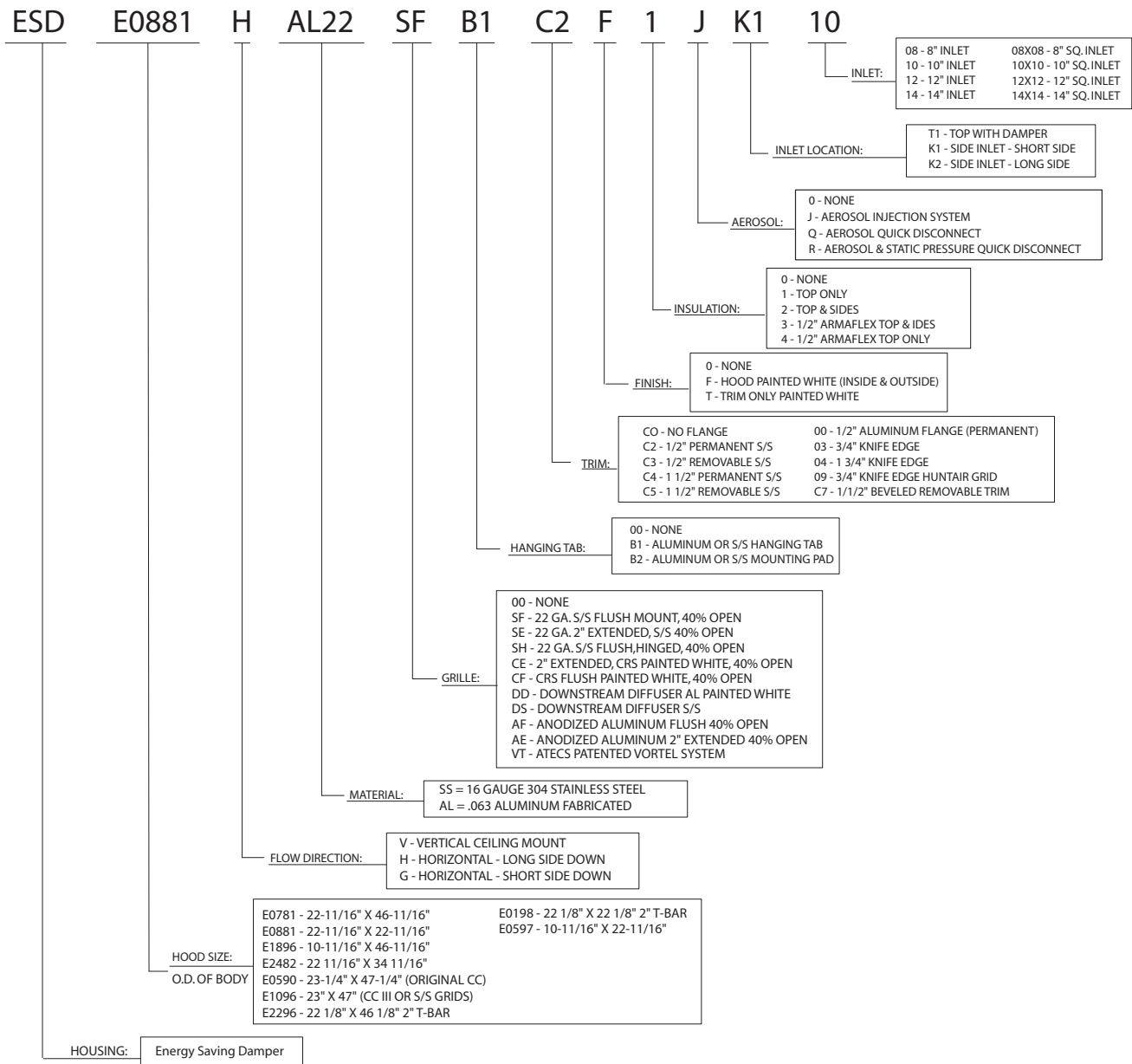
ESD Model 22 Airflow vs Pressure Drop with HEPA Filter



ESD Model 22 Airflow vs Pressure Drop with ULPA Filter



ESD Model-22 Component Chart



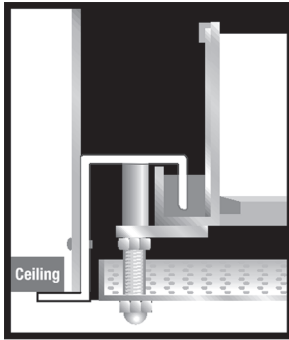


Fig. 1
2" Extended Grille

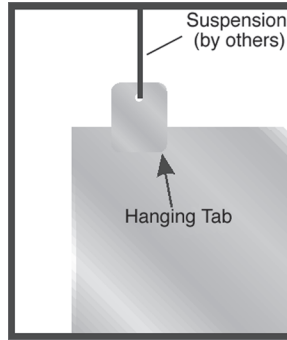


Fig. 2
Hanging tabs are side-mounted near each corner of the hood.

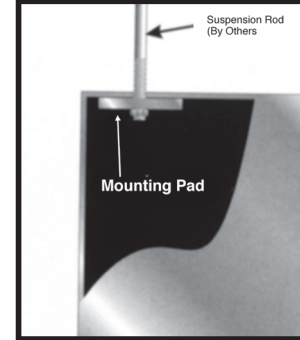


Fig. 3
Mounting pads (one at each upper corner) are located inside the hood.

The following options can be specified by including the appropriate underlined option codes in the ESD Model-22 style code from the component chart.

Construction Options

Aluminum construction shall be from .063" Aluminum. Select **Option Code AL** for .063 inch thickness aluminum.

Stainless steel construction from mill finish, 16 gauge Type 304. Select **Option Code SS** for 16 ga. type 304 mill finish stainless steel. (Hood only. Some parts are not stainless steel)

Grill Options

Flush Mounted Grilles with 40% open perforation. Elect **Option Code CF** for cold rolled steel, painted white. Select **Option Code SF** for type 304 stainless steel. Option **Code SH** for stainless steel hinged or **Option CH** for hinged CRS.

2 inch extended grilles extend 2 inches below the hood for better airflow diffusion into the room. Select **Option Code CE** for cold rolled steel, painted white. Select **Option Code SE** for type 304 stainless steel.

Downstream 4 way diffusers (not shown) provide the maximum "throw" of air into a room space. Select option code DD for this feature.

Support Options

Aluminum hanging tabs or mounting pads allow the hood to be suspended from overhead.

Select **Option Code B1** for hanging tabs. See Fig. 2. Select **Option Code B2** for mounting pads. See Fig. 3.

Trim options

A permanent perimeter trim and knife edge made with aluminum or type 304 stainless steel provides an attractive, finished appearance. (See Fig. 4.)

Select **Option Code 00** for integral 1/2 inch wide aluminum or stainless steel permanent trim. (Dependent on hood construction)

Select **Option Code C2** for standard 1/2 inch wide stain-less steel permanent trim.

Select **Option Code C4** for 1-1/2 inch wide stainless steel permanent trim. This is the mandatory choice for unit with insulation on top and sides for installation into plaster ceilings.

A removable perimeter trim made of type 304 stainless steel can be provided as a plaster ring for hoods that are flush mounted in hard ceilings. The trim is attached after the unit is installed in the ceiling and provides an attractive finished appearance.

Select **Option Code C3** for standard 1/2 inch wide removable trim.

Select **Option Code C5** for 1-1/2 inch wide removable trim. This is the mandatory choice for units with insulation on top and sides for installation into plaster ceilings.

Finish options

Select **Option Code 0** for non-painted finish.

Select **Option Code F** for a white powder painted finish inside and out.

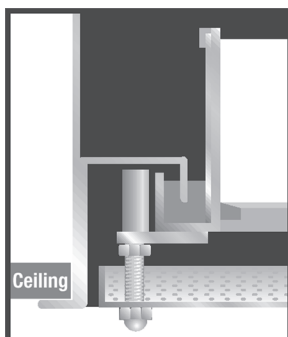


Fig. 4
Aluminum
Permanent Perimeter Trim/Knife Edge

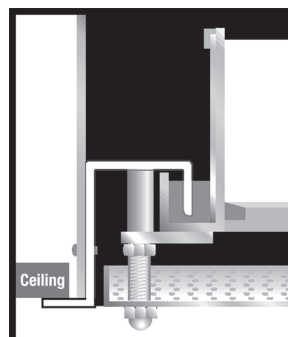


Fig. 2
Stainless Steel
Permanent Perimeter Trim/Knife edge

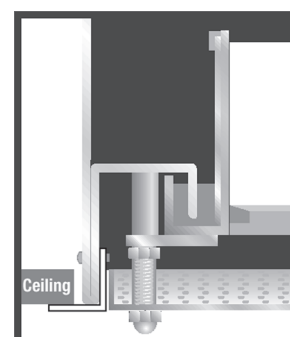


Fig. 3
Stainless Steel
Removable Perimeter Trim

Guide Specifications

1.0 General

- 1.1 Ducted Terminal Hoods shall be ESD Model-22 as manufactured by Flanders Corporation.
- 1.2 Hood sizes, efficiencies, capacities and construction options shall be as scheduled or noted on the drawings.

2.0 Hood construction

- 2.1 The hood shall be constructed of .063 in. Aluminum or 16 gauge Type 304 stainless steel with all straight seams of the module continuously welded. All other joints and the seams shall be intermittently welded and/or sealed with RTV sealant.

2.2 Select one of the following:

- 2.2.1 The hood shall be sized for lay-in installation into a 1-1/2 inch gasketed Tee Grid system having 24 inch x 48 inch and 24 inch x 24 inch grid dimensions. The perimeter flange and knife-edge shall be constructed of the same material as the hood.
- 2.2.2 The hood shall be designed for lay-in installation into a 1-1/2 inch gasketed Tee Grid System having 24 inch x 48 inch and 24 inch x 24 inch grid dimensions. The perimeter flange and knife edge shall be constructed of Type 304 stainless steel and shall be riveted and sealed into the hood.
- 2.2.3 The hood shall be designed for flush installation into a hard ceiling. A separate stainless steel 1/2 inch or 1-1/2 inch wide perimeter flange shall be provided and after the hoods are installed in the ceiling, the perimeter flange shall be provided and after the hoods are installed in the ceiling, the perimeter flange shall be riveted and sealed to the hood to provide a clean appearance.
- 2.3 Hood shall have a top or side mounted 8, 10, 12, or 14" round inlet. Unit shall have a factory installed ESD side damper adjustable from the room side by means of A Screwdriver inserted into a slot to turn a rotary shaft.
- 2.4 A 40% open perforated grille fabricated of 22 gauge cold-rolled steel and painted white or type 304 stainless steel shall be flush mounted extend 2 in. below the perimeter flange of the hood. The grille shall be easily removed from roomside by removing four (4) acorn nuts and washers.

- 2.5 The hood shall have a static pressure port for measuring resistance across the filter and for measuring resistance across the filter and for measuring the upstream aerosol concentration when leak testing. The static pressure port shall not be located in the filter.
- 2.6 The filter shall be sealed in the hood by a gel-seal. The filter shall have a perimeter channel filled with Flanders Blu-Jel® silicone sealant. When the filter is positioned in the hood, the knife edge in the hood shall penetrate the gel and form a leaktight seal. The filter is held in place with four (4) retainers that are turned 90s the knife-edge shall not bottom out in the gel track of the filter.
- 2.7 The hood shall be provided with 2 inch thick foil back insulation on either the top or the entire exterior of the module. The insulation shall be tested in accordance with ASTM-E84 and UL 723 to meet a rating of 25 flame spread, 50 fuel contained and 50 smoke developed.
- 2.8 The hood shall be suspended by 2 inch x 2 inch x .063 inch aluminum hanging tabs with 5/16 inch holes or by 2 inch x 2 inch x 1/8 inch aluminum mounting pads with 7/16 inch diameter holes mounted on the top corners of the module.
- 2.9 The hood shall be equipped with an aerosol dispersion nozzle to inject a challenge aerosol upstream of the filter when testing the filters for leaks. The inlet connection shall be a plug with a 1/2-inch full coupling located in the knife edge of the module and not in the filter. The challenge aerosol shall be released through an aerosol dispersion apparatus located upstream of the ESD Damper.



Flanders Corporation
531 Flanders Filters Road
Washington, NC 27889

Phone: (252) 946-8081

Fax: (252) 946-3425

Toll Free: (800) 637-2803

Website: www.flanders-ffi.com

REPRESENTED BY: