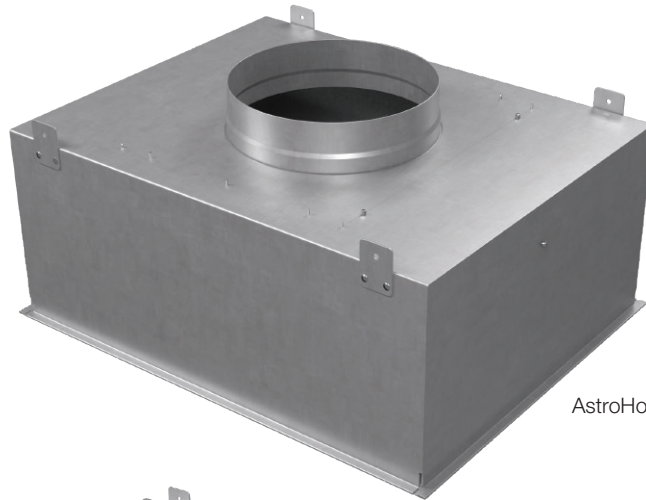




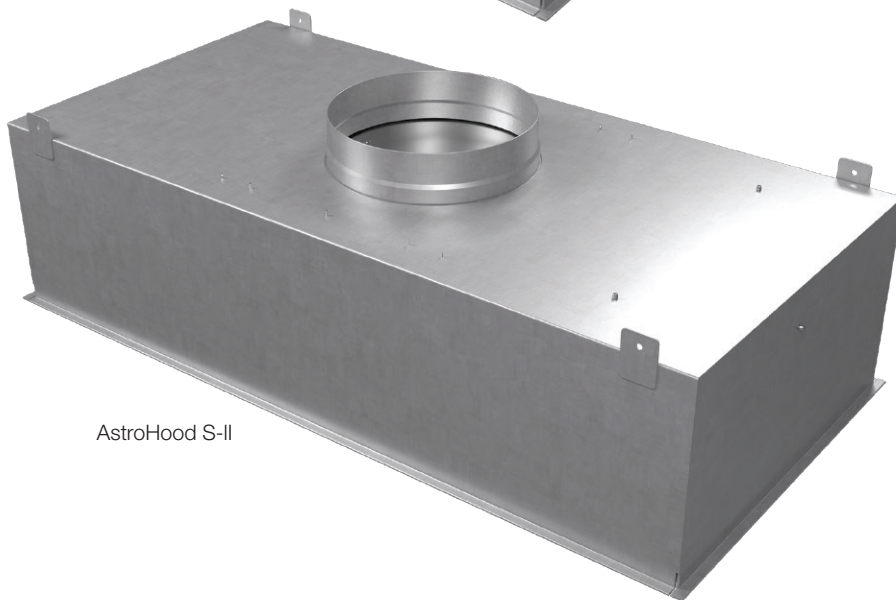
# AstroHood™ S-I & S-II

Ducted HEPA Terminal Hoods

## INSTALLATION, OPERATION, AND MAINTENANCE MANUAL



AstroHood S-I



AstroHood S-II

## TABLE OF CONTENTS:

Introduction and Precautions .....	02
Equipment Overview .....	03
Unpacking .....	03
Ducted Terminal Hood Installation .....	04
Mounting Options .....	05
Clean Ceiling Angles for AES Clean Ceiling .....	05
Flange (Permanent Trim) for Grid/T-Bar Ceiling .....	06
Field-Installed Trim for Hard/Gypsum Ceilings .....	06-07
PermaFrame .....	08
Grille Installation and Removal .....	09-10
Filter Unpacking, Installation, Storage, and Operation .....	11-12
Aerosol Injection and Static Pressure/Upstream Aerosol Ports .....	12-13
Damper Options and Operation .....	14-15
Insulation Options .....	15
Appendix A – Warranty Information .....	16
Appendix B – Manual Revision History .....	17
Contacting AAF .....	Back Cover

## INTRODUCTION AND PRECAUTIONS

### Intended Use

AAF AstroHood™ Ducted HEPA Terminal Hoods ensure the delivery of cleanroom-quality air to critical process applications, such as Pharmaceutical Manufacturing, Life Sciences, Biosafety, Healthcare, and all other applications where clean supply air is a requirement.

### User Responsibility

This document contains the information necessary to properly receive, assemble, install, operate, and maintain the AAF AstroHood Ducted HEPA Terminal Hood equipment. The purchaser, installer, and operator of the filter system MUST read and comply with this document in its entirety. Failure to comply with the requirements of this manual may result in serious injury and void the product warranty.

These instructions are specific to the AAF AstroHood S-I and S-II units and incorporated filters. All ancillary tasks including, but not limited to, electrical and mechanical work, equipment handling, and safety procedures must be performed in accordance with industry-accepted practice and all relevant local, state, and federal government codes, laws, and policies.

Before proceeding with installation, operation, or maintenance, review this Installation, Operation, and Maintenance Manual in its entirety and all safety procedures with your company's safety personnel.

### Precautions

- Units must be properly transported and handled, since improper transport and/or handling can result in damage, blemishes, or other imperfections.
- Deliveries are to be immediately inspected in the presence of the freight carrier to ensure equipment is delivered in full and free from damage.
- The installation site must be suitable for unit installation.
- The supporting construction must be level, and the structure must have sufficient load strength to support all equipment supplied.
- Mounting must be carried out by qualified and trained personnel in accordance with all local, state, and national codes and regulations.
- Drilling through the unit and/or the use of fasteners, such as sheet metal screws, rivets, etc., to secure the hood, as well as installation of field-installed trim, can compromise the integrity of the supply hood by creating leak paths through the pressure boundary. Utilize only factory-approved methods for suspending the hood from structural members located above the ceiling and attaching field-installed trim.

## Equipment Overview

The AstroHood™ S-I & S-II Ducted HEPA Terminal Hoods are a critical component to ensure filtration system integrity and air cleanliness downstream of HEPA filters. The S-I unit offers a fully seal-welded housing body with no penetrations of the pressure boundary. The S-II unit employs full welds downstream (clean side) of the HEPA filter and a riveted and caulked design upstream (dirty side). Both the S-I and S-II units are factory-pressure tested to 3" w.g. to guarantee a leak-free product is supplied. These units may be installed in a variety of ceiling types, including T-bar ceilings and plaster ceilings.

Both the S-I and S-II units are available in either 304 Stainless Steel or Aluminum construction with a variety of inlet options, top or side, and round or rectangular. Both units are supplied standard with an aerosol injection & dispersion system, as well as static pressure/upstream aerosol concentration port. The S-I unit is supplied with the industry-leading Energy-Saving Damper (ESD) which provides the lowest operational pressure drop and, thus, energy savings, of any damper configuration available. Its pressurized plenum design also leads the industry in airflow uniformity. The S-II unit comes standard with Guillotine damper, but Spilt Butterfly or ESD damper options are available.

All standard mounting and trim options are available: wire suspension, rod suspension, grid/T-bar ceilings, and clean ceiling angles, along with permanent flange or field-installed trim, as well as a variety of grille and insulation options.

AstroHood S-I & S-II units are available in many configurations and sometimes are supplied custom. Please reference order-specific data sheets and/or submittal drawings for more information.

### Unpacking

- Carefully remove the unit from the shipping carton and inspect for any damage that may have occurred during transportation. Two workers minimum are required to lift the unit from the container.
- Remove housing from packing material and inspect for concealed damage and any hardware that may have become loose in transit.
- Remove the Grille and Field-installed Trim, if supplied, and set aside. It is good practice to label or mark the grille and trim components to match with the respective unit to ensure a good fit.

## Ducted Terminal Hood Installation

Install and support housing as instructed below. Housing installation must be accomplished in a professional manner with flanges or trim properly sealed to prevent contaminant infiltration from the interstitial space.

Inlet options are available as top or side, and in round or square/rectangular configurations. For side inlets, damper options are limited to ESD and Guillotine. Flexible duct connections should be made using stainless steel, worm-gear type draw bands (supplied by others) for maximum reliability. For square/rectangular inlets, contractor is responsible for securing and sealing duct work to factory-supplied blank flange. Examples of inlets shown below.

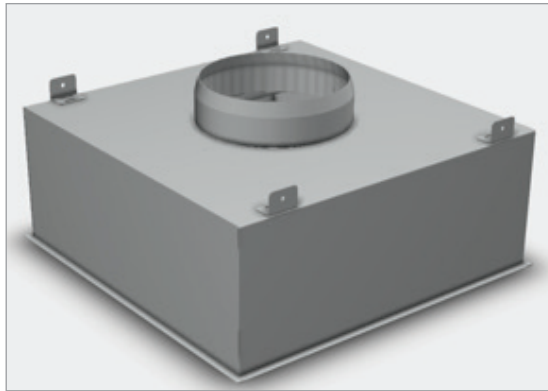


Fig 01: Round Top Inlet

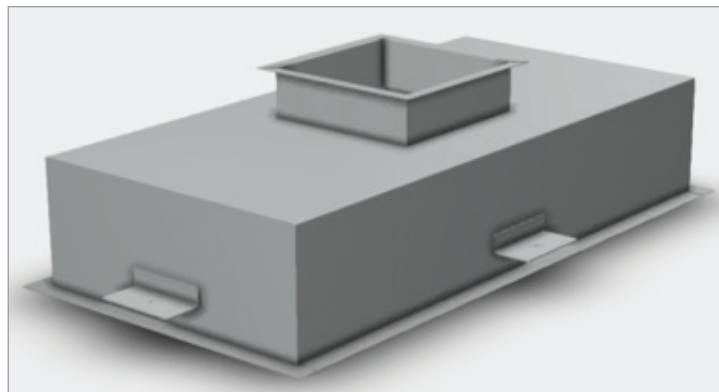


Fig 02: Square Top Inlet

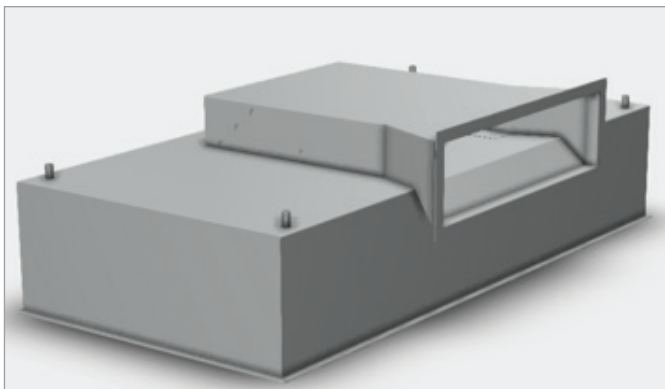


Fig 03: Rectangular Side Inlet

## Mounting Options

Units are suspended and leveled with wire or threaded rod (supplied by others) using either hanging tabs or mounting pads affixed to the housing. Another option is the use of Clean Ceiling Angles, whereby the unit is cinched to the hard ceiling with hardware (supplied by others) from above.

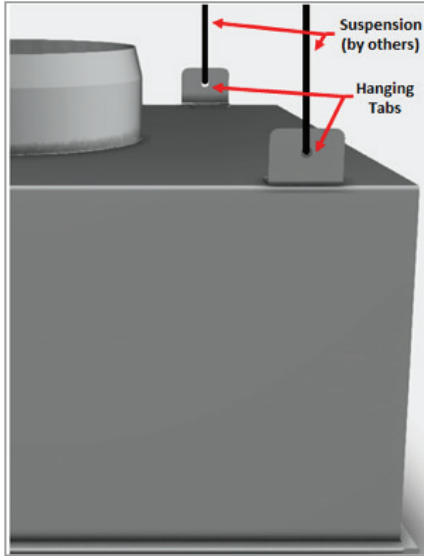


Fig 04: Wire - Hanging Tabs

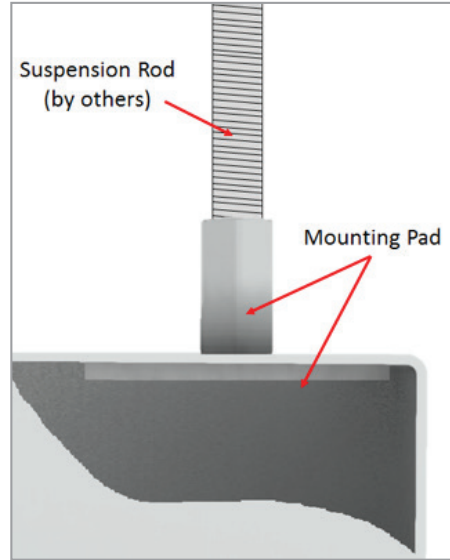


Fig 05: Rod – Mounting Pads

## Clean Ceiling Angles for AES Clean Ceiling

The AstroHood™ unit is installed from the top side of the AES Clean Ceiling Grid using the Clean Ceiling Angle flange hardware (supplied by others). The hardware is adjusted to secure the housing to the ceiling by cinching the field-installed trim option to the underside of the hard ceiling. There are four (4) clean ceiling flanges, with one (1) located on each side of the housing. The clean ceiling angles are welded to the housing body and are of the same material as the housing. The AstroHood unit should be leveled and secured to the ceiling per ceiling manufacturer recommendations.

The AstroHood trim should be sealed to the underside of the ceiling using RTV (Dow Corning 732 or GE 102 is recommended). See Field-Installed Trim instructions.

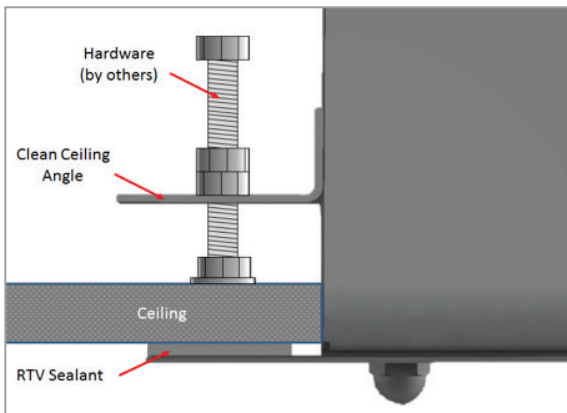


Fig 06: Clean Ceiling Angle Mount

### Flange\* (Permanent Trim) for Grid/T-Bar Ceiling

The AstroHood™ unit is installed from the top side of the suspended ceiling grid/T-bar with the integral flange resting onto the grid/T-bar. The AstroHood unit should be sealed to the grid using RTV (Dow Corning 732 or GE 102 is recommended).

1. Thoroughly clean the mating surfaces of the unit flange and ceiling grid to remove any debris or residue that may inhibit an adequate seal.
2. Apply a continuous, small bead (~ 1/4" diameter) of RTV to the mating surface of the grid/T-bar.
3. Center and lower the AstroHood unit into the opening and seat the unit onto the grid/T-bar. Apply uniform pressure to ensure the flange is bonded to the grid/T-bar (see Fig. 07).
4. Remove excess RTV.

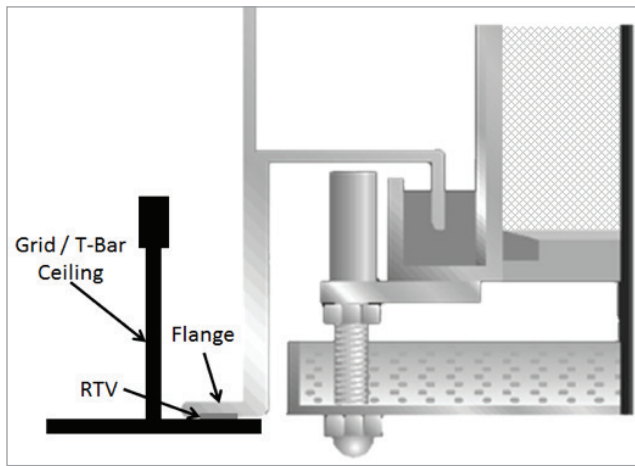


Fig. 07: Flange Mount for Grid / T-Bar Ceiling

\* Flange is the same material as housing.  
\*\* Flange is not designed to support ceiling.

### Field-Installed Trim\* for Hard/Gypsum Ceilings

The AstroHood unit can be installed from either above the ceiling or from the room side. The unit is suspended using either hanging tabs or mounting pads. The trim is then installed to create an airtight seal between the housing and ceiling, as well as a clean, flush finish.

1. Suspend housing from all four corners.
2. Level and align bottom lip of housing with finish ceiling (see Fig. 08).

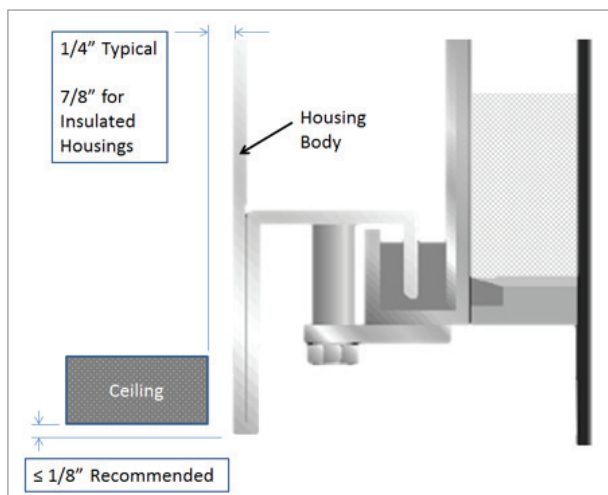


Fig. 08 Field-Installed Trim 1

### Field-Installed Trim\* for Hard/Gypsum Ceilings (cont'd)

3. Dry fit factory-supplied field-installed trim and while in position, mark proper fastening locations and drill 1/8" hole into AstroHood™ housing (see Fig. 09).
  - a. It is of utmost importance to locate holes using the trim as a template to align with the swirl-weld locations.
  - b. Failure to do so can create penetrations in the pressure boundary and cause bypass leakage, compromising the integrity of the filtration system and cleanroom.
4. Remove the trim and apply a continuous, small bead (~ 1/4" diameter) of RTV (Dow Corning 732 or GE 102 recommended) to the ceiling mating surface of the trim.
5. Reinsert the trim, align the holes, and secure in place using blind, closed rivets (see Fig. 10 & Fig. 11).
  - a. It is important to use closed end or blind rivets.
  - b. Otherwise, dirty air may travel along the rivet shaft and into the cleanroom.
6. Remove excess RTV.

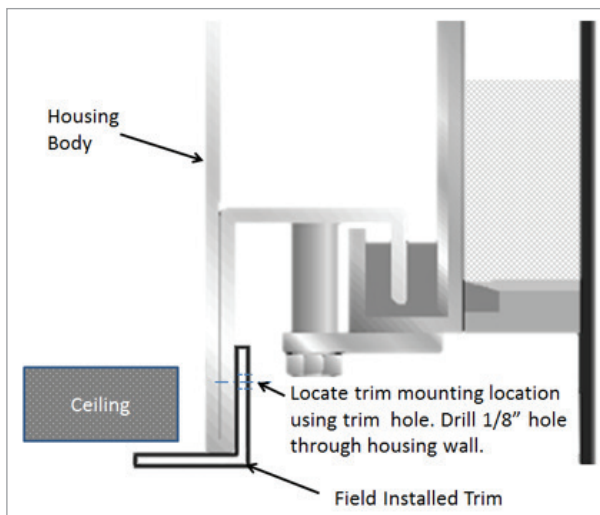


Fig. 09 Field-Installed Trim 2

\* Trim is not designed to support ceiling.

\*\* 1-1/2" Field-Installed Trim option is necessary for units supplied with the 2" foil-backed insulation option to accommodate insulation material.

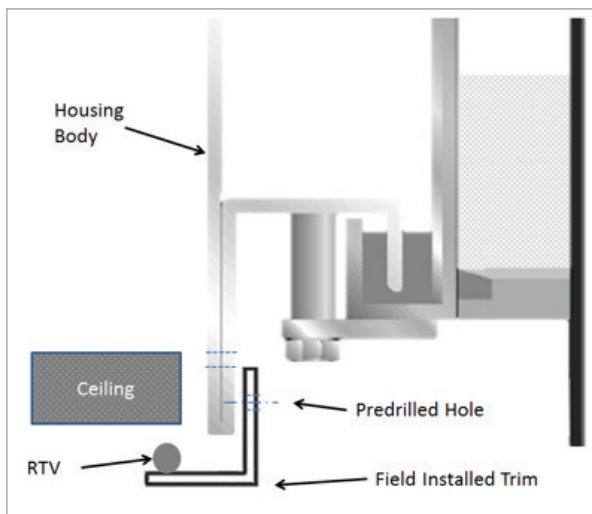


Fig. 10 Field-Installed Trim 3

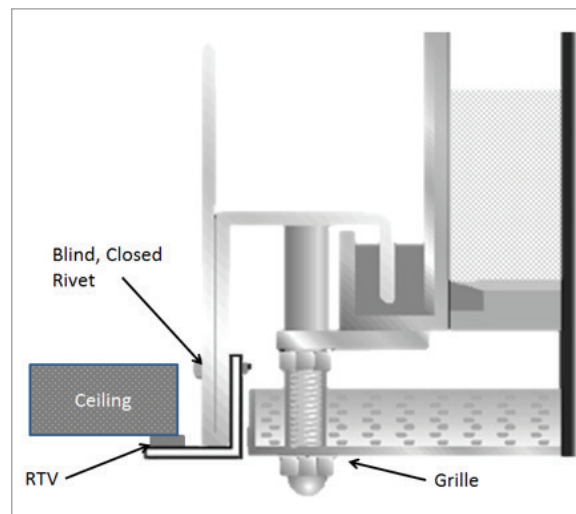


Fig. 11 Field-Installed Trim 4



## PermaFrame

The PermaFrame provides a support structure and room-side finish trim in one piece. It is supplied with predrilled mounting holes located on the vertical flanges that are used to easily level and anchor the frame to customer-supplied studs above the ceiling structure. Manufactured of 18-gauge cold-rolled steel or stainless steel, the welding on all exposed corners guarantees a smooth, cleanable surface. White powder coat paint is supplied as standard finish. The PermaFrame is ordered separately from the AstroHood™ unit.

### Dimensional Data - Standard Size AstroHood (1½" T-Bar)

AstroHood	Model Number	Actual Dimensions (inches)				Weight (lbs)
		L	W	IL	IW	
2 x 2	HCFA 2424	26	26	24	24	4
2 x 4	HCFA 2448	50	26	48	24	5

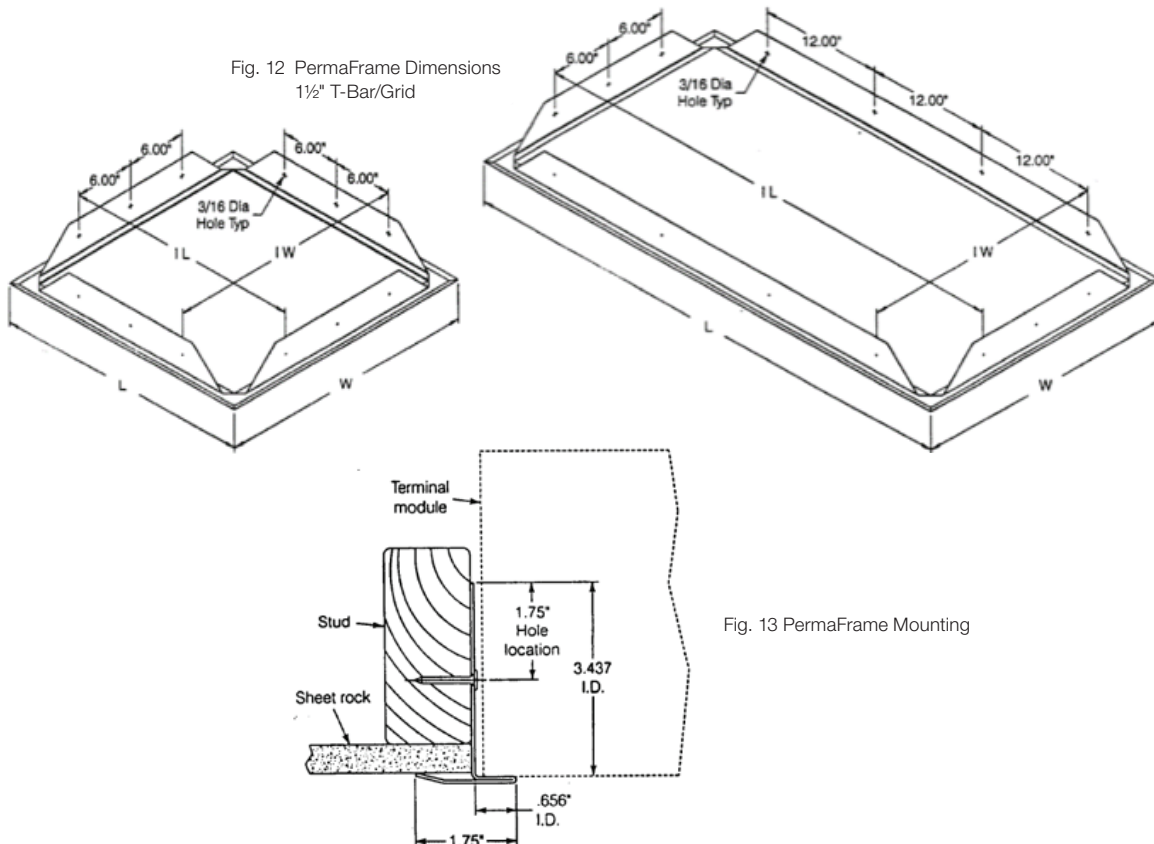
#### Drawing Notes:

Construction - 18-ga. cold rolled steel or 304 stainless steel.

For SS finish use - SS suffix, unit supplied painted white standard

IL - Inside Length

IW - Inside Width



## Grille Installation and Removal

The standard grille is removable and made of 40% open area 316L Stainless Steel. Swirl and painted options are also available. Grille mounting can be supplied as standard four (4) corner acorn nut design or Removable Hinged option with two (2) quarter-turn fasteners and safety cables.

### Acorn Nut Grille

The grille is fastened onto threaded studs using acorn nuts, one in each corner (see Fig. 14 below). The threaded studs protrude from the hood and through the grille to the room side. Acorn nuts and flat washers are installed on each stud to secure the grille in place.

To remove grille:

1. Loosen and remove the acorn nuts and flat washers.
2. Carefully remove and lower the grille. To avoid potential injury, it is strongly recommended two people perform this task.

To replace grille:

1. Align the holes in the grille with the four studs.
2. Hold the grille in place and reinstall the flat washers and acorn nuts. To avoid potential injury, it is strongly recommended two people perform this task.
3. Hand-tighten the acorn nuts. Do not use a wrench or socket, as overtightening may damage the threaded connection.

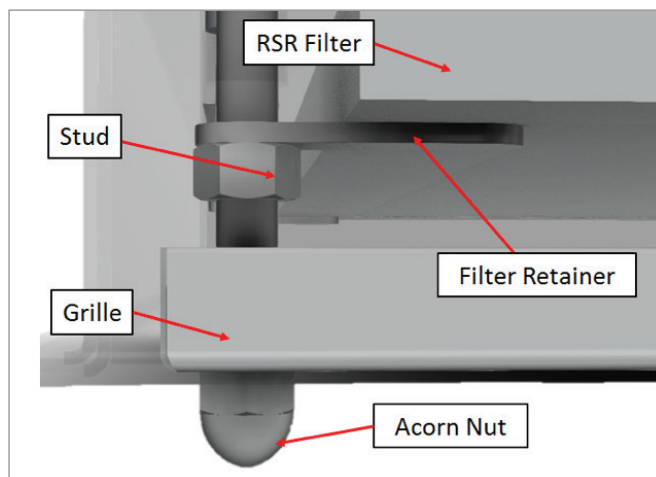


Fig. 14 Acorn Nut Grille

## Grille Installation and Removal (cont'd)

### Hinged Grille with ¼-Turn Fasteners and Safety Cable

The grille is attached on one side by two hinges permanently mounted to the housing, and on the opposite side by ¼-turn fasteners. The grille is also secured to the housing by two safety cables to prevent injury or damage.

To remove grille:

1. While supporting the underside of the grille with one hand, rotate the ¼-turn fasteners 90 degrees counterclockwise to disengage the fasteners.
2. Carefully pivot the grille downward so that it is hanging freely by the hinges.
3. Detach both safety cables.
4. Remove grille by sliding the grille sideways to disengage the hinges.

To replace grille:

1. Align the grille pivot pins with their respective housing mounted hinges and slide the grille to engage the pivot pins into the hinges.
2. Attach both safety cables.
3. Rotate the grille upward to the closed position.
4. Push the ¼-turn fasteners into their receptacles and rotate 90 degrees clockwise to lock in place.

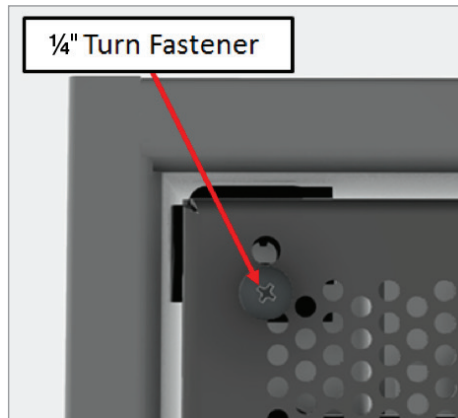


Fig. 15 Hinged Grille – ¼"-Turn Fastener



Fig. 16 Hinged Grille

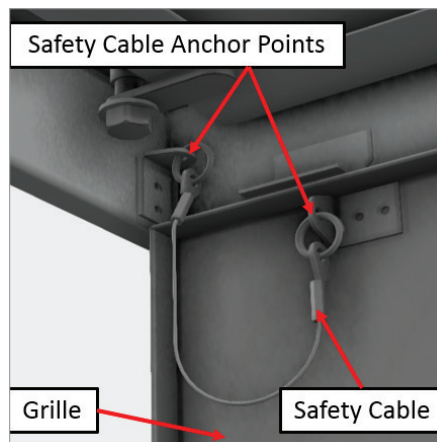


Fig. 17 Hinged Grille – Safety Cable

## Filter Unpacking, Installation, Storage, and Operation

### Unpacking

- Before removing the filter from the carton, carefully read the removal and handling instructions printed on the outside of the carton.
- AAF cleanroom filters may come packaged in suitcase-style cardboard sleeves. If so, simply reach into the box and grab the pre-punched handles within the insert.
- If the filter is in a cardboard liner, the filter must be oriented so that the open ends of the liner are facing outward (i.e., to your left and right rather than upward). Carefully cut the packing tape that holds the filter in the liner. Always check for torn or deflected liner edges. If any are found, straighten or flatten such edges prior to liner removal to prevent media damage.
- One person should carefully hold the plastic bag(s) while the other person carefully pulls the liner, sliding it away from the filter.
- Panel filters will be single- or double-bagged (depending on customer requirements) with snug-fitting cardboard liners. Ducted filters will be single- or double-bagged and packed in reinforced cartons.
- The filter should be handled with extreme care to avoid contact with the media and/or face screen.
- While the bag is still present, carry the filter by grabbing the bag. Be careful to keep the filter away from your body and any objects in your path.
  - If the bag is not present, always handle filter by the frame, avoiding contact with the media and/or face screen.
- Remove the bag carefully. Avoid bringing hands and fingers into contact with the filter media.
- Additional precautions for gel seal filters:
  - Care is taken at the factory to prevent the bag from contacting the gel. Be very careful when unpacking gel seal filters to remove the bag slowly and away from the gel seal.
  - If the bag comes in contact with the gel, pull the bag off the gel slowly. Quick removal of the bag may cause damage to the gel and possible separation of gel from the gel channel.

### Installation

- Carefully lift the filter into place and using the integral filter alignment tabs, insert into the housing, taking care to make certain the knife edge is properly seated into the fluid gel seal. NOTE: Setting filters properly requires two (2) people.
- Rotate each of the four (4) filter retainers, one (1) in each corner, into place and hand-tighten the hex nuts.
- Install the grille using the four (4) acorn nuts or ¼-turn fasteners with the hinged grille option.

### Storage

- Location: Storage should be indoors, (under roof and enclosed) and absolutely protected from moisture.
- It is strongly recommended that the storage space be climate-controlled.
  - Temperature Limits: Maximum temperatures of 250°F (121°C) intermittent, and 100°F (38°C) steady state. Minimum temperature is 32°F (0°C).

## Filter Unpacking, Installation, Storage, and Operation (cont'd)

### Operating Conditions

- Temperature: The maximum operating temperature is determined by the filter configuration.
  - Consult the filter submittal drawing for the specific maximum operating temperature.
- Humidity: 100% relative humidity is acceptable. However, condensation must be avoided to prevent degradation of performance and potential filter failure.
- Filters should not be operated in caustic or acidic environments.
- Filters should not be operated in excess of 1-1/2 times the rated performance for flow rate or pressure drop.

### Aerosol Injection and Static Pressure/Upstream Aerosol Ports

All S-I and S-II units are supplied with room-side aerosol injection port and aerosol dispersion system, as well as an upstream static pressure/upstream aerosol sample port to facilitate validation testing. These ports are available as either standard 3/8" female NPT fittings, supplied with respective plugs, or as 3/8" chrome-plated female-type quick-connect/disconnect fittings. These connection points are labeled on the inside surface of the housing and are visible from the room side.

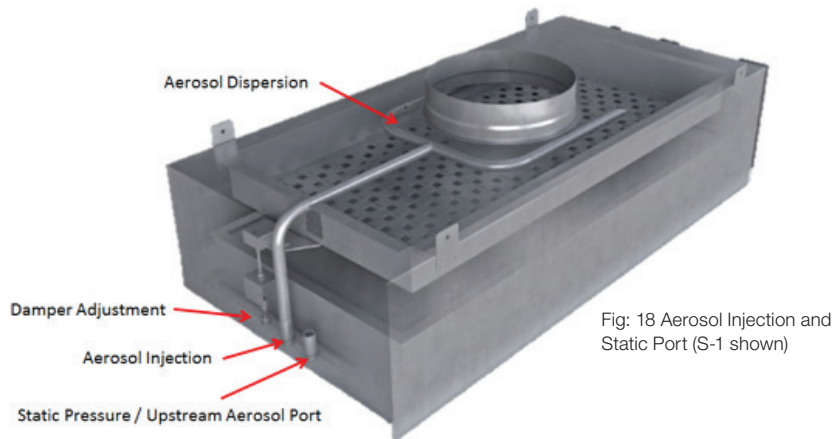


Fig: 18 Aerosol Injection and Static Port (S-1 shown)

### NPT Ports

Standard 3/8" plumbing style NPT fittings and plugs are supplied for the aerosol injection port and static pressure port.

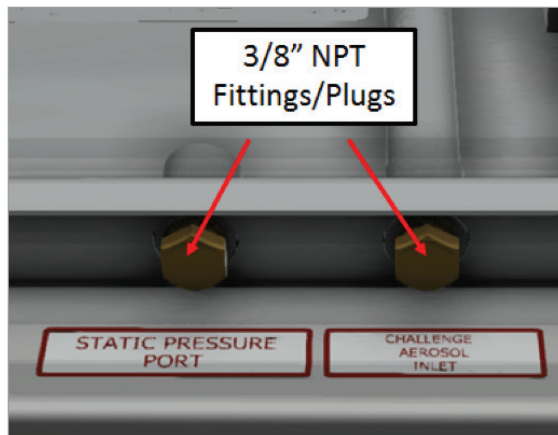


Fig: 19 3/8" NPT Aerosol Injection and Static Port

### Quick-Connect/Disconnect Ports

The 3/8" chrome-plated quick-connect/disconnect fitting incorporates an integral spring-loaded check valve that ensures the valve is closed during normal operating conditions. Simply connect the mating male component into the female fitting to introduce aerosol or take measurements, as needed. The "CPC" side thumb latch allows for simple one-handed disconnection and seating of the check valve.

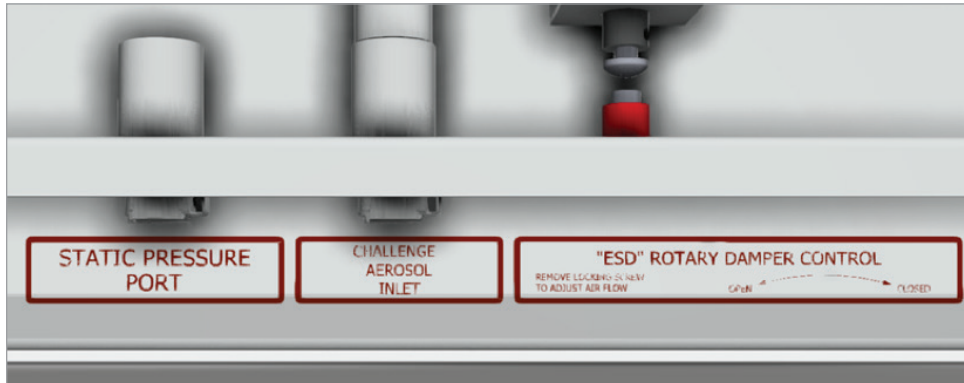


Fig: 20 Quick-Connect/Disconnect  
Aerosol Injection and Static Port

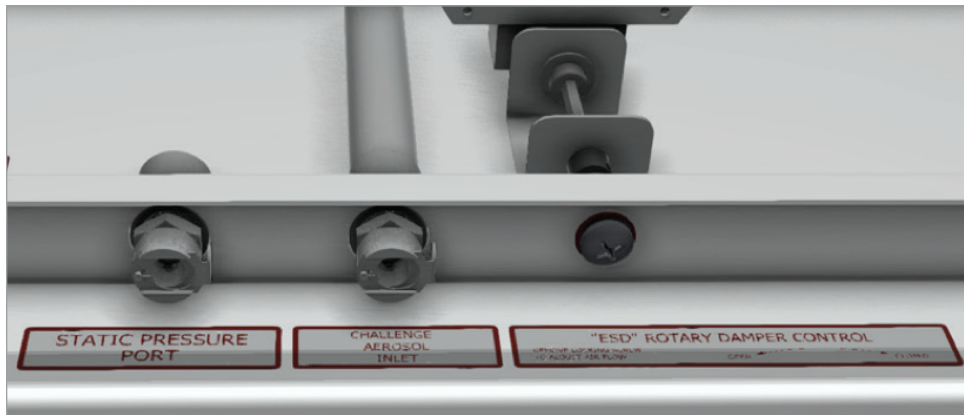


Fig: 21 Quick-Connect/Disconnect  
Aerosol Injection and Static Port

## Damper Options and Operation

The AstroHood™ S-1 unit is supplied standard with an ESD (Energy-Saving Damper); the AstroHood S-2 unit is available with a Guillotine, Split Butterfly, and ESD damper options. All damper adjustment control is accessed from the room side by removing the damper adjustment port plug and making adjustments with a Phillips head screwdriver.

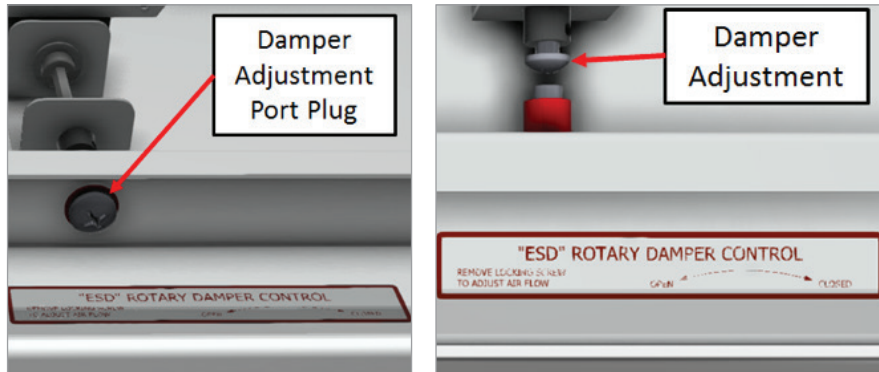


Fig: 22 Damper Adjustment

The ESD utilizes a proprietary, pressurized plenum design that minimizes system resistance to industry lows while also providing superior airflow uniformity. The ESD is operated and adjusted from the room side with a Phillips head screwdriver via mechanical rod and rack & pinion control, affording infinite fine-tuning adjustment over a minimum of ten (10) full turns and making it inherently self-locking (see Fig 23).

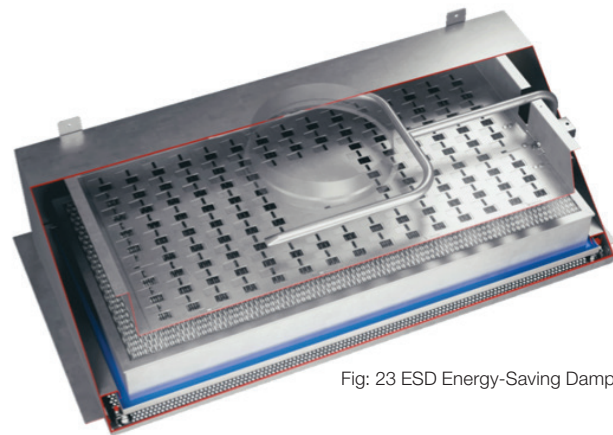


Fig: 23 ESD Energy-Saving Damper

The Guillotine Damper is operated from the room side by a mechanical rod linkage assembly of stainless steel construction with a control rod. It is adjusted from fully open to fully closed position with a quarter revolution using a Phillips head screwdriver (see Fig. 24). The guillotine damper is locked in position with a set screw.

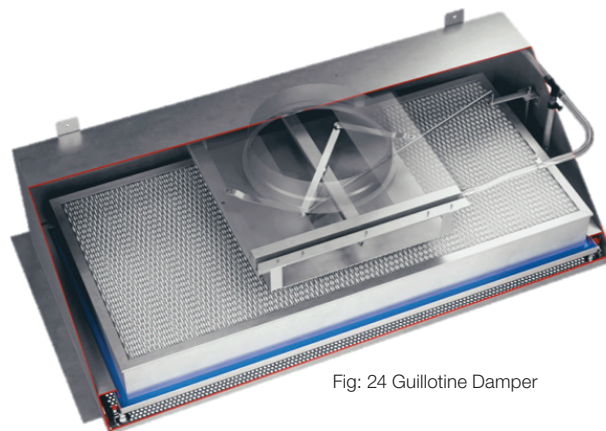


Fig: 24 Guillotine Damper

### Damper Options and Operation (cont'd)

The Split Butterfly Damper is controlled via rotary flex cable from the room side and is adjustable from fully open to fully closed position with one (1) full revolution using a Phillips head screwdriver (see Fig. 25).

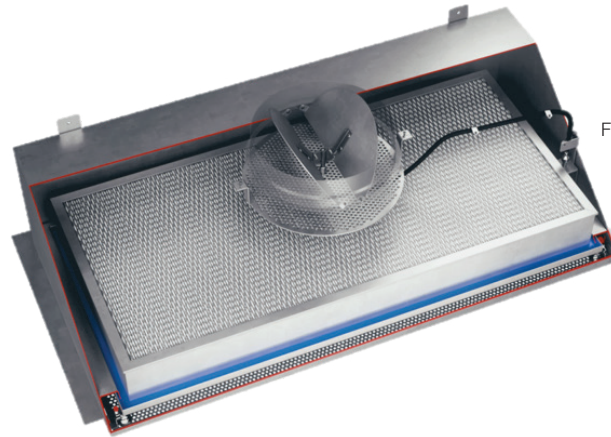


Fig: 25 Split Butterfly Damper

### Insulation Options

Insulation options are available to prevent heat loss, mitigate potential condensation, and/or provide sound attenuation. Determining the use of these options is the responsibility of the design engineer. The 2" foil-backed option is an aluminum foil-backed fiberglass (installed 6.0 R-value) attached to the housing using adhesive-mounted insulation anchors and caps. The Armaflex option is a ½" thick, semi-solid panel (installed 2.1 R-value) mounted using adhesive and tape at the seams.



## APPENDIX A – WARRANTY

### AAF INTERNATIONAL LIMITED WARRANTY

The Seller warrants that it will provide free replacement parts in the event any product manufactured by the Seller proves defective in material or workmanship for a period of twelve (12) months from initial startup or eighteen (18) months from date of shipment, whichever expires sooner. Product(s) not manufactured by the Seller but also sold under this agreement are warranted only to the extent that the manufacturer warranted them to the Seller or directly to Buyer.

The Seller's liability to Buyer shall not exceed the lesser of the cost of correcting defects in the product(s) sold or the original purchase price of the product(s) and the Seller shall in no event be liable to Buyer or third parties for any delays. The Seller's warranty does not apply to any product(s) or goods which: (1) have been opened, disassembled, repaired, or altered by anyone other than the Seller or its authorized service representative; or, (2) which have been subjected to misuse, misapplication, negligence, accidents, damage, abuse, improper storage, or abnormal use or service; or, (3) have been operated or installed in a manner contrary to Seller's printed instructions; or, (4), have been installed in an incorrect or improper application; or, (5) have become corroded or subjected to abrasion. The Seller is not obligated to pay any costs or expenses in connection with the removal and re-installation of such product(s) or goods, including but not limited to labor, service costs, and shipping charges. The same obligations and conditions shall extend to replacement parts furnished by the Seller hereunder. This parts warranty and any optional extended warranties are granted only to the original user. Seller's duty to perform under this or any warranty may be delayed, at Seller's sole option, until Seller has been paid in full for all products or goods purchased by Buyer. No such delay shall extend the warranty period.

To obtain assistance under this limited warranty please contact the selling agency. To obtain information or to gain factory assistance, contact AAF International Warranty Claims Department, 9920 Corporate Campus Drive, Suite 2200, P.O. Box 35690, Louisville, Kentucky 40223-5000; Telephone (502) 637-0011, FAX (888) 223-6500.

THIS WARRANTY CONSTITUTES BUYER'S SOLE REMEDY. IT IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED. THERE IS NO IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. NOTWITHSTANDING ANY OTHER TERMS OF ANY AGREEMENT BETWEEN THE SELLER AND BUYER, IN NO EVENT AND UNDER NO CIRCUMSTANCES SHALL SELLER BE LIABLE FOR INCIDENTAL, INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, WHETHER THE THEORY BE BREACH OF THIS OR ANY OTHER WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, OR STRICT LIABILITY.

No person (including any agent, salesman, dealer or distributor) has the authority to expand the Seller's obligation beyond the terms of this express warranty, or to state that the performance of the product(s) is other than published by the Seller.



For Technical or Application Questions:

Phone: 1 (888) 223-2003

Email: [productsupport@aafintl.com](mailto:productsupport@aafintl.com)



## AAF International Plant Locations

AAF, the world's largest manufacturer of air filtration solutions, operates production, warehousing and distribution facilities in 22 countries across four continents. With its global headquarters in Louisville, Kentucky, AAF is committed to protecting people, processes and systems through the development and manufacturing of the highest quality air filters, filtration equipment, and associated housing and hardware available today.

Contact your local AAF representative for a complete list of AAF Air Filtration Product Solutions.

### Americas

Louisville, KY  
Atlanta, GA  
Ardmore, OK  
Bartow, FL  
Columbia, MO  
Fayetteville, AR  
Hudson, NY  
Momence, IL  
Ontario, CA  
Smithfield, NC  
Tijuana, Mexico  
Votorantim, Brazil  
Washington, NC

### Europe

Cramlington, UK  
Gasny, France  
Vitoria, Spain  
Ecoparc, France  
Trencin, Slovakia  
Vadstena, Sweden  
Vantas, Finland

### Asia & Middle East

Riyadh, Saudi Arabia  
Shah Alam, Malaysia  
Suzhou, China  
Shenzhen, China  
Miaoli, Taiwan  
Bangalore, India  
Noida, India  
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