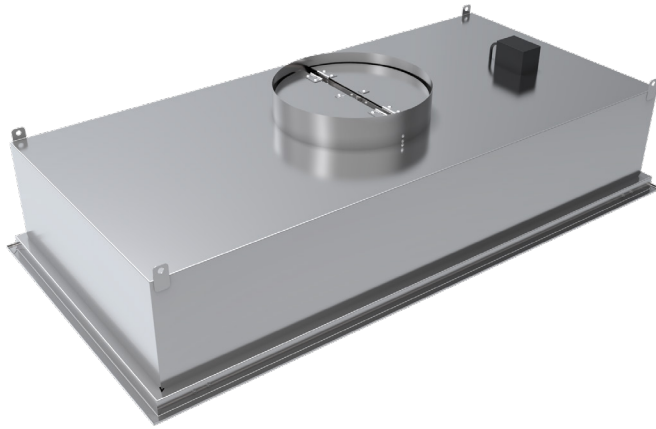


# 5100HF

Laminar Flow Diffuser | Enhanced | HEPA Filter



5100HF shown with LED light option.



## INTRODUCTION

The 5100HF series of laminar diffusers is a convenient critical room solution, as each unit is ASHRAE 170 compliant and comes with a HEPA/ULPA filter that is ready for field installation.

These units work by delivering a low velocity, non-aspirating, unidirectional flow of clean supply air into the space. This airflow pattern minimizes room air induction, which reduces the opportunity for air borne pathogens to be re-entrained and pollute the critical space. For this reason, they are commonly used in operating rooms as the primary diffuser array, where they provide a clean piston of air over the patient during surgical procedures.

Outside of the critical space, the only appreciable amount of room air entrainment occurs at the boundaries of the moving air mass, which are located outside the confines of the critical space (ie: operating table). As a result, the patient is effectively isolated from residual room air.

The advantages of laminar flow technology provide similar benefits in other clean room applications, such as research laboratories, animal laboratories, food processing plants, pharmaceutical laboratories and protective environment rooms.

## MODEL

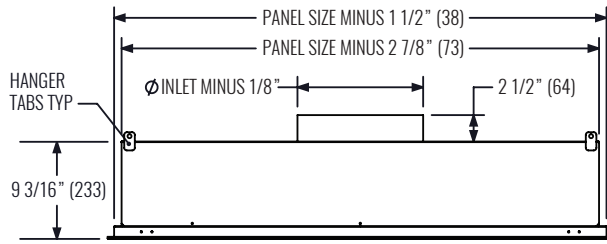
**5100HF** - Laminar Flow Panel with Gel Seal HEPA/ULPA Filter and Filter Brackets, Aluminum and Stainless Steel Construction

**5FILTER** - HEPA or ULPA filter for 5100HF (Order as a spare or replacement part only.)

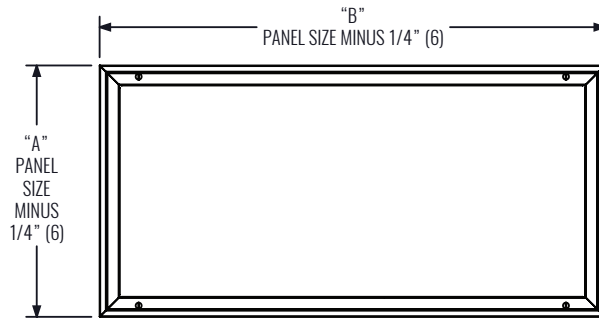
## FEATURES

- Low velocity, non-aspirating
- Fully welded plenum body and diffuser face
- HEPA (optional ULPA) filter with room-side filter access
- Quick opening (1/4 turn) fasteners allow face removal
- Built-in, face accessible, adjustable trim disk for even air distribution and field balancing
- Safety cables (2) prevent accidental dropping of face
- 13% free area perforated face is standard, larger free area perforated faces are available for larger capacity units
- Frame Styles: Surface mount (F22) and lay-in T-bar (F23) for 1.00" and 1.50" tee widths
- Integral earthquake hanger tabs
- Optional room-side accessible cable operated damper
- Optional integral LED lights
- Standard finish depends on ordered options; optional finish is Antimicrobial White

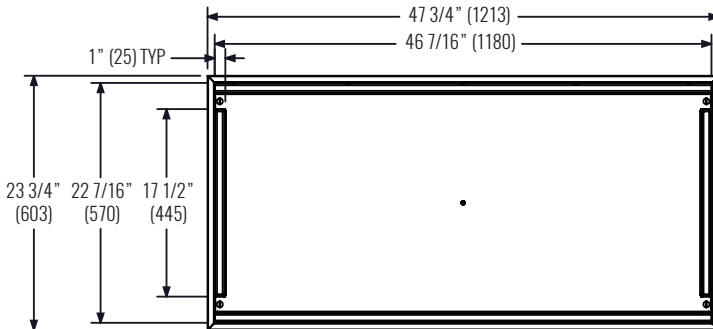
**DIMENSIONAL DATA**



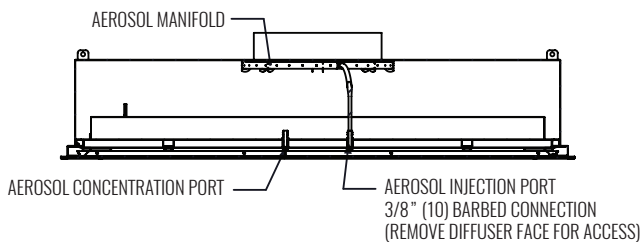
**SIDE VIEW**



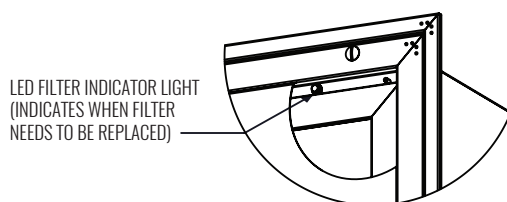
**FACE VIEW**



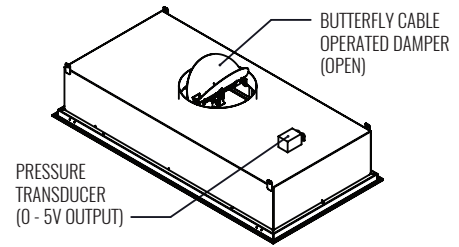
**LED LIGHT DETAIL (24" x 48" UNIT SHOWN)**



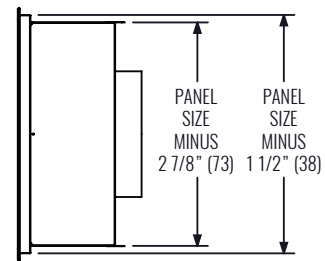
**AEROSOL MANIFOLD AND INJECTION PORT DETAIL**



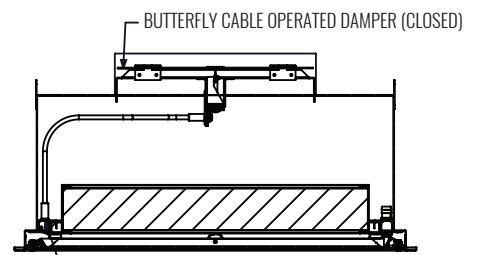
**FILTER INDICATOR LIGHT DETAIL**



**CONSTANT FILTER MONITORING DETAIL**



**SIDE VIEW**



**CABLE OPERATED DAMPER DETAIL**

**DIMENSIONAL REFERENCES**

PANEL SIZE	A	B
12" x 24"	11 3/4" (298)	23 3/4" (603)
12" x 48"	11 3/4" (298)	47 3/4" (1213)
12" x 60"	11 3/4" (298)	59 3/4" (1518)
12" x 72"	11 3/4" (298)	71 3/4" (1822)
24" x 24"	23 3/4" (603)	23 3/4" (603)
24" x 36"	23 3/4" (603)	35 3/4" (908)
24" x 48"	23 3/4" (603)	47 3/4" (1213)
24" x 60"	23 3/4" (603)	59 3/4" (1518)
24" x 72"	23 3/4" (603)	71 3/4" (1822)
36" x 48"	35 3/4" (908)	47 3/4" (1213)
36" x 60"	35 3/4" (908)	59 3/4" (1518)

**NOTE:** Dimensions in parentheses are millimeters.

# 5100HF

Laminar Flow Diffuser | Enhanced | HEPA Filter



## PERFORMANCE DATA | 13% FREE AREA

8" INLET	AIRFLOW (CFM)	100	120	140	160	180	200	220	240	260	280	290
48" x 12" Module *	Total Pressure	0.17	0.24	0.33	0.43	0.55	0.68	0.82	0.98	1.14	1.33	1.42
	NC	-	17	19	22	25	27	29	31	34	35	37
60" x 12" Module	Total Pressure	0.11	0.16	0.22	0.28	0.36	0.44	0.54	0.64	0.75	0.87	0.93
	NC	-	16	18	21	24	25	28	30	33	34	36

8" INLET	AIRFLOW (CFM)	100	120	140	160	180	200	220	240	260	280	295
24" x 24" Module *	Total Pressure	0.17	0.24	0.32	0.42	0.54	0.66	0.8	0.95	1.12	1.3	1.44
	NC	0	17	19	22	25	27	29	31	34	35	37
36" x 24" Module	Total Pressure	0.07	0.1	0.14	0.18	0.23	0.29	0.35	0.41	0.48	0.56	0.62
	NC	0	15	18	21	24	26	28	30	33	34	36
48" x 24" Module	Total Pressure	0.05	0.07	0.09	0.12	0.15	0.18	0.22	0.27	0.31	0.36	0.4
	NC	-	-	17	20	23	25	27	30	32	33	35

10" INLET	AIRFLOW (CFM)	160	180	200	220	240	260	280	300	320	340	360
36" x 24" Module	Total Pressure	0.014	0.18	0.22	0.27	0.32	0.37	0.43	0.5	0.56	0.64	0.71
	NC	15	18	20	21	23	26	28	30	32	34	36
48" x 24" Module	Total Pressure	0.08	0.1	0.13	0.15	0.18	0.21	0.25	0.28	0.32	0.37	0.41
	NC	-	15	18	19	22	25	27	29	31	33	35
60" x 24" Module	Total Pressure	0.06	0.07	0.09	0.11	0.13	0.15	0.17	0.2	0.22	0.25	0.28
	NC	-	-	17	19	22	24	27	29	31	33	35

12" INLET	AIRFLOW (CFM)	230	260	290	315	345	375	400	430	460	490	520
48" x 24" Module	Total Pressure	0.16	0.2	0.25	0.29	0.35	0.42	0.48	0.55	0.63	0.71	0.8
	NC	15	18	21	22	25	28	30	32	35	38	42
60" x 24" Module	Total Pressure	0.1	0.13	0.16	0.19	0.23	0.27	0.31	0.36	0.41	0.47	0.53
	NC	15	18	21	22	25	28	30	32	35	38	42

**NOTES:** Data was derived from tests conducted in accordance with ANSI/ASHRAE Standard 70-1991. Data is for diffusers with clean filters. Filters may be operated up to a final resistance of 2" w.g. (500 Pa). Noise Criteria (NC) is based on 10 dB room absorption, re 10<sup>-12</sup> Watts, damper fully open. Blank (-) indicates a NC of less than 15.

SPECIALTY PRODUCTS | CRITICAL ENVIRONMENT

5100HF

## PERFORMANCE DATA | 23% FREE AREA

8" INLET	AIRFLOW (CFM)	200	240	280*	320	360	400
24" x 24" Module	Total Pressure	0.64	0.92	1.26	1.64	2.08	2.56
	NC	-	16	22	24	28	32

10" INLET	AIRFLOW (CFM)	200	240	280*	320	360	400
24" x 24" Module	Total Pressure	0.6	0.87	1.18	1.54	1.95	2.4
	NC	-	-	-	-	20	24
	AIRFLOW (CFM)	300	360	420	480*	540	600
24" x 36" Module	Total Pressure	0.49	0.71	0.96	1.26	1.59	1.97
	NC	-	19	25	27	31	35
	AIRFLOW (CFM)	400	480	560	640	720*	800
24" x 48" Module	Total Pressure	0.47	0.68	0.92	1.21	1.53	1.88
	NC	20	26	32	34	38	42

12" INLET	AIRFLOW (CFM)	200	240	280*	320	360	400
24" x 24" Module	Total Pressure	0.59	0.85	1.16	1.51	1.92	2.37
	NC	-	-	-	-	-	17
	AIRFLOW (CFM)	300	360	420	480*	540	600
24" x 36" Module	Total Pressure	0.46	0.67	0.91	1.19	1.5	1.86
	NC	-	-	19	21	25	29
	AIRFLOW (CFM)	400	480	560	640	720*	800
24" x 48" Module	Total Pressure	0.43	0.62	0.84	1.1	1.39	1.71
	NC	15	20	26	28	32	36
	AIRFLOW (CFM)	500	600	700	800	900*	1000
24" x 60" Module	Total Pressure	0.42	0.6	0.82	1.07	1.35	1.67
	NC	20	25	31	33	37	40

14" INLET	AIRFLOW (CFM)	300	360	420	480*	540	600
24" x 36" Module	Total Pressure	0.45	0.65	0.88	1.15	1.46	1.8
	NC	-	-	-	15	19	23
	AIRFLOW (CFM)	400	480	560	640	720*	800
24" x 48" Module	Total Pressure	0.41	0.59	0.81	1.05	1.33	1.64
	NC	-	-	20	22	26	30
	AIRFLOW (CFM)	500	600	700	800	900*	1000
24" x 60" Module	Total Pressure	0.39	0.57	0.77	1.01	1.28	1.57
	NC	-	-	25	27	31	35

16" INLET	AIRFLOW (CFM)	500	600	700	800	900*	1000
24" x 60" Module	Total Pressure	0.38	0.54	0.74	0.97	1.22	1.51
	NC	-	-	19	21	25	29

**NOTES:** Data was derived from tests conducted in accordance with ANSI/ASHRAE Standard 70-2006. Data is for diffusers with clean filters. Filters may be operated up to a final resistance of 2" w.g. (500 Pa). Noise Criteria (NC) is based on 10 dB room absorption, re 10<sup>-12</sup> Watts, damper fully open. Blank ( - ) indicates a NC of less than 15.

## SUGGESTED SPECIFICATION & CONFIGURATION

### SECTION 233713 – DIFFUSERS

#### PART 1 – GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division \*\* Specifications Sections, apply to this section

##### 1.2 SUMMARY

- A. Sections Includes:
1. Filtered Laminar Flow Diffuser

##### 1.3 CODES AND STANDARDS

1. IEST-RP-CC-001, Institute of Environmental Sciences HEPA and ULPA Filters
2. IEST-RP-CC006, Institute of Environmental Sciences Recommended Practices for Testing Clean Rooms
3. IES-RP-CC034, Institute of Environmental Sciences Recommended Practices for HEPA and ULPA Filter Leak Tests
4. ASHRAE Standard 70, Method of Testing the Performance of Air Outlets and Air Inlets, 2006
5. ASHRAE Standard 170, Ventilation of Health Care Facilities, 2017
6. ASTM Standard E84, Standard Test Method for Surface Burning Characteristics of Building Materials, 2016

##### 1.4 SUBMITTALS

- A. Product Data: For each type of produce indicated, include the following:
1. Data Sheet: Indicate materials of construction, finish and mounting details and performance data including throw vertical and horizontal, static pressure, sound ratings.
  2. Source quality-control reports.

#### PART 2 - PRODUCTS

##### 2.1 DIFFUSERS

- A. Filtered Laminar Flow Diffuser
1. Manufacturers: Subject to compliance with requirements and performance listed in section 2.2 Source Quality Control, products by one of following manufacturer is acceptable
    - a. Krueger (Basis of Design)
    - b. Titus
    - c. Tuttle & Bailey
  2. Diffuser shall be Group E Non-Aspirating Diffuser per ASHRAE Standard 170-2017.
  3. Diffuser plenum shall be constructed of a single sheet of {0.40" thick aluminum / 20 gauge 304 stainless steel} and welded at all seams and corners. Plenum shall be attached to the mounting frame without mechanical fasteners; mechanical fasteners that penetrate the plenum shall not be acceptable. Inlet collar shall be sealed to the top of the plenum.
    - a. Option: All exterior seams are to be continuously welded.
  4. Knife edge, which penetrates gel in the filter frame, shall be an integral part of the diffuser mounting frame to assure leakage is consistent with that of the filter.
  5. Diffusers shall have non-removable filter retainers, requiring no tools for installation or removal of filter.
  6. Diffusers shall be supplied with static pressure port to allow measurement of pressure drop across the face of the diffuser.
  7. The face of the diffuser shall be {13 / 23 / 33} percent free area perforated {0.40" thick aluminum / 20 gauge 304 stainless steel}. The face shall be secured in place by quarter-turn fasteners for quick removal and sanitizing. Diffusers shall be provided with two PVC coated stainless steel safety cables for ease of installation/removal and to prevent accidental dropping and of the diffuser face .
  8. **(Optional)** Diffusers shall be equipped with a dedicated aerosol challenge port and dispersion manifold to allow field testing of filtered units in accordance with industry leakage standards.
  9. **(Optional)** A butterfly damper shall be located in the inlet collar of the diffuser. Damper shall be operated by a Phillips head operator accessible without removal of filter or filter plugs.
  10. **(Optional)** Diffusers shall be supplied with 1 ½" foil-faced external insulation. Insulation shall have a flamespread index of 0-25 and a smoke developed index of 0-50 (25/50 rating) when tested in accordance with ASTM E84.
  11. Finish: shall be one of the following:
    - a. #44 White.
      - i. The finish shall be a powder coat paint, baked at 425°F.
      - ii. The paint thickness shall be 2.0 – 3.0 mils, gloss at 60° per ASTM D523-89 of 60 – 70%
      - iii. The paint shall have a pencil hardness per ASTM D3363-92A of H – 2H,
      - iv. The paint shall have crosshatch adhesion per ASTM D3359-83 of 5B
      - v. The paint must pass a salt spray test per ASTM B117-9048 of 1000 hours,
      - vi. The paint must pass a humidity test per ASTM D2247-92 of 1000 hours
      - vii. The paint must pass a conical mandrel per ASTM D522 of 1/8" conical bend, no cracking shown.
    - b. #4A Antimicrobial White
      - i. The finish shall be a powder coat paint, baked at 425°F.
      - ii. The paint thickness shall be 2.0 – 3.0 mils, gloss at 60° per ASTM D523-89 of 60 – 70%
      - iii. The paint shall have a pencil hardness per ASTM D3363-92A of H – 2H,

## SUGGESTED SPECIFICATION & CONFIGURATION (Continued)

- iv. The paint shall have crosshatch adhesion per ASTM D3359-83 of 5B
- v. The paint must pass a salt spray test per ASTM B117-9048 of 1000 hours,
- vi. The paint must pass a humidity test per ASTM D2247-92 of 1000 hours
- vii. The paint must pass a conical mandrel per ASTM D522 of 1/8" conical bend, no cracking shown.
- c. Aluminum with mill finish
- d. Stainless Steel with mill finish

### 2.2 SOURCE QUALITY CONTROL

- A. The manufacturer shall provide published performance data for rated for the filtered radial throw diffuser
  - 1. The diffuser shall be tested in accordance with ANSI/ASHRAE Standard 70-2006
  - 2. Throw values are at isothermal conditions

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 INSTALLATION

- A. Install Diffusers level and plumb.
- B. Verify diffuser air patterns are as indicated on drawings during installation.
- C. Ceiling-Mounted Outlets: Drawings indicate general arrangement of ducts, fittings and accessories. Air Outlet and locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. Where architectural features or other items conflict with installation, notify Engineer for determination of final location.
- D. Install diffusers with airtight connections to ducts and to allow service and maintenance of dampers, air extractors and fire dampers.

### 3.3 ADJUSTING

- A. After installation, verify diffusers air patterns is as indicated on drawings, or as directed before starting air balance.

## END OF SECTION 233713

### 1. SERIES: (XXXXXX)\*

5100HF - Laminar flow diffuser with HEPA filter

### 2. PATTERN: (XX)

03 - Aluminum pan and face  
 04 - Aluminum face and stainless steel pan  
 05 - Stainless steel pan and face

### 3. ROUND NECK SIZE: (XX)

06", 08", 10", 12", 14", 16", 18"

### 4. FRAME: (XXX)

F22 - Surface Mount  
 F23 - Lay-in T-Bar (up to 1.5")

### 5. PANEL: (XXxXX)

12"x24"	12"x48"	12"x60"	12"x72"
24"x24"	24"x36"	24"x48"	24"x60"
24"x72"	36"x48"	36"x60"	

### 6. PERFORATED FACE: (XX)

13 - 13% free area  
 23 - 23% free area  
 33 - 33% free area

### 7. INSULATION: (X)

0 - None  
 I - External 1.5" insulation  
 R - External molded R6 insulation  
 C - Internal fiber free insulation

### 8. ACCESSORIES: (XX)

00 - Default trim disc  
 CD - Cable operated damper  
 WI - Welded inlet  
 LE - LED lights \*\*  
 PM - Constant filter monitoring  
 PL - Filter pressure light  
 AT - Aerosol test system (PAO)

### 9. FINISH: (XX)

01 - Mill  
 10 - Alumican  
 44 - British White  
 4A - British White (Antimicrobial)

\* Unit includes four safety cables on each panel.

\*\* Only available for 24"x24", 24"x36", and 24"x48" panel sizes.

**SAMPLE CONFIGURATION:** 5100HF - 03 - 08 - F23 - 24x48 - 13 - R - WI - LE - PM - PL - AT - 44