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# AstroSafe® V

## Low-Wall Containment Systems

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## IMPORTANT MESSAGE



**NOTICE: Compliance with installation and operation standards must be met to ensure quality performance.**

HEPA filters are factory-tested to meet the requirements of IEST-RP-CC001 for HEPA filters:

- Industrial Grade
- Nuclear Grade
- Laminar Flow Grade
- Bio/Hazard Grade HEPA
- VLSI
- ULPA
- Pharmaceutical

Test results appear on both the filter label and upon the filter carton label. An additional quality assurance test report is kept on file and is available on request.

AAF recommends that all HEPA filters be tested in place by qualified personnel to ensure that the filters have been correctly installed in the containment housing.

AAF service personnel are available for installations, supervision of installation, testing, and certification of compliance to industry and government standards and instruction of the owner's personnel in testing and maintenance procedures.

AAF does not guarantee that its equipment will operate at the performance levels given on the identification labels or in the catalog specifications under all conditions of installation and use, nor does AAF guarantee the suitability of its product for the particular end use that may be contemplated by the buyer.

For best results, it is recommended that the buyer supply complete information about the operating conditions of the ventilation system to AAF for evaluation.

When the system components are supplied to the buyer or an agent for final installation and assembly in the field, it should be under the supervision of factory-trained personnel.

Failure to adhere to this recommendation or failure of the buyer to have filters retested and serviced in a timely fashion will nullify or limit any warranties that might otherwise apply and may result in a compromised installation.

**NOTE: Throughout the AAF product bulletins we make reference to standards that may appear old and/or revised. Our purpose in specifying the older versions of standards is due to the nature of these products and where they are typically used.**

**During the years and numerous revisions, these standards have become less stringent than their original versions. We believe in manufacturing and referencing the critical versions to help the owners maintain the stringent requirements this industry originally intended.**

# Quality Assurance Program

AAF established the Quality Assurance program to address the 18 criteria structure of ASME NQA-1 (formally N45.2), "Quality Assurance Requirements for Nuclear Facility Applications." As suppliers of High Efficiency Air Filtration products and services, there are three standards that govern the majority of AAF's activities.

1. ASME N509-1989 (reaffirmed 1996)  
"Nuclear Power Plant Air-cleaning Units and Components"
2. ASME N510-1989 (reaffirmed 1995)  
"Testing of Nuclear Air Treatment Systems"
3. ASME AG-1- latest revision  
"Code on Nuclear Air and Gas Treatment"

These standards and our customer's specifications invoke many other standards and codes the AAF' Quality Assurance program incorporates as standard practice.

There are a variety of Quality Assurance programs that manufacturers implement to ensure product and service quality, two such systems are ISO-9001 and ASME NQA-1.

## Abstracts of these programs include:

**ISO 9001:2015** specifies requirements for a Quality Management System where an organization

1. Needs to demonstrate its ability to consistently provide product that meets customer and applicable regulatory requirements, and
2. Aims to enhance customer satisfaction through the effective application of the system, including processes for continual improvement of the system, and the assurance of conformity to customer and applicable regulatory requirements.

All requirements of this international standard are generic and are intended to be applicable to all organizations, regardless of type, size, and product provided.<sup>1</sup>

## ASME NQA-1:

This Standard sets forth requirements for the establishment and execution of quality assurance programs for the siting, design, construction, operation, and decommissioning of nuclear facilities. Non-mandatory guidance is provided in the Appendices. NQA-1 establishes 18 criteria covering all aspects of quality, from purchase of raw materials to design and testing.<sup>2</sup>

Because ASME NQA-1 applies to the Nuclear Industry where containment and safety are of paramount concern, it is generally seen to establish more checks and balances. Containment air filtration started out as a critical requirement in the Nuclear industry to protect workers, the public, and the environment. Today, containment air filtration is a critical issue in a variety of industries and applications, from pharmaceutical, health care, military, and the original nuclear applications among others. Because of the critical safety requirements of the nuclear industry, ASME N509, ASME N510, and ASME AG-1 are recognized as the standards for design and testing of containment air filtration systems. Each of these standards requires a Quality Assurance program that meets the requirements of ASME NQA-1.

AAF is certified to ISO 9001:2015 and maintains a full scope Quality Assurance program that meets the requirements of ASME NQA-1, 10 CFR 50 Appendix B, and DOE O 414 1A. Customers that require the stringent application of quality principles that only a mature and developed program can offer routinely audit this Quality Assurance program.

## Sources:

1. ISO.org
2. ASME.org
3. Comparison NQA 1 and ISO 9001 Technical Report, available from ASME.org

## Quick Facts

AAF AstroSafe® V Containment Systems address the pharmaceutical industries continuous concerns for safety. These innovative types of Containment Housings may also be used in other applications where the containment of dangerous or potent toxic and noxious compounds are prevalent and the ease of side servicing from within the conditioned space is a benefit. The AAF AstroSafe V Containment Systems offers the following:

- First and foremost ensures safety. The AAF reputation for excellence is the design and fabrication of critical air filtration systems. All manufactured products meet all of the basic requirements of ASME NQA-1.
- Guarantees control of likely hazardous materials and eliminating the contamination of the downstream ductwork.
- Ensures that the owner's facility meets their established limitations for protecting the maintenance workers and surrounding area. Facilities are also able to meet the requirement of local and government agencies.
- Is available with all possible required filter elements, ancillary components, including prefilter section, final filter section, in-place test sections for scan testing and isolation dampers.
- Constructed from 304 stainless steel with a #4 finish on the door and trim for a nice room-side appearance. These containment housings are also available in 316L stainless steel.
- The entire housing and filter seal surface are pressure decay tested to 10" w.g. to ensure the assembled components will perform precisely under normal operating conditions. Each housing is visually inspected at the factory and tested for alignment and filter fit prior shipment.



# Safety Comes First

## From the Leader in Air Filtration Technology

The AAF International reputation for excellence in the design and fabrication of critical air filtration systems is the result of decades of attention to the toughest environmental and safety standards in the world. Throughout the long development of the AstroSafe® V Containment Systems, safety has been the first design priority and our track record reflects the confidence of our customers. AAF containment systems are operating in hundreds of sites, including:

- Pharmaceutical Facilities
- Hospital Isolation Suites
- Microelectronic Sites
- Genetic and Biotech Labs
- University Campuses
- Industrial Process Exhaust Systems
- Chemical Process Facilities
- Animal Disease Labs
- Radioisotope Handling Facilities
- Nuclear Power Plants
- Strategic Nuclear Facilities
- HVAC Systems
- Department of Energy Facilities

# AstroSafe® V Low-Wall Containment Systems

AstroSafe V Containment Systems are typically used in critical processes where dangerous airborne particulate or gases must be prevented from entering the atmosphere. The information in this bulletin provides the description of the many possibilities and arrangements.

**BF-Series Bag-in/Bag-Out:** The BF-Series housing features a side access bag-in/bag-out port which allows gel seal filters that have been contaminated in service to be removed from the housing without direct contact with service personnel.

Many options are available, including static pressure taps, test ports, transitions, dampers, and in-place scan sections which allow the operator to perform individual filter system integrity tests without having to enter the system or otherwise disrupt its operation.



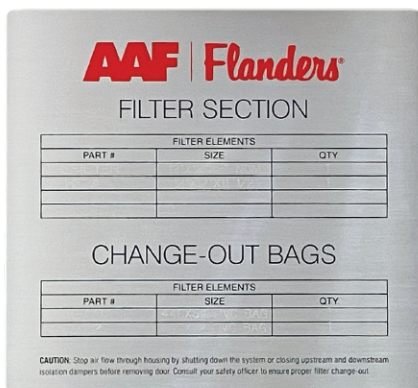




# AstroSafe® V Low-Wall Containment Systems: Standard Features

## Engraved ID Label

Each primary filter access door has a stainless steel label attached to the surface. This label contains the housing model number, the AAF order number and change-out bag(s) information. When provided, the label can also contain the owner's system ID number and model numbers for the filters, and prefilters. This information is permanently engraved on the label to facilitate reordering of critical replacement parts and components.



*Stainless-Steel Label*

## Door Latches

Standard latches are threaded studs with removable hand knobs. The studs align with the retainers provided at wash corner of the door and are secured with the hand knobs.



*Threaded Studs with Removable Knobs*

## Return Grill

Stainless steel return grilles are available in both type 304 and type 316L stainless steel polish finish.



*Stainless-Steel Return Grill*

# AstroSafe® V Low-Wall Containment Systems: Standard Features

## Static Pressure Taps

Static pressure taps are 1/4-inch stainless steel half couplings with brass hex plugs. The taps can be located on the top or the back of the housing upstream and downstream of the prefilters and/or HEPA filters.



*Static Pressure Taps are 1/4-inch Stainless Steel Half-Coupling with Brass Hex Plugs*

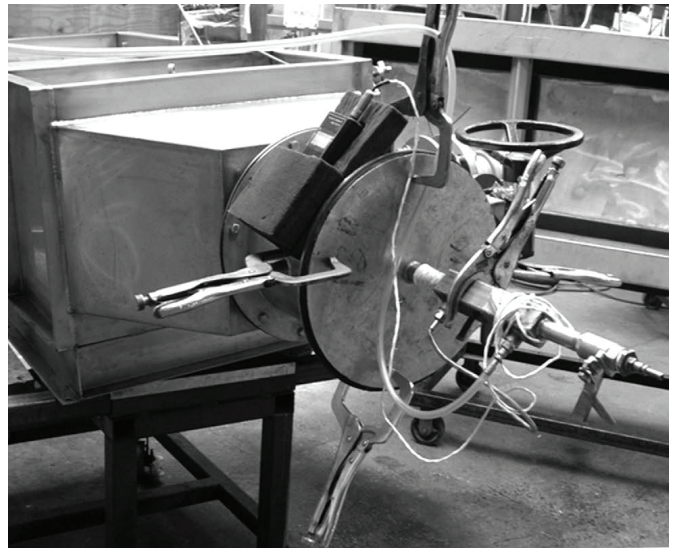
## Test Ports

Test ports are stainless steel 3/8-inch half couplings with brass hex plugs located on the door access side of the housing for upstream sampling. This is a separate downstream test kit that will be installed in the field by others, and is used only when overall efficiency testing is required.

*Note: The downstream sample test port should be located at least ten (10) duct diameters downstream of the filter. This is a separate downstream test kit that will be installed in the field by others, and is used only when overall efficiency testing is required.*

## Leak Testing

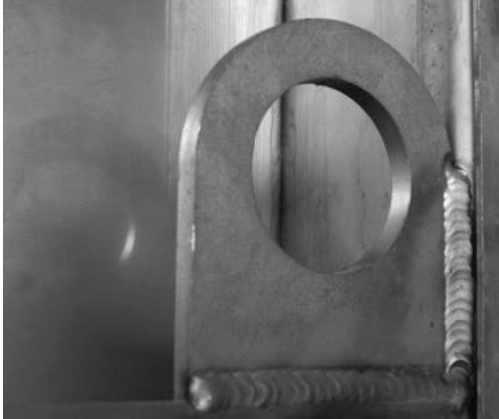
Both the filter sealing surface and complete assembly pressure boundary are leak tested by the Pressure Decay Method, in accordance with ASME N510-1995 reaffirmed, Testing of Air-Cleaning Systems, Paragraphs 6 and 7. Readings are recorded once a minute for five (5) minutes. AAF standard acceptable maximum leak rate is 0.0005 CFM per cubic foot of housing volume at ten (10) inches water gage for the filter sealing surface, and 0.0005 CFM per cubic foot of housing column at the design pressure for the housing pressure boundary.



*Pressure Decay Leak Testing*

## Lifting Lugs

Lifting lugs of 1/4-inch thick Type 304 stainless steel with a 1 1/2-inch diameter lifting lug welded to the top of the housing.

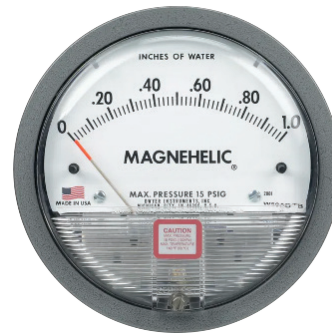


Lifting Lug

## Differential Pressure

AAF can provide differential pressure gages, factory mounted with brass fittings and copper tubing. Factory installed gages are mounted on brackets for systems indoors or outdoors. Factory installed gages have 300-Series stainless steel identification labels stitch welded to the mounting bracket. These gages can also be provided (unmounted) as separate items.

AAF offers both magnehelic gages or magnehelic gages with transmitter.



Magnehelic® Gage

Magnehelic® Gage  
with Transmitter



## Filter Configuration and Sizes

Housing Configuration (per Checkbox Submittals)	Final Filter Size (Actual)	Prefilter Size (Nominal)	Unit Dimensions (W x H x D)	Standard Damper Ø Size
0CCF	12" x 12" x 11.5"	N/A	25" x 62" x 21"	8" Ø
0CCF-SCAN			25" x 77" x 21"	
2/4/6CCF		12" x 12"	25" x 74" x 21"	
2/4/6CCF-SCAN			25" x 89" x 21"	
0GCF	24" x 12" x 11.5"	N/A	37" x 62" x 21"	10" Ø
0GCF-SCAN			37" x 77" x 21"	
2/4/6GCF		24" x 12"	37" x 74" x 21"	
2/4/6GCF-SCAN			37" x 89" x 21"	
0GGF	24" x 24" x 11.5"	N/A	37" x 62" x 33"	12" Ø
0GGF-SCAN			37" x 77" x 33"	
2/4/6GGF		24" x 24"	37" x 74" x 33"	
2/4/6GGF-SCAN			37" x 89" x 33"	
1020-0GGF	(2) 24" x 24" x 11.5"	N/A	71" x 63.5" x 33"	20" Ø
1020-0GGF-SCAN			71" x 78.5" x 33"	
1020-2/4/6GGF		24" x 24"	71" x 75.5" x 33"	
1020-2/4/6GGF-SCAN			71" x 90.5" x 33"	

# AstroSafe® V Low-Wall Containment Systems: Standard Features

## Cinching Strap

A cinching strap is provided with each bag to tie off the slack in the bag during the interval between filter changes. The cinching strap prevents the bag from being drawn into the housing during normal operations. The strap is tied at a point near the tip of the bag-in/bag-out port, drawing the bag tightly across the port and allowing the slack to fall off to the outside.



*Cinching Strap*

## Bag-In/Bag-Out Port

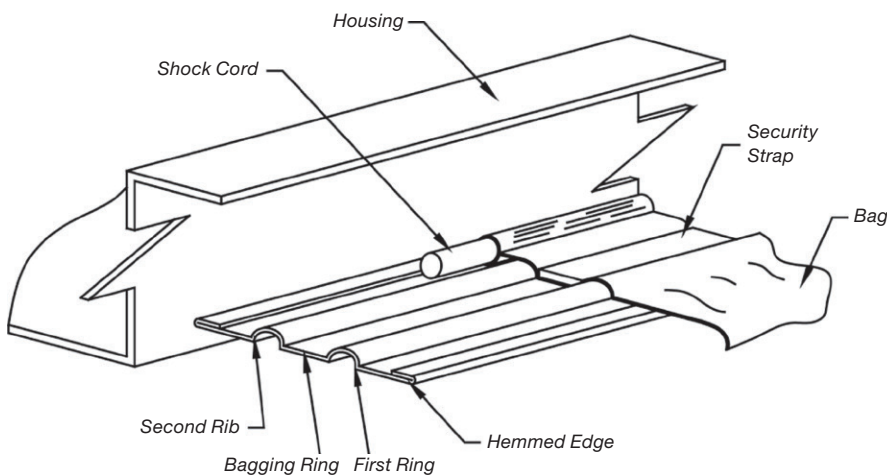
The bag-in/bag-out port inside each access door provides a place for securing the change-out bag during filter replacement. This port is continuously welded on the inside. To prevent damage to the bag, the outer lip of the port is hemmed. The port itself has a smooth shape. Two (2) ribs around its perimeter provide a means of securing the bag with security strap.



*Threaded  
Stud Door*

## Bagging Ring

The bagging ring is seal-welded around the access port of each BF-Series containment housing. The elastic shock cord of the PVC change-out bag is stretched around the bagging ring. The BF-Series bagging ring features a hemmed edge to prevent tearing the bag, and two (2) continuous ribs to secure the bag.





# AstroSafe® V Low-Wall Containment Systems: Accessories

## PVC Change-Out Bag

A PVC bag is included with each access door. The AAF change-out bag is translucent and yellow in color with a clear section at the attachment end for change-out viewing.

An elastic shock cord is hemmed into the mouth of the bag for a firm fit when stretched around the bagging ring.

The bag has three (3) built-in glove sleeves to facilitate the filter change-out. Correct replacement bag sizes are engraved on the door label of each housing. Replacement bag size labels are also attached to the shock cord hemmed into the bag mouth. PVC bags of this design have been tested by an independent laboratory to prove the bag's operability at extreme temperature ranges of 0°F–130°F.



*PVC Change-Out Bags*



*Elastic Shock Cord*

## Change-Out Port

The BF-Series change-out port, accessed by door removal, has two (2) ribs on the bagging ring to facilitate the bag-in/bag-out procedure.



*Change-Out Port Bagging Ring*

## Security Strap

An orange nylon strap is included with each access port. The strap is buckled with a “D” ring and has Velcro strips to secure the end.



*Nylon Security Strap*

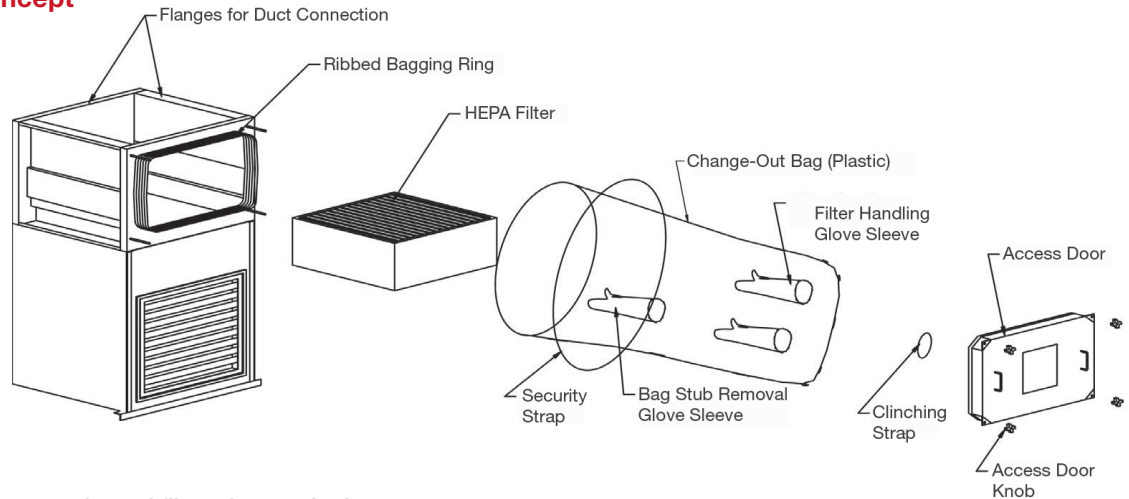


*Replacement Bag Size Labels  
Attached to Shock Cord*

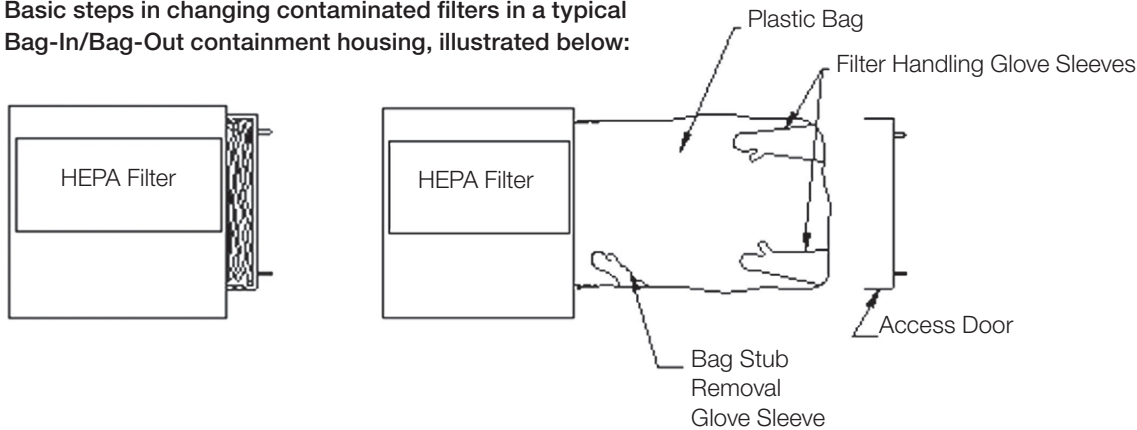
# AstroSafe® V Low-Wall Containment Systems: Bag-in/Bag-out Process

## Filter Change-Out Concept

**Note:**  
A complete step-by-step change-out instruction manual is furnished with each housing or system.



Basic steps in changing contaminated filters in a typical Bag-In/Bag-Out containment housing, illustrated below:



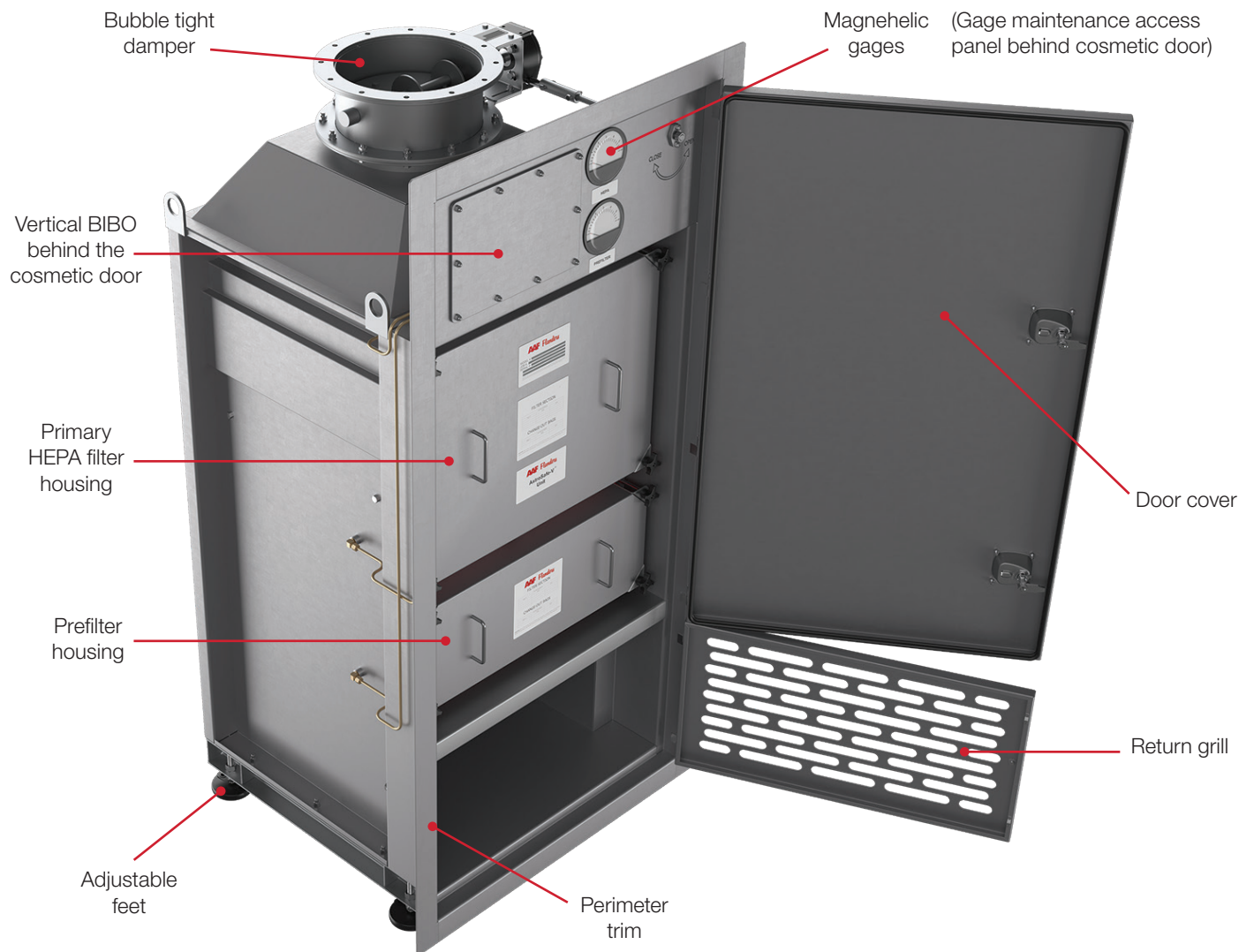
Remove access door, extend bag and place arms in *filter handling glove sleeves* of bag.



Carefully draw contaminated filter into bag and place filter (in bag) on stand or table. Remove arms from bag. Seal bag between access port and filter. Cut bag, leaving bag stub attached to access port. Place new filter into a new bag. Place new bag over bag stub attached to access port. Remove bag stub using *bag stub removal glove sleeve* of the new bag. Draw stub into sleeve by turning sleeve inside out. Install new filter using glove sleeves. Seal and detach bag stub/glove sleeve. Fold new bag inside bagging ring and replace access door.



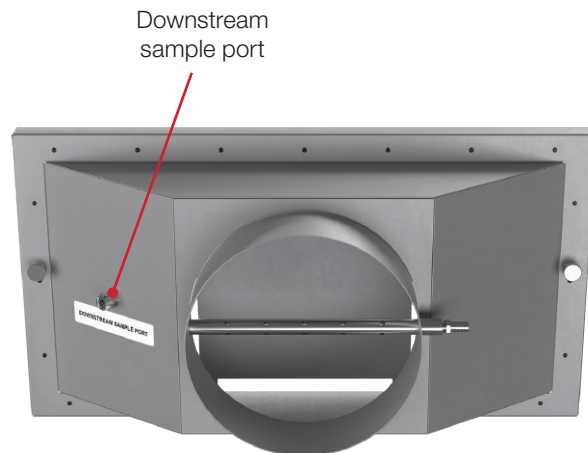
# AstroSafe® V Low-Wall Containment Systems: Optional Arrangements and Designs



## In-Place Testing Shroud



Where HEPA filters must be tested for efficiency while in service, AAF can provide an in place test shroud that can be used in the field to inject aerosol. The use of the in place test shroud solves the issue of having to inject aerosol 10 duct diameters upstream of the filter. AAF has qualified this shroud for aerosol injection per IEST-RP-CC002.2 & CC0034.5. This can be used for both overall efficiency testing on housings utilizing the downstream test kit or for scan testing on housings equipped with the AstroScan M test housing.



# AstroSafe® V Low-Wall Containment Systems: Ancillary Items

## Scan Test Housing

The integrity of many containment systems is adequately determined by testing the overall integrity of the filters. Other systems require individual filters to be scan-tested periodically while in service to locate “pinhole” leaks in the filters. If any are present, the filters may be replaced.

This capability is achieved in a system by incorporating AAF AstroScan M housings directly downstream of the filters to be tested.

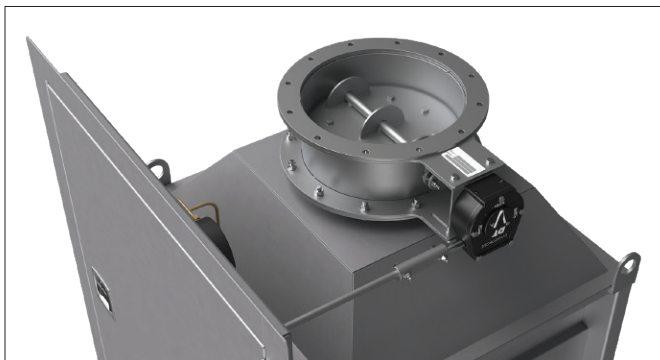
*Note: AstroScan M test housing literature is available upon request. Contact AAF or your local representative for complete details.*



*Scan probe assembly connection*

## Bubble Tight Isolation Damper

These dampers allow isolation of components during filter change processes. The standard manual actuator utilize a 1/4 turn worm gear actuated by a 3/4" drive nut, behind the cosmetic door.





## Access Door Cover

The AstroSafe V incorporates a cosmetic access cover door to hide and protect the components within. Additionally, the access cover will present a smooth flush appearance to the filtration system. This door features the same materials of construction as the containment filtration system it's protecting. Heavy-duty stainless steel hinges are supplied.



Primary HEPA Filter

Prefilter



## Prefilters

AAF incorporates a prefilter section with a separate access door that can accommodate 2", 4", or 6" deep nominal size prefilters to extend the performance life of the primary filters. The separate access door for the prefilter section allows for the primary filters to remain positively secure during the prefilter change-out process.



MEGApleat M9

## Primary HEPA Filters

The primary filter section typically incorporates gel-seal or HEPA filters, which are a minimum of 99.97% at 0.3-micron size particles. Filters are properly against the filter sealing surface to ensure that the air within the containment system will be serviced by the filter. The primary filter section uses standard 24"x24"x 11.5" HEPA filters. 12"x12"x 11.5", and 24"x12"x 11.5" are also available.



MegaCel I

### Important Notice

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