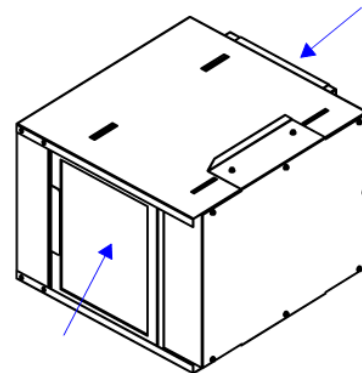


ADE ENGINEERING UPDATE



TFS-F Dual Inlet

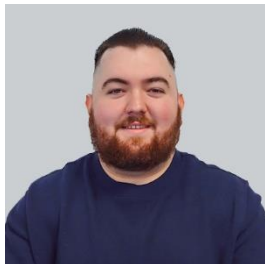
In an effort to combat Covid-19 through HVAC transmission, we are seeing engineers attempting to introduce filters on the return/induced air inlet of fan powered boxes. From Chris Marina's white paper on "Combating Covid-19: Upgrading Fan Powered Box Filters": "The challenge with upgrading filtration is the increased resistance associated with the filters...This is especially true when trying to implement high efficiency particulate air (HEPA) filters. Viruses are generally in the 0.3-1-micron size range, which HEPA filters are very good at filtering out (99% efficient and up), but pressure drops could be up to 1.5" w.g. each. In addition, the respiratory droplets that the virus clings to are in the 1-5-micron range. A viable alternative is a MERV 13 filter... the pressure drop across them is significantly less, and they still provide a 70% capture rate of particles in the 0.3-1-micron range and 90% capture rate of particles in the 1-3-micron range." [1]



Fan powered boxes already come with throwaway filter, this is there to only protect the internal components from dust and debris during construction. The throwaway filter are 1" deep but a retrofit piece can be used to make a 2" channel. This would allow you to use a thicker filter which typically has a lower pressure drop than its 1" counterpart.

We have worked with Titus to create an induced air inlet with inlets on two sides. The benefit to having two air streams is that you will lower the CFM through each filter and therefore have a lower pressure drop than you would with the same volume of air through one filter. If retrofitting, you will need to use filter clips to hold the filter (reference page 2); if ordering new units with the dual inlet option, the filters will simply slide into a track (reference page 3).

The relationship between Filter Face Velocity and Initial Resistance (pressure drop) is fairly linear and proportional – as FPM increases, PD increases as well. Having the option of using 1" or 2" filters on one or two sides gives us a greater flexibility in using filters with higher MERV ratings. If introducing filters creates a pressure drop that is too high, it can prevent the fan powered box from operating correctly. Using a 2" Filter can lower the pressure drop and have the fan powered box operating in a more desirable position on the fan curve.



Name: Andrew Reed

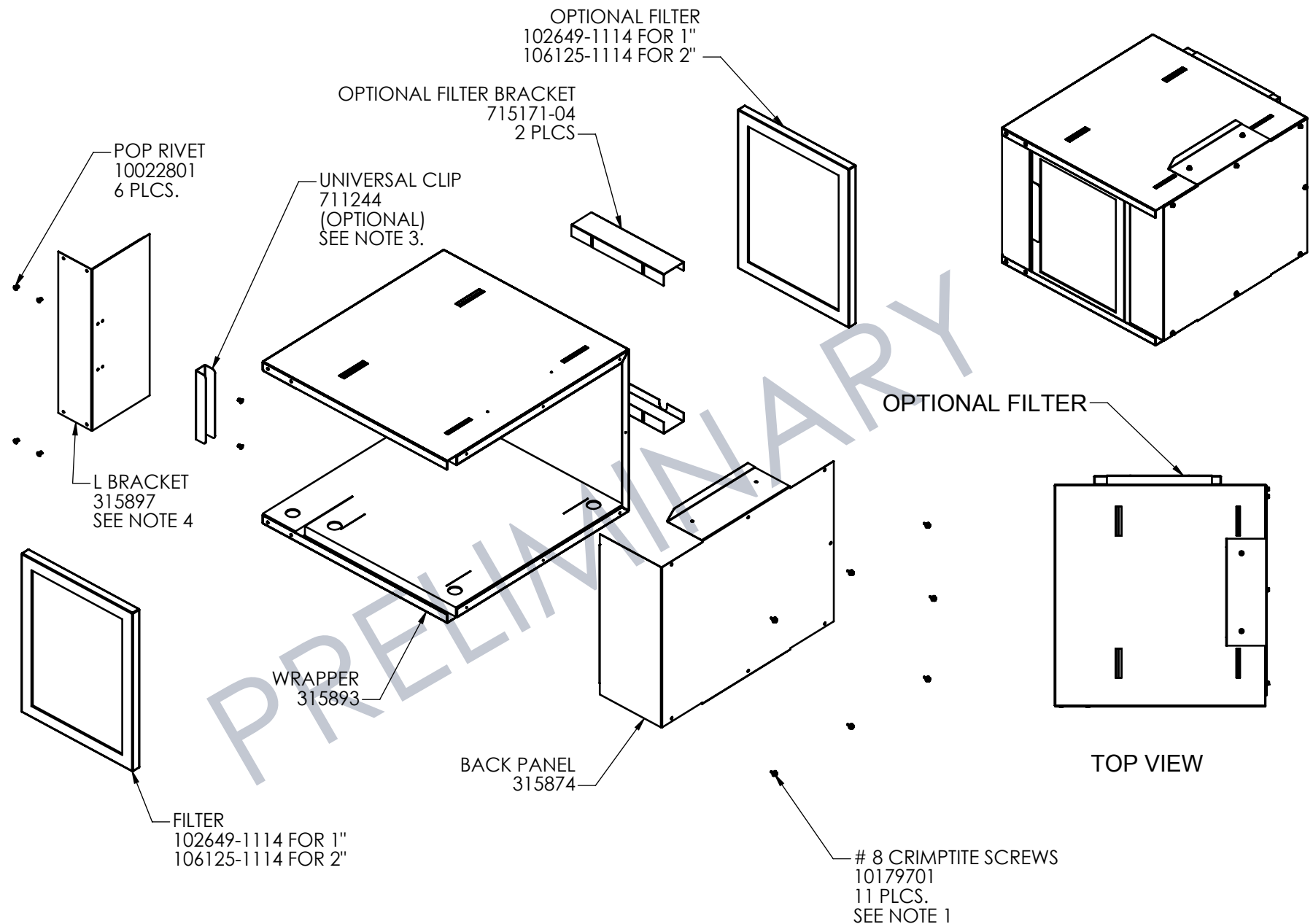
Title: Engineering

Email: areed@adehvac.com

Phone: 516-256-7638



[1]https://www.adehvac.com/uploads/files/News/Combating_Covid19_Upgrading_Your_Fan_Powered_Boxes_REV2.pdf?v=1606145455072



NOTES:

1. ALIGN HOLES ON INSULATION BRACKETS WITH EXTRUDED HOLES ON WRAPPER.
2. ASSEMBLE SUB-ASSEMBLY WITH #8-18X1/2" CRIMPTITE SCREWS.
3. ASSEMBLE L-BRACKET & FILTER CLIP USING (2) 10022801 POP RIVETS.
4. ASSEMBLE L-BRACKET TO WRAPPER USING (4) 10022801 POP RIVETS.

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DO NOT SCALE DRAWING

REMOVE ALL BURRS AND SHARP EDGES

DIMENSIONS ARE IN INCHES
TOLERANCES:
ANGULAR: MACH $\pm 1^\circ$
BEND $\pm 2^\circ$
TWO PLACE DECIMAL $\pm .03$
THREE PLACE DECIMAL $\pm .015$

MATERIAL

FINISH

LATEST ECO

WORKFLOW STATE

Working

RELEASED ON

RELEASED BY

TITLE

DWG NO

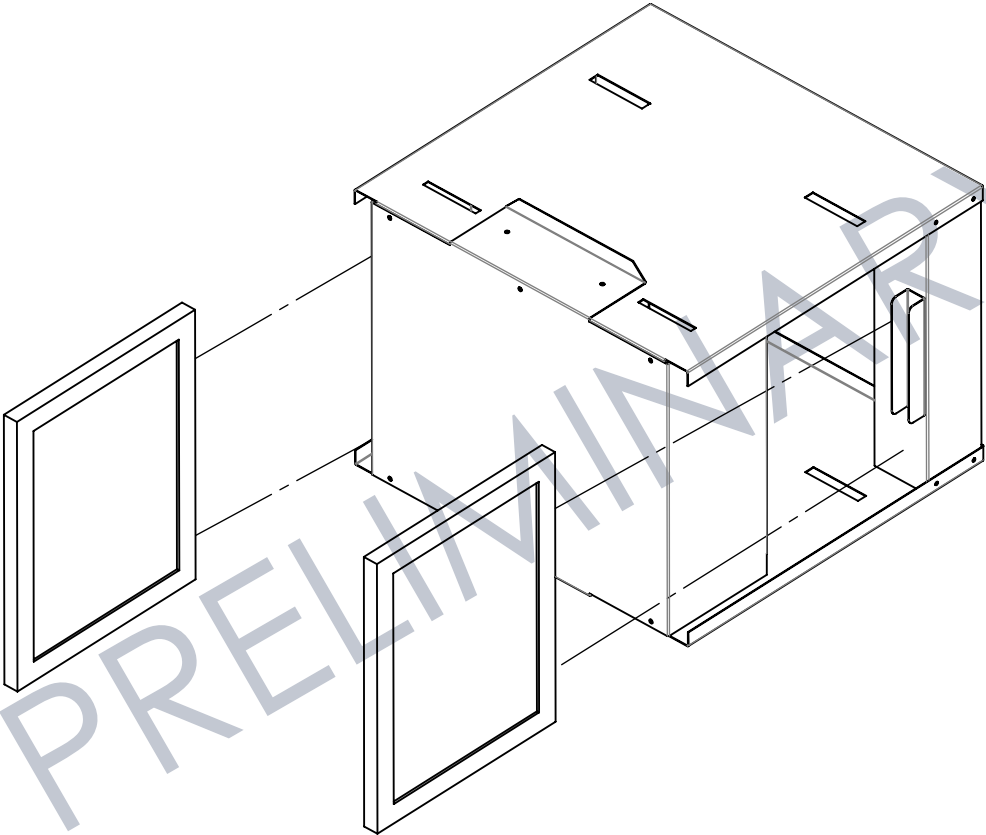
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REV SHEET

Page 2 of 15

1 OF 6

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THREE PLACE DECIMAL $\pm .015$

MATERIAL
FINISH

LATEST ECO
WORKFLOW STATE

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DWG NO	
Assem1test	
REV	SHEET
Page 3 of 15	1 OF 1

VP-MERV8® SC

(Standard Capacity)

EXTENDED SURFACE PLEATED PANEL FILTERS

- Low initial resistance and strong Dust Holding Capacity (DHC) for performance and economy
- Ecologically friendly frame components made from recyclable materials
- Expanded metal grid prevents media flutter while in operation
- Diagonal support members and wire-backed media contribute to overall strength of construction
- Filter media pack is bonded to the frame at all points of contact to eliminate air bypass
- MERV 8

The VP-MERV8 SC pleated filter is a MERV 8 filter with low resistance to airflow. It does not rely on electrostatic charge to capture particulate, achieving a true mechanical MERV 8 rating.

The VP-MERV8 SC filters are an upgrade to existing flat panels, as well as competitive MERV 6–7 pleated filters. Filters are available in 1", 2" and 4" depths. VP-MERV8 SC filters are available in a wide range of sizes and will fit most commercial and industrial installations with little or no system modification.

Superior Design and Construction

Media: 100% non-woven synthetic media manufactured from recyclable material.

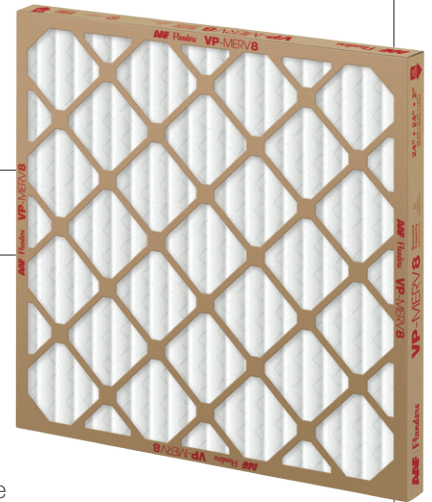
Media Support: Diamond-shaped expanded metal.

Pleat Design: V-Pleat design aids in pressure drop while reducing energy cost. Design allows for maximum airflow and DHC during the life of the filter.

Frame: Unbleached, natural Kraft-board with moisture inhibitor.

Applications

VP-MERV8 SC filters are designed for general air filtration in all types of cooling, heating, and ventilating systems. They may be used as prefilters to extend the life of higher efficiency filters or on their own. They are suitable for installation in front access holding frames and side access housings. These filters are excellent for upgrading from disposable panel filters, permanent filters, or media pads in metal frames where a higher level of cleaning is desired.



VP-MERV8® SC Filters

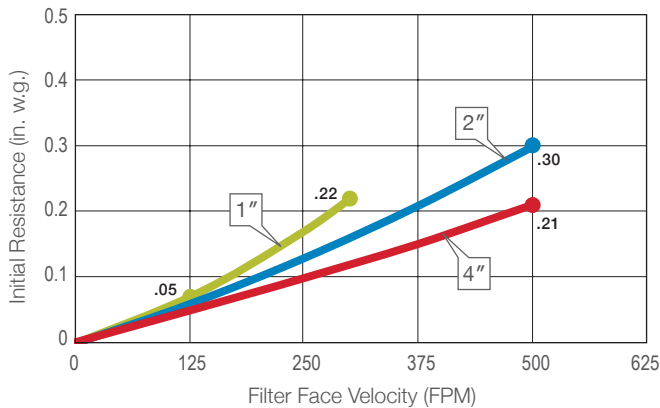
Performance Data

Filter	Pleats Per Linear Foot	Rated Initial Resistance (in. w.g.)		Recommended Final Resistance (in. w.g.)	ASHRAE 52.2 MERV	Continuous Operating Temperature Limits
		300 FPM	500 FPM			
1" VP-MERV8 SC	13	.22	–	1.0	8	180° (82°)
2" VP-MERV8 SC	9	.16	.30	1.0	8	180° (82°)
4" VP-MERV8 SC	9	.11	.21	1.0	8	180° (82°)

All performance data based on ASHRAE Standard 52.2. Performance tolerance conforms to Section 6.4 of ANSI/AHRI Standard 850-2013.

Underwriters Laboratories Classification – VP-MERV8 filters are UL Classified. Testing was performed according to UL Standard 900.

Initial Resistance vs. Filter Face Velocity



Energy savings may be realized by operating the VP-MERV8 SC filters to a lower final resistance. Contact your local AAF Flanders representative for a Total Cost of Ownership analysis for your specific application.

VP-MERV8® is a registered trademark of Flanders Corporation in the U.S.

Product Information – Standard Sizes

Nominal Size (Inches) (W x H x D)	Actual Sizes (Inches) (W x H x D)	Rated Airflow (SCFM)			Pleats Per Filter	Gross Media Area (sq. ft.)
		300 FPM	500 FPM	625 FPM		
10 x 10 x 1	9½ x 9½ x ¾	200	350	–	9	1.1
10 x 20 x 1	9½ x 19½ x ¾	400	700	–	9	2.3
12 x 20 x 1	11½ x 19½ x ¾	500	833	–	11	2.7
12 x 24 x 1	11¾ x 23¾ x ¾	600	1000	–	11	3.2
14 x 20 x 1	13½ x 19½ x ¾	583	972	–	13	3.3
14 x 25 x 1	13½ x 24½ x ¾	729	1215	–	13	4.1
15 x 20 x 1	14½ x 19½ x ¾	625	1042	–	14	3.5
16 x 20 x 1	15½ x 19½ x ¾	667	1111	–	15	3.7
16 x 25 x 1	15½ x 24½ x ¾	833	1389	–	15	4.6
18 x 24 x 1	17½ x 23½ x ¾	900	1500	–	17	4.9
18 x 25 x 1	17½ x 24½ x ¾	938	1563	–	17	5.2
20 x 20 x 1	19½ x 19½ x ¾	833	1389	–	19	4.5
20 x 24 x 1	19½ x 23½ x ¾	1000	1667	–	19	5.4
20 x 25 x 1	19½ x 24½ x ¾	1042	1736	–	19	5.7
24 x 24 x 1	23¾ x 23¾ x ¾	1200	2000	–	23	6.4
25 x 25 x 1	24½ x 24½ x ¾	1302	2170	–	24	7.2
10 x 20 x 2	9½ x 19½ x 1¾	400	700	850	7	4.3
12 x 20 x 2	11½ x 19½ x 1¾	500	850	1050	9	4.8
12 x 24 x 2	11¾ x 23¾ x 1¾	600	1000	1250	8	5.8
14 x 20 x 2	13½ x 19½ x 1¾	600	950	1150	10	5.8
14 x 25 x 2	13½ x 24½ x 1¾	750	1200	1500	10	7.2
15 x 20 x 2	14½ x 19½ x 1¾	650	1050	1300	11	6.2
16 x 20 x 2	15½ x 19½ x 1¾	650	1100	1400	12	6.7
16 x 25 x 2	15½ x 24½ x 1¾	850	1400	1750	12	8.4
18 x 24 x 2	17½ x 23½ x 1¾	900	1500	1900	13	8.7
18 x 25 x 2	17½ x 24½ x 1¾	950	1550	1950	13	9
20 x 20 x 2	19½ x 19½ x 1¾	850	1400	1750	15	8.2
20 x 24 x 2	19½ x 23½ x 1¾	1000	1650	2100	14	9.8
20 x 25 x 2	19½ x 24½ x 1¾	1050	1750	2150	15	10.2
24 x 24 x 2	23¾ x 23¾ x 1¾	1200	2000	2500	17	11.5
25 x 25 x 2	24½ x 24½ x 1¾	1300	2150	2700	19	12.6
12 x 24 x 4	11¾ x 23¾ x 3¾	600	1000	1250	9	11.1
16 x 20 x 4	15½ x 19½ x 3¾	650	1100	1400	12	12.3
16 x 25 x 4	15½ x 24½ x 3¾	850	1400	1750	12	15.5
18 x 24 x 4	17½ x 23½ x 3¾	900	1500	1900	14	17.3
20 x 20 x 4	19½ x 19½ x 3¾	850	1400	1750	15	15.4
20 x 24 x 4	19½ x 23½ x 3¾	1000	1650	2100	15	18.6
20 x 25 x 4	19½ x 24½ x 3¾	1050	1750	2150	15	19.3
24 x 24 x 4	23¾ x 23¾ x 3¾	1200	2000	2500	18	22.3
25 x 29 x 4	24½ x 28½ x 3¾	1500	2500	3150	22	28.4
28 x 30 x 4	27½ x 29½ x 3¾	1750	2900	–	21	33.2



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ISO Certified Firm

AFP-1-382 01/17

PREpleat® M13

(MERV 13)

EXTENDED SURFACE PLEATED PANEL FILTERS

- High efficiency with low initial resistance
- 100% synthetic recyclable high-loft media
- 2-piece heavy-duty die-cut frame
- Expanded metal backing
- Double-wall frame
- Diagonal grid supports for maximum strength
- MERV 13

The PREpleat M13 pleated filter has a low initial resistance and supports achievement of LEED® credits by significantly improving Indoor Air Quality (IAQ) and reducing energy consumption.

The PREpleat M13 filter provides an initial efficiency of MERV 13 per ASHRAE Standard 52.2 at a resistance of only .20" w.g. (2" depth) when operating at airflow velocity of 375 FPM—and only 0.30" at 500 FPM.

Superior Design and Construction

Media: 100% non-woven synthetic media manufactured from recyclable material.

Media Support: Diamond-shaped expanded metal maintains maximum support while avoiding air bypass.

Pleat Design: V-Pleat design minimizes resistance, keeping consistent pleat count, height, and shape.

Frame: Heavy-duty two-piece moisture-resistant frame includes diagonal and horizontal support members bonded to the media on the air entering and leaving sides. This is a durable frame for any commercial and industrial application.

Operating Temperature Limits: Maximum operating temperature is 180°F (82°C).

Applications

PREpleat M13 filters are designed for general air filtration in all types of cooling, heating, and ventilating systems. They can be used as prefilters to extend the life of higher efficiency filters or on their own. They are suitable for installation in front access holding frames and side access housings. These filters are excellent for upgrading from disposable panel filters, permanent filters, or media pads in metal frames where a higher level of cleaning is desired.



PREpleat® M13 Filters

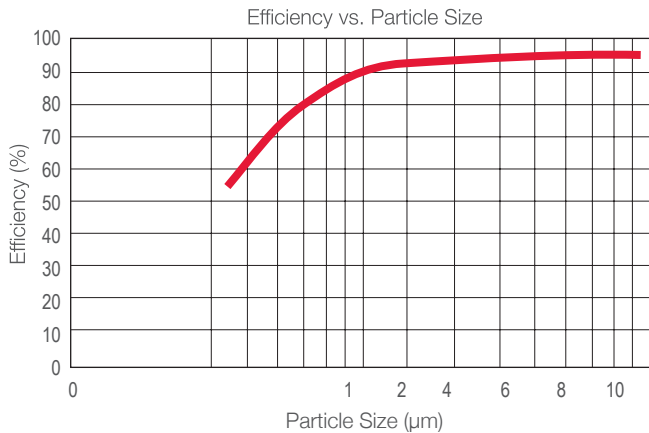
Performance Data

Filter	Pleats Per Linear Foot	Rated Initial Resistance (in. w.g.)		Recommended Final Resistance (in. w.g.)	ASHRAE 52.2 MERV	Continuous Operating Temperature Limits
		300 FPM	500 FPM			
1" PREpleat M13	15	.25	–	1.0	13	180°F (82°C)
2" PREpleat M13	15	.16	.30	1.0	13	180°F (82°C)
4" PREpleat M13	9	.10	.20	1.0	13	180°F (82°C)

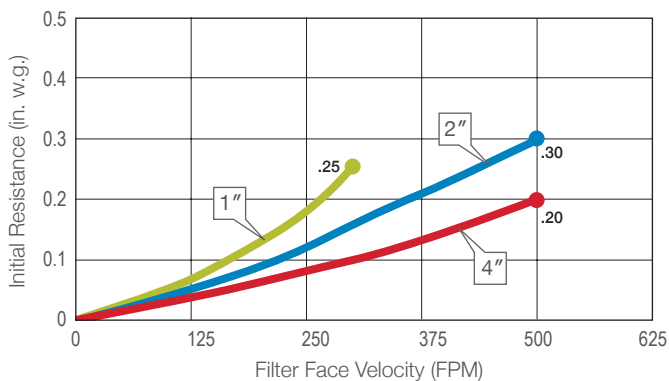
All performance data based on ASHRAE Standard 52.2. Performance tolerance conforms to Section 6.4 of ANSI/AHRI Standard 850-2013.

Underwriters Laboratories Classification – PREpleat M13 filters are UL Classified. Testing was performed according to UL Standard 900.

Composite Minimum Efficiency Curve



Initial Resistance vs. Filter Face Velocity



Energy savings may be realized by operating the PREpleat M13 filters to a lower final resistance. Contact your local AAF Flanders representative for a Total Cost of Ownership analysis for your specific application.

Product Information – Standard Sizes

Nominal Sizes (Inches) (W x H x D)	Actual Sizes (Inches) (W x H x D)	Rated Airflow (SCFM)			Pleats Per Filter	Gross Media Area (sq. ft.)
		300 FPM	500 FPM	625 FPM		
10 x 20 x 1	9½ x 19½ x ¾	400	700	–	12	2.7
12 x 20 x 1	11½ x 19½ x ¾	500	850	–	14	3.1
12 x 24 x 1	11½ x 23½ x ¾	600	1000	–	14	3.7
14 x 20 x 1	13½ x 19½ x ¾	600	950	–	17	3.7
14 x 25 x 1	13½ x 24½ x ¾	750	1200	–	17	4.6
15 x 20 x 1	14½ x 19½ x ¾	650	1050	–	18	3.9
16 x 20 x 1	15½ x 19½ x ¾	650	1100	–	19	4.1
16 x 24 x 1	15½ x 23½ x ¾	800	1350	–	19	4.9
16 x 25 x 1	15½ x 24½ x ¾	850	1400	–	19	5.2
18 x 20 x 1	17½ x 19½ x ¾	750	1250	–	22	4.7
18 x 24 x 1	17½ x 23½ x ¾	900	1500	–	22	5.7
18 x 25 x 1	17½ x 24½ x ¾	950	1550	–	22	5.9
20 x 20 x 1	19½ x 19½ x ¾	850	1400	–	24	5.1
20 x 24 x 1	19½ x 23½ x ¾	1000	1650	–	24	6.2
20 x 25 x 1	19½ x 24½ x ¾	1050	1750	–	24	6.4
24 x 24 x 1	23½ x 23½ x ¾	1200	2000	–	29	7.4
25 x 25 x 1	24½ x 24½ x ¾	1300	2150	–	31	8.3
10 x 20 x 2	9½ x 19½ x 1¼	400	700	850	12	6.1
12 x 20 x 2	11½ x 19½ x 1¼	500	850	1050	14	7.3
12 x 24 x 2	11½ x 23½ x 1¼	600	1000	1250	14	8.8
14 x 20 x 2	13½ x 19½ x 1¼	600	950	1150	17	8.5
14 x 25 x 2	13½ x 24½ x 1¼	750	1200	1500	17	10.6
15 x 20 x 2	14½ x 19½ x 1¼	650	1050	1300	18	9.1
16 x 20 x 2	15½ x 19½ x 1¼	650	1100	1400	19	9.7
16 x 24 x 2	15½ x 23½ x 1¼	800	1350	1650	19	11.2
16 x 25 x 2	15½ x 24½ x 1¼	850	1400	1750	19	12.2
18 x 20 x 2	17½ x 19½ x 1¼	750	1250	1500	22	10.9
18 x 24 x 2	17½ x 23½ x 1¼	900	1500	1875	22	13.1
18 x 25 x 2	17½ x 24½ x 1¼	950	1550	1950	22	13.7
20 x 20 x 2	19½ x 19½ x 1¼	850	1400	1750	24	12.2
20 x 24 x 2	19½ x 23½ x 1¼	1000	1650	2100	24	14.6
20 x 25 x 2	19½ x 24½ x 1¼	1050	1750	2150	24	15.2
24 x 24 x 2	23½ x 23½ x 1¼	1200	2000	2500	29	17.5
25 x 25 x 2	24½ x 24½ x 1¼	1300	2150	2700	31	19.0
12 x 24 x 4	11½ x 23½ x 3¼	600	1000	1250	9	11.3
16 x 20 x 4	15½ x 19½ x 3¼	650	1100	1400	12	12.5
16 x 25 x 4	15½ x 24½ x 3¼	850	1400	1750	12	15.6
18 x 24 x 4	17½ x 23½ x 3¼	900	1500	1875	14	17.5
20 x 20 x 4	19½ x 19½ x 3¼	850	1400	1750	15	15.6
20 x 24 x 4	19½ x 23½ x 3¼	1000	1650	2100	15	18.8
20 x 25 x 4	19½ x 24½ x 3¼	1050	1750	2150	15	19.6
24 x 24 x 4	23½ x 23½ x 3¼	1200	2000	2500	18	22.6
28 x 30 x 4	27½ x 29½ x 3¼	1750	2900	–	21	32.6

PREpleat® is a registered trademark of Flanders Corporation in the U.S.



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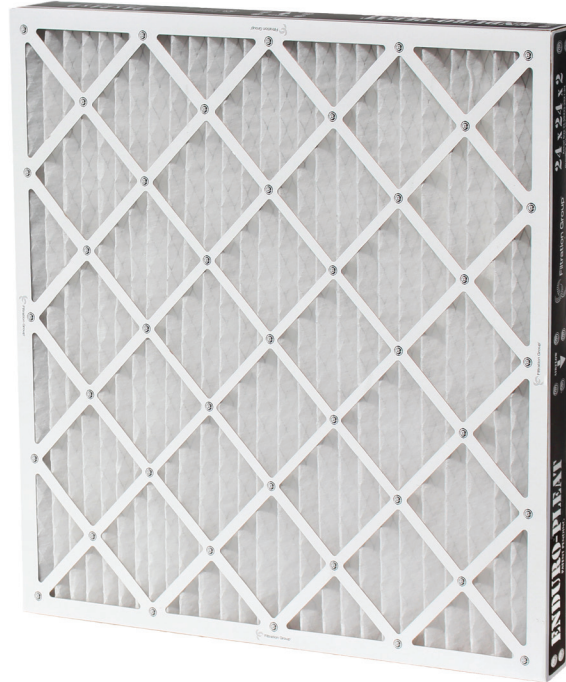
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AFP-1-384 01/17



PRODUCT OVERVIEW

- MERV 8/8A
- Available in 2" & 4" depths
- Ideal for use in
 - Office and Retail
 - Manufacturing and Distribution
 - Government and Educational facilities
 - Doctor offices, assisted living facilities and Hospitals
 - Hotels and Airports
 - Single and Multi-Family Housing



AEROSTAR® ENDURO-PLEAT

WHY THE ENDURO-PLEAT?

- Stronger components for longer service life in challenging applications
- Achieves a MERV 8/8A without an electrostatic charge
- Extremely low resistance of 0.20" w.g.
 - Improved air flow
 - Energy cost savings
- 100% synthetic media
 - Moisture resistant
 - Will not promote microbial growth
- Highest quality beverage board die-cut frame contaminants
- Rugged wire backing – twice as heavy as industry standards
- Guaranteed to last longer than any other MERV 8 pleated filter



* See your Filtration Group representative for details regarding the limited guarantee.

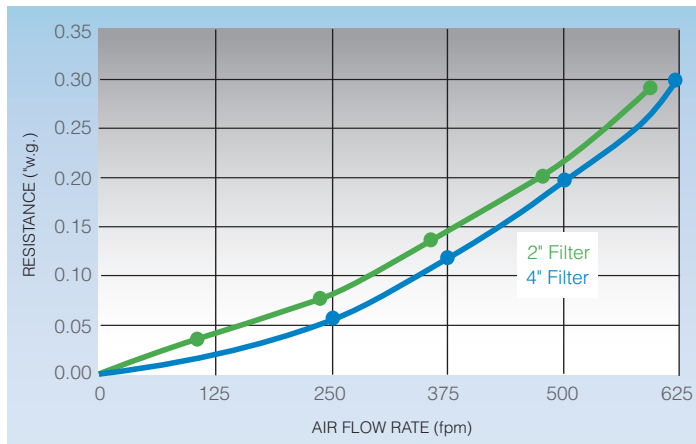


ENDURO-PLEAT

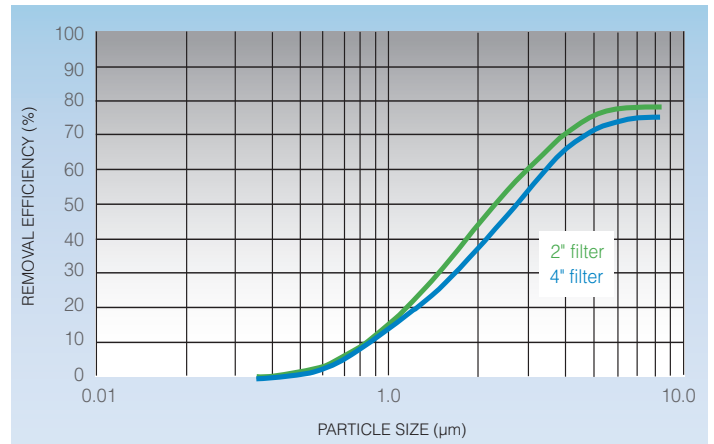
PERFORMANCE DATA (24 x 24 x 2)

CAPACITY	FILTER DEPTH	INITIAL RESISTANCE (*w.g.)			FINAL RESISTANCE (*w.g.)
		375 fpm	500 fpm	625 fpm	
High	2"	0.13	0.20	0.29	1.5
	4"	0.12	0.20	0.30	1.5

INITIAL RESISTANCE (24 x 24 x 2)



MINIMUM REMOVAL EFFICIENCY (24 x 24 x 2)



PRODUCT DATA

PART NUMBER	NOMINAL SIZE (H" x W" x D")	ACTUAL SIZE (H" x W" x D")	CFM CAPABILITIES	
			375 fpm	500 fpm
13712242	12 x 24 x 2	11 3/8 x 23 3/8 x 1 3/4	750	1000
13714252	14 x 25 x 2	13 1/2 x 24 1/2 x 1 3/4	900	1215
13716202	16 x 20 x 2	15 1/2 x 19 1/2 x 1 3/4	825	1100
13716242	16 x 24 x 2	15 3/8 x 23 3/8 x 1 3/4	1000	1325
13716252	16 x 25 x 2	15 1/2 x 24 1/2 x 1 3/4	1050	1400
13718242	18 x 24 x 2	17 3/8 x 23 3/8 x 1 3/4	1125	1500
13718252	18 x 25 x 2	17 1/2 x 24 1/2 x 1 3/4	1175	1550
13720202	20 x 20 x 2	19 1/2 x 19 1/2 x 1 3/4	1050	1400
13720242	20 x 24 x 2	19 3/8 x 23 3/8 x 1 3/4	1250	1650
13720252	20 x 25 x 2	19 1/2 x 24 1/2 x 1 3/4	1300	1750
13720302	20 x 30 x 2	19 3/4 x 29 3/4 x 1 3/4	1563	2083
13724242	24 x 24 x 2	23 3/8 x 23 3/8 x 1 3/4	1500	2000

PART NUMBER	NOMINAL SIZE (H" x W" x D")	ACTUAL SIZE (H" x W" x D")	CFM CAPABILITIES	
			500 fpm	625 fpm
13712244	12 x 24 x 4	11 3/8 x 23 3/8 x 3 3/4	1000	1250
13716204	16 x 20 x 4	15 1/2 x 19 1/2 x 3 3/4	1100	1400
13716254	16 x 25 x 4	15 1/2 x 24 1/2 x 3 3/4	1389	1750
13718244	18 x 24 x 4	17 3/8 x 23 3/8 x 3 3/4	1500	1875
13720244	20 x 24 x 2	19 3/8 x 23 3/8 x 3 3/4	2000	2100
13720254	20 x 25 x 4	19 1/2 x 24 1/2 x 3 3/4	1750	2200
13724244	24 x 24 x 4	23 3/8 x 23 3/8 x 3 3/4	2000	2500

* Contact Customer Care for additional sizes and information.

ENGINEERING SPECIFICATIONS

1.0 General

- Filters shall be Aerostar® Enduro-Pleat extended surface pleated air filters as manufactured by Filtration Group.
- Filters shall be available in standard configurations and available in depths of 2" and 4".
- Underwriters Laboratories classified to UL 900.
- Filters are manufactured by an ISO 9001 registered company.

2.0 Filter Materials of Construction

- Media shall be 100% synthetic, non-charged mechanical media that does not support microbial growth.
- Frame shall be a heavy-duty, high strength, 28 pt moisture resistant beverage board with a cross member design that increases filter rigidity and prevents breaching. Frame shall be recyclable.

- Filters shall have a 100% post-consumer recycled expanded metal support grid bonded to the air-exiting side of the filter to maintain pleat uniformity and prevent fluttering. Metal support grid shall be recyclable. Expanded metal shall weigh minimum of 0.05 pounds/ft² and be minimum 93% open.

3.0 Filter Performance

- Filters shall be MERV 8/8A when tested in accordance with the ASHRAE 52.2 Test Standard.
- For initial resistance of filters, see Performance Data chart above.
- Filter shall be rated to withstand a continuous operating temperature up to 200°F and 100% maximum relative humidity.
- Filters shall have a recommended final resistance of 1.5" w.g.



PRODUCT OVERVIEW

- MERV 13
- Available in 1", 2" & 4" depths
- Ideal for use in
 - Office and Retail
 - Manufacturing and Distribution
 - Government and Educational facilities
 - Doctor offices, assisted living facilities and Hospitals
 - Hotels and Airports
 - Single and Multi-Family Housing



GREEN PLEAT

WHY THE GREEN PLEAT?

- Advanced, dual-component, synthetic air media
- Charged fibers immediately trap contaminants
- Resulting dust cake enhances traditional filtration
- Promotes high filtration during entire life cycle
- High efficiency filtration in compact depth
 - Low resistance to air flow
 - Reduced energy costs
 - Eliminates need to retrofit to achieve a higher MERV rating
 - Provides points toward LEED certification
 - Keeps coils and ductwork much cleaner
 - Quickly traps pollen, allergens & contaminants

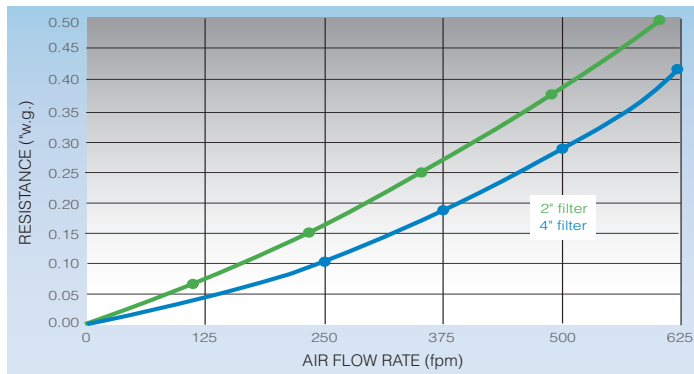


GREEN PLEAT

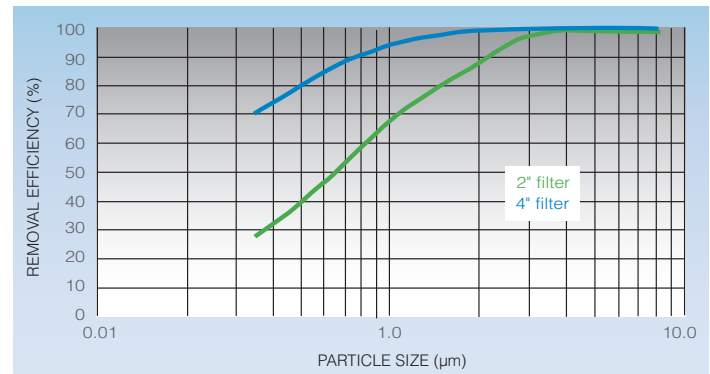
PERFORMANCE DATA (24 x 24)

CAPACITY	FILTER DEPTH	INITIAL RESISTANCE ("w.g.)				FINAL RESISTANCE ("w.g.)
		300 fpm	375 fpm	500 fpm	625 fpm	
High	1"	0.35	0.47	—	—	1.0
	2"	—	0.25	0.37	0.50	1.0
	4"	—	0.18	0.29	0.42	1.0

INITIAL RESISTANCE (24 x 24)



MINIMUM REMOVAL EFFICIENCY (24 x 24)



PRODUCT DATA

PART NUMBER	NOMINAL SIZE* (H" x W" x D")	ACTUAL SIZE (H" x W" x D")	CFM CAPABILITIES	
			300 fpm	375 fpm
21567	10 x 20 x 1	9 1/2 x 19 1/2 x 3/4	400	525
21570	12 x 12 x 1	11 3/4 x 11 3/4 x 3/4	300	375
21571	12 x 20 x 1	11 1/2 x 19 1/2 x 3/4	500	625
21572	12 x 24 x 1	11 1/2 x 23 1/2 x 3/4	600	750
21574	14 x 20 x 1	13 1/2 x 19 1/2 x 3/4	575	725
21576	14 x 25 x 1	13 1/2 x 24 1/2 x 3/4	725	900
21577	15 x 20 x 1	14 1/2 x 19 1/2 x 3/4	625	775
21579	16 x 16 x 1	15 3/4 x 15 3/4 x 3/4	525	650
21580	16 x 20 x 1	15 1/2 x 19 1/2 x 3/4	650	825
21581	16 x 24 x 1	15 1/2 x 23 1/2 x 3/4	800	1000
21582	16 x 25 x 1	15 1/2 x 24 1/2 x 3/4	825	1050
21584	18 x 20 x 1	17 1/2 x 19 1/2 x 3/4	750	925
21586	18 x 24 x 1	17 1/2 x 23 1/2 x 3/4	900	1125
21587	18 x 25 x 1	17 1/2 x 24 1/2 x 3/4	925	1175
21588	20 x 20 x 1	19 1/2 x 19 1/2 x 3/4	825	1050
21589	20 x 24 x 1	19 1/2 x 23 1/2 x 3/4	1000	1250
21590	20 x 25 x 1	19 1/2 x 24 1/2 x 3/4	1050	1300
21591	20 x 30 x 1	19 3/4 x 29 3/4 x 3/4	1250	1530
21593	24 x 24 x 1	23 1/2 x 23 1/2 x 3/4	1200	1500
21594	25 x 25 x 1	24 1/2 x 24 1/2 x 3/4	1300	1625

* Contact Customer Care for additional sizes and information.

PART NUMBER	NOMINAL SIZE* (H" x W" x D")	ACTUAL SIZE (H" x W" x D")	CFM CAPABILITIES	
			375 fpm	500 fpm
21515	10 x 20 x 2	9 1/2 x 19 1/2 x 1 3/4	525	700
21516	12 x 24 x 2	11 3/8 x 23 3/8 x 1 3/4	750	1000
21517	14 x 20 x 2	13 1/2 x 19 1/2 x 1 3/4	725	975
21518	14 x 25 x 2	13 1/2 x 24 1/2 x 1 3/4	900	1200
21519	16 x 20 x 2	15 1/2 x 19 1/2 x 1 3/4	825	1100
21520	16 x 24 x 2	15 3/8 x 23 3/8 x 1 3/4	1000	1325
21521	16 x 25 x 2	15 1/2 x 24 1/2 x 1 3/4	1050	1400
21522	18 x 24 x 2	17 3/8 x 23 3/8 x 1 3/4	1125	1500
21523	18 x 25 x 2	17 1/2 x 24 1/2 x 1 3/4	1175	1550
21524	20 x 20 x 2	19 1/2 x 19 1/2 x 1 3/4	1050	1400
21525	20 x 24 x 2	19 3/8 x 23 3/8 x 1 3/4	1250	1650
21526	20 x 25 x 2	19 1/2 x 24 1/2 x 1 3/4	1300	1700
21527	24 x 24 x 2	23 3/8 x 23 3/8 x 1 3/4	1600	2000
21528	25 x 25 x 2	24 1/2 x 24 1/2 x 1 3/4	1625	2150
			500 fpm	625 fpm
21541	12 x 24 x 4	11 3/8 x 23 3/8 x 3 3/4	1000	1250
21542	16 x 20 x 4	15 1/2 x 19 1/2 x 3 3/4	1100	1400
21543	16 x 25 x 4	15 1/2 x 24 1/2 x 3 3/4	1400	1750
21544	18 x 24 x 4	17 3/8 x 23 3/8 x 3 3/4	1500	1875
21545	20 x 20 x 4	19 1/2 x 19 1/2 x 3 3/4	1400	1750
21546	20 x 24 x 4	19 3/8 x 23 3/8 x 3 3/4	1650	2100
21547	20 x 25 x 4	19 1/2 x 24 1/2 x 3 3/4	1750	2200
21548	24 x 24 x 4	23 3/8 x 23 3/8 x 3 3/4	2000	2500

ENGINEERING SPECIFICATIONS

1.0 General

- Filters shall be Aerostar® MERV 13 Green Pleat extended surface pleated air filters as manufactured by Filtration Group.
- Filters shall be available in depths of 1", 2", and 4".
- Underwriters Laboratories classified to UL 900.
- Filters are manufactured by an ISO 9001 registered company.

2.0 Filter Materials of Construction

- Media shall be 100% synthetic media that does not support microbial growth.
- Frame shall be a high wet strength beverage board with cross member design that increases filter rigidity and prevents breaching. Frame shall be recyclable.

- Filters shall have a 100% post-consumer recycled expanded metal support grid bonded to the air-exiting side of the filter to maintain pleat uniformity and prevent fluttering. Metal support grid shall be recyclable.

3.0 Filter Performance

- Filters shall be MERV 13 when tested in accordance with ASHRAE 52.2 Test Standard.
- For initial resistance of filters, see Performance Data chart above.
- Filter shall be rated to withstand a continuous operating temperature up to 150°F
- Filters shall have a recommended final resistance of 1.0" w.g.

Multi-Pleat™ XL8

MERV 8 Extended Surface Pleated Panel Filter with Mechanical Media



Features

- Upgrade from standard pleated filter
- MERV 8 and MERV 8-A performance rating
- Mechanical MERV 8 media is not reliant on electrostatic charge for efficiency
- Low resistance to airflow
- High dust holding capacity
- Sturdy double-wall frame design
- Moisture resistant beverage board frame
- Standard and high capacity models
- Available in 1", 2", 4" and 6" depths

Multi-Pleat XL8 Mechanical MERV 8

The Koch **Multi-Pleat XL8** is a medium efficiency extended surface pleated panel filter, engineered to provide higher initial efficiencies and overall superior performance than standard pleated filters. The **Multi-Pleat XL8** carries a MERV 8 and MERV 8-A performance rating in accordance with ASHRAE Test Standard 52.2-2007.

The MERV 8 and MERV 8-A performance rating provided by the **Multi-Pleat XL8** make the filter an excellent upgrade from disposable filters and standard MERV 6 and 7 rated pleated filters. The **Multi-Pleat XL8** is the best selection in applications such as hospitals, laboratories, pharmaceutical plants, commercial office buildings, and in any system in which a higher degree of indoor air quality is required.

Multi-Pleat XL8 Construction

The **Multi-Pleat XL8** media is produced with an optimal blend of highly specialized fibers, developed by Koch Filter specifically for use in extended surface air filters. Developed to deliver a "one of a kind" performance, this specialized media operates on mechanical filtration principles which provide high efficiency, low pressure drop and high dust holding capacity.

The Koch Multi-Pleat XL8 maintains a MERV 8 performance rating before and after conditioning steps when tested in accordance to ASHRAE Test Standard 52.2-2007 and 52.2-2007 Appendix J.

Two Media Area Capacity Levels

Standard Capacity **XL8** filters provide a combination of efficiency, economy, and excellent overall performance. Standard Capacity XL8 filters are an excellent choice in applications where filter change schedules are based on preventive maintenance schedules.

High Capacity **XL8-HC** filters are similar in construction to the Standard Capacity but have the added advantage of approximately 30% more media. The additional media results in extended filter life, making the XL8-HC the ideal filter for use in filtration systems where filter change schedules are predicated on recommended final pressure drop readings.

Nominal Size	Actual Size	Capacity (CFM)			Standard Capacity			Media Area	High Capacity			Media Area
		@300	@500	@625	@300 FPM	@500 FPM	@625 FPM		@300 FPM	@500 FPM	@625 FPM	
10x20x1	9.50 x 19.50 x .75	425	700	NR	0.26	0.51	NR	2.3	0.21	0.41	NR	2.9
12x24x1	11.38 x 23.38 x .75	600	1000	NR	0.26	0.51	NR	3.3	0.21	0.41	NR	4.2
14x20x1	13.50 x 19.50 x .75	590	980	NR	0.26	0.51	NR	3.3	0.21	0.41	NR	4.1
14x25x1	13.50 x 24.50 x .75	730	1215	NR	0.26	0.51	NR	4.1	0.21	0.41	NR	5.1
15x20x1	14.50 x 19.50 x .75	625	1050	NR	0.26	0.51	NR	3.5	0.21	0.41	NR	4.4
16x20x1	15.50 x 19.50 x .75	670	1115	NR	0.26	0.51	NR	3.8	0.21	0.41	NR	4.7
16x25x1	15.50 x 24.50 x .75	840	1400	NR	0.26	0.51	NR	4.7	0.21	0.41	NR	5.9
18x24x1	17.38 x 23.38 x .75	900	1500	NR	0.26	0.51	NR	5.1	0.21	0.41	NR	6.3
20x20x1	19.50 x 19.50 x .75	840	1400	NR	0.26	0.51	NR	4.8	0.21	0.41	NR	5.9
20x25x1	19.50 x 24.50 x .75	1050	1740	NR	0.26	0.51	NR	6	0.21	0.41	NR	7.4
24x24x1	23.38 x 23.38 x .75	1200	2000	NR	0.26	0.51	NR	6.8	0.21	0.41	NR	8.5
25x25x1	24.50 x 24.50 x .75	1310	2170	NR	0.26	0.51	NR	7.4	0.21	0.41	NR	9.3
10x20x2	9.50 x 19.50 x 1.75	425	700	875	0.14	0.25	0.34	4	0.09	0.18	0.25	6
12x20x2	11.50 x 19.50 x 1.75	500	840	1050	0.14	0.25	0.34	4.8	0.09	0.18	0.25	7.2
12x24x2	11.38 x 23.38 x 1.75	600	1000	1250	0.14	0.25	0.34	5.7	0.09	0.18	0.25	8.6
14x20x2	13.50 x 19.50 x 1.75	590	980	1215	0.14	0.25	0.34	5.6	0.09	0.18	0.25	8.4
14x25x2	13.50 x 24.50 x 1.75	730	1215	1520	0.14	0.25	0.34	7.1	0.09	0.18	0.25	10.6
15x20x2	14.50 x 19.50 x 1.75	625	1050	1310	0.14	0.25	0.34	6.1	0.09	0.18	0.25	9.1
16x20x2	15.50 x 19.50 x 1.75	670	1115	1400	0.14	0.25	0.34	6.7	0.09	0.18	0.25	9.9
16x24x2	15.50 x 23.50 x 1.75	800	1350	1675	0.14	0.25	0.34	7.8	0.09	0.18	0.25	11.6
16x25x2	15.50 x 24.50 x 1.75	840	1400	1740	0.14	0.25	0.34	8.1	0.09	0.18	0.25	12.1
18x24x2	17.50 x 23.50 x 1.75	900	1500	1875	0.14	0.25	0.34	8.8	0.09	0.18	0.25	13.1
20x20x2	19.50 x 19.50 x 1.75	840	1400	1740	0.14	0.25	0.34	8.3	0.09	0.18	0.25	12.4
20x24x2	19.50 x 23.50 x 1.75	1000	1675	2100	0.14	0.25	0.34	9.8	0.09	0.18	0.25	14.6
20x25x2	19.50 x 24.50 x 1.75	1050	1740	2170	0.14	0.25	0.34	10.5	0.09	0.18	0.25	15.5
24x24x2	23.38 x 23.38 x 1.75	1200	2000	2500	0.14	0.25	0.34	11.8	0.09	0.18	0.25	17.9
25x25x2	24.50 x 24.50 x 1.75	1310	2170	2720	0.14	0.25	0.34	12.8	0.09	0.18	0.25	19.1
12x24x4	11.38 x 23.38 x 3.75	600	1000	1250	0.09	0.18	0.25	10.6	0.08	0.16	0.23	12.9
16x20x4	15.50 x 19.50 x 3.75	670	1115	1400	0.09	0.18	0.25	12	0.08	0.16	0.23	14.7
16x24x4	15.38 x 23.38 x 3.75	800	1350	1675	0.09	0.18	0.25	14.3	0.08	0.16	0.23	17.5
16x25x4	15.50 x 24.50 x 3.75	840	1400	1750	0.09	0.18	0.25	15	0.08	0.16	0.23	18.4
18x24x4	17.50 x 23.38 x 3.75	900	1500	1875	0.09	0.18	0.25	16.3	0.08	0.16	0.23	19.9
20x20x4	19.50 x 19.50 x 3.75	840	1400	1740	0.09	0.18	0.25	15.1	0.08	0.16	0.23	18.4
20x24x4	19.50 x 23.38 x 3.75	1000	1675	2100	0.09	0.18	0.25	18.1	0.08	0.16	0.23	22.2
20x25x4	19.50 x 24.50 x 3.75	1050	1740	2170	0.09	0.18	0.25	19.5	0.08	0.16	0.23	23.6
24x24x4	23.38 x 23.38 x 3.75	1200	2000	2500	0.09	0.18	0.25	22.5	0.08	0.16	0.23	27.5
24x24x6	23.38 x 23.38 x 5.75	1200	2000	2500	0.13	0.19	0.29	33.3	0.11	0.17	0.28	40.7

Notes:

- MERV (Minimum Efficiency Reporting Value) • Recommended Final Pressure Drop is 1.0" w.g.
- Performance data is based on ASHRAE Test Standards 52.1-1999 and 52.2-2007. • Recommended maximum continuous operational temperature is 200° F.



KOCHFILTER®
PURE PERFORMANCE

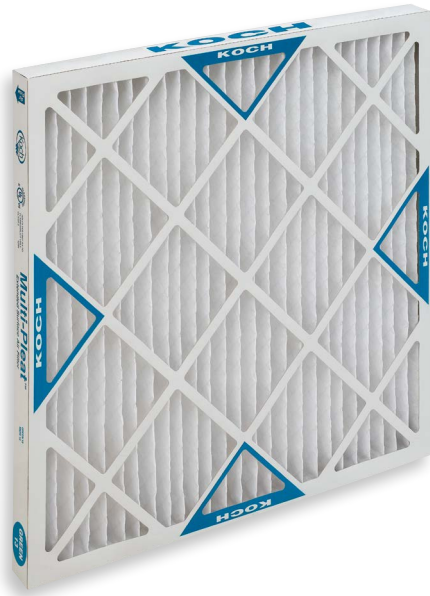
8401 Air Commerce Drive, Louisville, KY 40219

toll free: 800.757.5624 | phone: 502.634.4796 | Fax: 502.969.2364

info@kochfilter.com | www.kochfilter.com

Multi-Pleat™ Green13

MERV 13 Extended Surface Pleated Panel Filters



Features

- Earns LEED points
- MERV 13 performance rating
- Reduces energy costs
- Extended filter lifecycle
- Conserves resources
- Improves indoor environmental quality
- Available in 1", 2", 4" and 6" depths

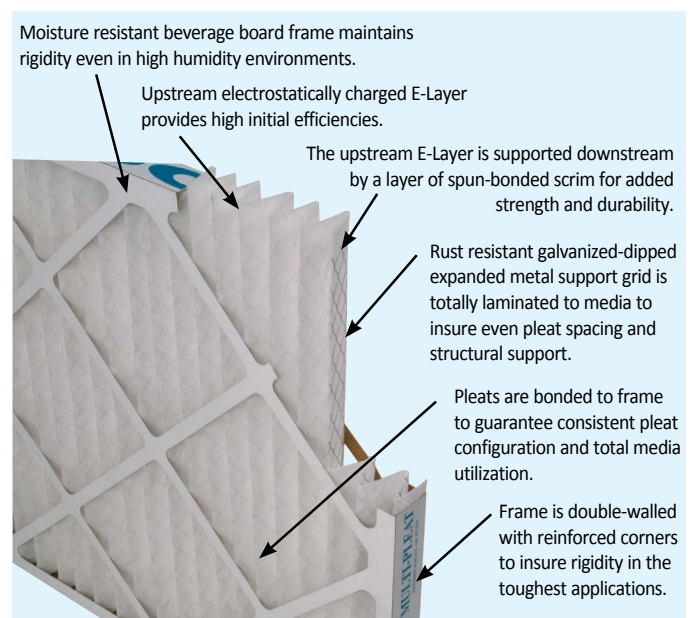
Multi-Pleat GREEN13

The Koch **Multi-Pleat Green13** is a sustainable component of green building development. By virtue of its MERV13 performance rating, the Green13 can earn points toward LEED certification in the US Green Building Council's Green Building Rating System.

The MERV 13 performance ratings provided by the **Multi-Pleat GREEN 13** make the filter an excellent upgrade from disposable filters and ordinary pleated filters in applications such as hospitals, laboratories and pharmaceutical plants, commercial office buildings, and in any system in which a higher degree of clean air is required.

Multi-Pleat GREEN13 Construction

The media in the **Multi-Pleat Green 13** is produced with a specialized blend of electrostatically-charged synthetic fibers, researched by Koch Filter specifically for use in extended surface air filtration. This layer of polypropylene fibers, known as the E-Layer, is composed of rectangular shaped fibers arranged in an intersecting cross-pattern design. This unique fiber configuration insures greater stability of the electrostatic charge, reduced pressure drop, and prolonged efficiencies compared to other filter medias.



Nominal Size	Actual Size	Capacity (CFM)			Resistance (In. W.G.)			Media Area
		@300	@500	@625	@300 FPM	@500 FPM	@625 FPM	
10x20x1	9.50 x 19.50 x .75	425	700	NR	0.26	0.50	NR	2.9
12x24x1	11.38 x 23.38 x .75	600	1000	NR	0.26	0.50	NR	4.2
14x20x1	13.50 x 19.50 x .75	590	980	NR	0.26	0.50	NR	4.1
14x25x1	13.50 x 24.50 x .75	730	1215	NR	0.26	0.50	NR	5.1
15x20x1	14.50 x 19.50 x .75	625	1050	NR	0.26	0.50	NR	4.4
16x20x1	15.50 x 19.50 x .75	670	1115	NR	0.26	0.50	NR	4.7
16x25x1	15.50 x 24.50 x .75	840	1400	NR	0.26	0.50	NR	5.9
18x24x1	17.38 x 23.38 x .75	900	1500	NR	0.26	0.50	NR	6.3
20x20x1	19.50 x 19.50 x .75	840	1400	NR	0.26	0.50	NR	5.9
20x25x1	19.50 x 24.50 x .75	1050	1740	NR	0.26	0.50	NR	7.4
24x24x1	23.38 x 23.38 x .75	1200	2000	NR	0.26	0.50	NR	8.5
25x25x1	24.50 x 24.50 x .75	1310	2170	NR	0.26	0.50	NR	9.3
10x20x2	9.50 x 19.50 x 1.75	425	700	875	0.12	0.29	0.41	6
12x20x2	11.50 x 19.50 x 1.75	500	840	1050	0.12	0.29	0.41	7.2
12x24x2	11.38 x 23.38 x 1.75	600	1000	1250	0.12	0.29	0.41	8.6
14x20x2	13.50 x 19.50 x 1.75	590	980	1215	0.12	0.29	0.41	8.4
14x25x2	13.50 x 24.50 x 1.75	730	1215	1520	0.12	0.29	0.41	10.6
15x20x2	14.50 x 19.50 x 1.75	625	1050	1310	0.12	0.29	0.41	9.1
16x20x2	15.50 x 19.50 x 1.75	670	1115	1400	0.12	0.29	0.41	9.7
16x24x2	15.50 x 23.50 x 1.75	800	1350	1675	0.12	0.29	0.41	11.6
16x25x2	15.50 x 24.50 x 1.75	840	1400	1740	0.12	0.29	0.41	12.1
18x24x2	17.50 x 23.50 x 1.75	900	1500	1875	0.12	0.29	0.41	13.1
20x20x2	19.50 x 19.50 x 1.75	840	1400	1740	0.12	0.29	0.41	12.2
20x24x2	19.50 x 23.50 x 1.75	1000	1675	2100	0.12	0.29	0.41	14.6
20x25x2	19.50 x 24.50 x 1.75	1050	1740	2170	0.12	0.29	0.41	15.2
24x24x2	23.38 x 23.38 x 1.75	1200	2000	2500	0.12	0.29	0.41	17.5
25x25x2	24.50 x 24.50 x 1.75	1310	2170	2720	0.12	0.29	0.41	19.1
12x24x4	11.38 x 23.38 x 3.75	600	1000	1250	0.11	0.27	0.39	12.9
16x20x4	15.50 x 19.50 x 3.75	670	1115	1400	0.11	0.27	0.39	14.7
16x24x4	15.38 x 23.38 x 3.75	800	1350	1675	0.11	0.27	0.25	17.5
16x25x4	15.50 x 24.50 x 3.75	840	1400	1750	0.11	0.27	0.39	18.4
18x24x4	17.50 x 23.38 x 3.75	900	1500	1875	0.11	0.27	0.39	19.9
20x20x4	19.50 x 19.50 x 3.75	840	1400	1740	0.11	0.27	0.39	18.4
20x24x4	19.50 x 23.38 x 3.75	1000	1675	2100	0.11	0.27	0.39	22.2
20x25x4	19.50 x 24.50 x 3.75	1050	1740	2170	0.11	0.27	0.39	23.1
24x24x4	23.38 x 23.38 x 3.75	1200	2000	2500	0.11	0.27	0.39	26.6
24x24x6	23.38 x 23.38 x 5.75	1200	2000	2500	0.13	0.31	0.45	40.7

Notes:

- MERV (Minimum Efficiency Reporting Value) • Recommended Final Pressure Drop is 1.0" w.g. • Multi-Pleat Green13 filters are listed and tested in accordance with UL Standard 900.
- Performance data is based on ASHRAE Test Standard 52.2-2012. • Recommended maximum continuous operational temperature is 200° F.



KOCH FILTER®
PURE PERFORMANCE

8401 Air Commerce Drive, Louisville, KY 40219

toll free: 800.757.5624 | phone: 502.634.4796 | Fax: 502.969.2364

info@kochfilter.com | www.kochfilter.com