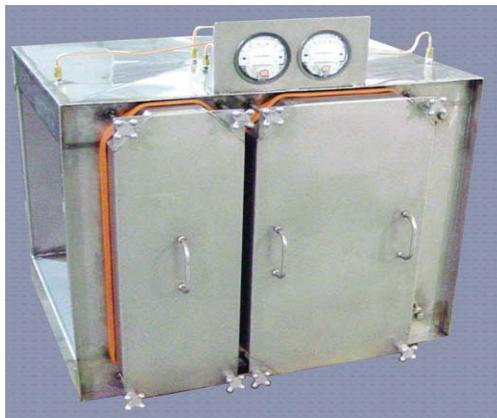
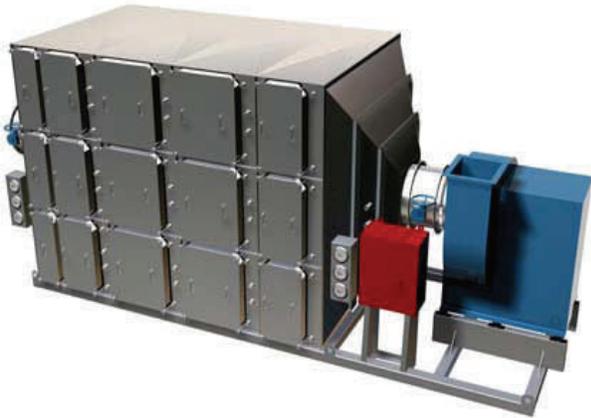




**EnviTec
Corporation**

Meeting the World's Technology Needs

BAG-IN/BAG-OUT (BIBO) HIGH EFFICIENCY PARTICULATE (HEPA) FILTER HOUSINGS



OVERVIEW

The EnviTec Bag In/Bag Out side access high efficiency air filter housing is a permanent housing designed to hold either gasket or gel seal filters. It is an all welded product designed for critical clean air exhaust applications.

Inside each unit's door(s), a ribbed inlet collar provides for a PVC bag attachment. The PVC bag creates a barrier seal between service personnel and the contaminated filters. Therefore, filter-servicing personnel avoid direct contact with any threatening particulate. An initial bag kit is included with each order.

Depending on end user requirements, a variety of prefilter, absorber, and/or HEPA filter sections are incorporated into the unit. Housings may be joined in series or parallel. Test sections in series may also be incorporated with the housing. Specific fan filter combinations are also available for isolation room systems. These systems encompass blowers with inverters/starters and or PLC controllers to provide constant system airflow as the filters load.

A removable access door for each type filter section allows for individual filter/absorber change out. Each housing is custom manufactured to meet specific end user requirements.

The all stainless steel unit allows an unencumbered airflow through the upstream and downstream openings. All Bag In/Bag Out housings are factory pressure decay tested in accordance with ANSI/ASME-N510-1995 reaffirmed up to +/- 10" W.G. as well as DIN 1946. Further, all units are manufactured in accordance to the quality criteria listed in AG-1. Complete component trace ability is provided upon request.

APPLICATIONS

EnviTec's Bag-in/Bag-out side access filter housings are designed and are used in the following applications, as well as many more:

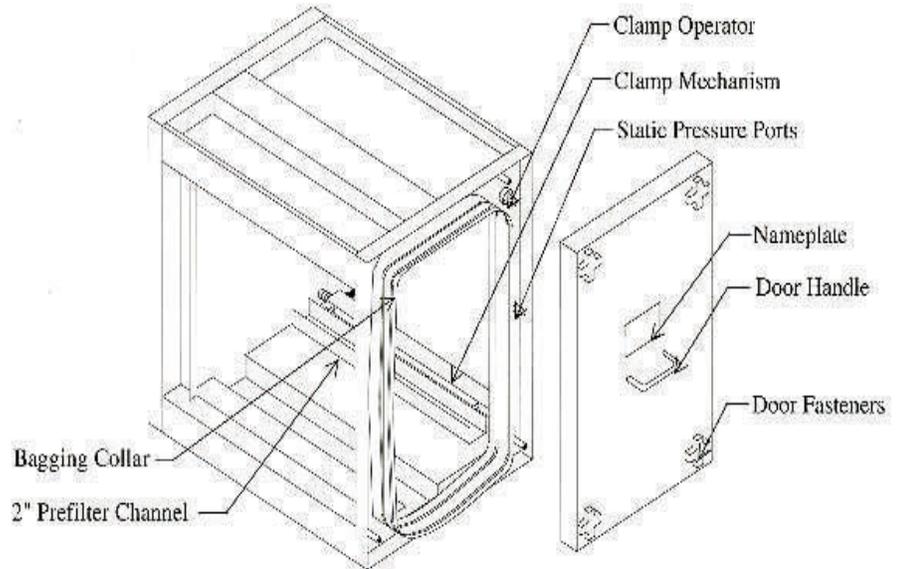
- Radiological Contamination
- Clean Rooms
- Microelectronics
- Nanotechnology
- Hospital Suites
- Isolation Areas
- Biological Research Areas

PERFORMANCE

The Bag In/Bag Out side access filter housing accommodates different HEPA and Ashrae filter efficiencies. Standard housings accommodate 24" X 24" X 11 ½" deep HEPA filters with DOP efficiencies of 95%, 99.97% and/ or 99.99% at 0.3 µm. Pre-filter sections are available in 2", 4" and/or 6" in depths.

GASKET SEAL

The filter to housing gasket seal is effected by means of a continuous flat mounting surface on the interior of the housing, which mates to a perimeter gasket on the filter. To affect the seal, the bolt-activated top and bottom hand operated crank locking mechanisms secure the filter(s) against the housing's perimeter mounting surface, compressing the gasket.



FLUID SEAL



The filter to housing gel seal is effected by means of a continuous perimeter knife-edge on the interior of the housing, which mates into the gel filled perimeter channel on the face of the filter to effect the seal. The hand operated locking mechanism guides and secures the filter into the knife-edge penetrating the gel and forming a positive seal on the filter face. Hand torqued door latches provide a positive pressure door to housing seal as well as ease filter servicing. When the housing is fully loaded and the door sealed properly, the housing efficiency is equal to that of the filter rating.

ROUND BAG-IN/BAG OUT UNITS

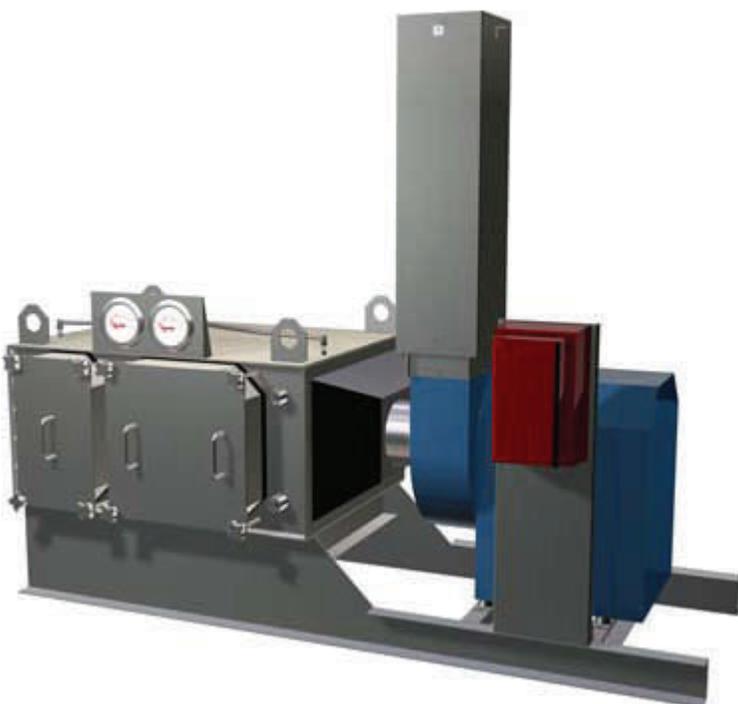
EnviTec's round housing is specially designed for high pressure and low air volume applications. Connections to the unit are typically through a round-flanged inlet and outlet. Access to the filter is through the top of the unit.



SELF CONTAINED ISOLATION UNITS

The fan powered filtration unit incorporates the filter housing and a blower for specific exhaust air applications.

Multiple configurations can be incorporated using variable frequency drives, starters, programmable logic controllers and airflow monitoring devices.



INSTALLATION

EnviTec BIBO filter housings are very easy to install since they are modular. Optional transitions are available that can connect any square or rectangular filter housing to round, square or rectangular ductwork.

CONSTRUCTION

- **Housing is made from either T304 14-gauge stainless steel or –optional T316 14-gauge stainless steel. L grade is available as well.**
- **Locking trays are made from either T316 12-gauge stainless steel or T304 12-gauge stainless steel.**
- **Removable retrieval rods ease the removal of filters.**
- **Welding is seam to reinforce joint strength and to prevent air leakage.**
- **Door(s) are perimeter gasketed in order to ensure positive filter seal.**

AVAILABLE OPTIONS

- **Additional Bag Kits**
- **Custom and Drilled Flanges**
- **Vertical Flow**
- **Weather Cover**
- **Double Wall Insulation**
- **Bottom Access**
- **Static Port(s)**
- **DOP Port**
- **Magnehelic Gauge**
- **Photohelic Gauge**
- **High Temperature Gasket**
- **Lifting Lugs**
- **Isolation Dampers**
- **Breather Filter Port**
- **Transitions**
- **Aluminized Steel Construction**

GENERAL CONSTRUCTION

All housing components are factory assembled and tested in accordance with accepted requirements, including American, British and European Standards.

The housing is constructed from 14 gauge and 12 gauge type T-304 stainless steel (as standard). The EnviTec construction method provides adequate reinforcement to withstand a negative or positive pressure of at least 20" water column (w.c.) or the client's specified operating system pressure, whichever is higher. The housing has side access for filter installation and removal. Housing design allows air to enter and exit the housing without changing direction. The housing accommodates standard sized filters that do not require any special attachments or devices to function properly during or after installation. Prior to leaving the factory, each filter housing module, as well as the entire assembly, is tested to insure its integrity in accordance with ERDA 76-21, paragraph 6.2.2 housing construction, "Nuclear Air Cleaning Handbook", Table 4-2 for filter fit, mechanical function, filter sealing surface flatness, and tested under system operating pressure by means of pressure decay test.

WELDING and CLEANING

All pressure retaining welded joints and seams are continuously welded, (EnviTec standard). All manufacturing scratches and weld heat discolorations are removed by a wire brush. The housing is free of all burrs and sharp edges. All weld joints and any portion of any gasket setting surface is ground smooth and flush to base metals. All welding is visually inspected by qualified factory personal in accordance to ANSI/AWS D9.1-1990, ("Specification for Welding of Sheet Metal"). As a minimum, all welded joints are visually inspected for cracks, underfill, incomplete fusion, overlaps, surface porosity, gas pockets, crevices, crater pits and depressions.

HOUSING HARDWARE

All hardware used in the manufacture and assembly of the filter housing is a minimum of 300 series stainless steel (i.e. nuts, bolts, washers, springs, etc.), except for the brass nuts used for filter clamping device and the aluminum hand knobs used for filter access door retaining. Aluminum hand knobs are used to protect against galling of stainless steel threaded parts) per ERDA 76-21, Section 6.2.2 housing construction.

REMOVABLE GASKET SEAL FILTER CLAMPING

The filter clamping device (locking tray) is operated by means of a standard wrench from outside of the housing front. The filter clamping mechanism is located on the clean air side of the filter / adsorber (i.e. downstream), leaving the filter sealing mechanism to be located in clean air. The sealing mechanism is self-aligning and adjustable by means of springs used in a dual compression bar assembly. The filter clamping device produces a minimum of fourteen hundred (1,400) pounds of pressure per filter element to insure a proper and uniform filter to frame seal along its gasketed surface. The filter-clamping device is driven by a type T-304 stainless steel (3) piece locking tray. The locking tray contains no acme thread. The filter clamping device seals each filter individually with maximum of ten (10) foot-pounds of torque. A single brass hex nut is incorporated into each individual locking tray to prevent the galling of the stainless steel drive components under pressure.

FILTER ACCESS DOORS

Each filtration element location is provided with an access door to remove the filtration element and replace it with another. Access doors are single wall type. The filter access door is sealed to the housing front by means of a skinned silicone closed cell sponge gasket. Silicone gasketing does not have a memory during prolonged compression, (i.e. it will never lose its shape or composition during compression) and is replaceable.

FILTER ACCESS PORTS

Each filter access port has a bag clamping ring (also called a bagging ring). The bagging ring has a smooth hemmed edge to insure safe installation and removal of the filter change out bag. The bagging ring is seal welded to the housing front around the filter access port. It is designed with two (2) raised ridges to stretch the shock cord of the filter change out bag elastic mouth around the bagging ring. The bagging ring and filter change out bag are concealed behind the removable filter access door when in the installed position. The filter access door is clamped in place with the use of 2" aluminum hand (star shaped) knobs which do not require tools to furnish the necessary torque resulting in the specified tightness.

FILTER REMOVAL ROD

All filter housings are equipped with a filter removal rod assembly. The filter removal rod operates within the glove of the PVC filter bag.

ACCESS ORIENTATION

Filter access handedness is by the side (right hand, left hand or both) of the housing where the filters are to be accessed. The handedness is determined as if a person were standing inside of the housing and is facing in the downstream direction of the air stream (i.e. the air is hitting the person in the back).

FILTER CHANGE-OUT BAG

The filter change out bag is constructed of 8 mil thick LP-375C Class 2 PVC flexible material and is yellow in color. The filter bag is matted on one side to reduce static and is semi-transparent. The filter bag has a clear portion at the mouth for visual purposes and two (2) glove ports for filter manipulation and one (1) additional glove port for the removal of the bag stub after the initial change out. The filter change out bag is retained to the bagging ring by means of a safety strap for an air tight and secure seal. All system straps and change out bags are furnished by EnviTec and shipped boxed inside the system.

FACTORY TESTING and QUALITY ASSURANCE

The filter housing is manufactured under EnviTec Corporation's quality assurance program that addresses the workmanship requirements of ASME NQA-1 "Quality Assurance Program Requirements for Nuclear Facilities". All production welds are visually inspected per EnviTec standard procedure (E-25 "Visual Inspection of Welds") which incorporates workmanship acceptance criteria. The filter housing is tested for filter fit, filter sealing, and surface flatness. Each housing module and the complete pressure boundary is leak pressure tested by the "Pressure Decay Method" in accordance with ASME N510-1998, "Testing of Nuclear Air Cleaning Systems," paragraphs 6 & 7, at standard conditions or under the client's operating pressure and temperature, whichever is greater (both filter sealing surface and overall housing are tested). All testing done is also in full compliance to DIN 1946.

Containment Filter Housings

Type	Style	Size	Mat.
GB1	- 012P	- 10H20W	- 304 - (SP)

Housing Seal
G - Gasket Seal
F - Fluid Seal
Housing Type
B - Bag-In/Bag-Out
N - Non Bag-in/Bag-Out

Doors
1 - One Access Door
2 - Two Access Doors, One Per Side
3 - Two Access Doors on One Side
 (One for Prefilter, One for Primary Filter)
4 - Four Access Doors, Two on Each Side
 (One for Prefilter, One for Primary Filter)

Prefilter Size
0 - No Prefilter
2 - 2" Prefilter
4 - 4" Prefilter
6 - 6" Prefilter

Final Filter Size
12P - 11 1/2" HEPA
12C - 12" CARBON
16C - 16" CARBON
18C - 18" CARBON
19C - 19" CARBON
(X) - Special

SPECIAL HOUSING
 If housing requires non-standard properties, it will be given the (SP) designation and will be noted on the drawing.
 IE: high pressure, etc.

Material
304 - 304 Stainless
304L - 304L Stainless
316 - 316 Stainless
316L - 316L Stainless
ALZ - Aluminized

Housing Width
05W - 1/2 Wide
10W - 1 Wide
15W - 1-1/2 Wide
20W - 2 Wide
25W - 2-1/2 Wide
30W - 3 Wide

Housing Height
05H - 1/2 High
10H - 1 High
15H - 1-1/2 High
20H - 2 High
25H - 2-1/2 High
30H - 3 High

Prefilter Containment Housings

Type	Style	Size	Mat.
PB1	- 400	- 10H20W	- 304 - (SP)

Housing
P - Prefilter
Housing Type
B - Bag-In/Bag-Out
N - Non Bag-in/Bag-Out

Doors
1 - One Access Door
2 - Two Access Doors, One Per Side

Prefilter Size
2 - 2" Prefilter
4 - 4" Prefilter
6 - 6" Prefilter

Final Filter Size
00 - No Final Filter

SPECIAL HOUSING
 If housing requires non-standard properties, it will be given the (SP) designation and will be noted on the drawing.
 IE: high pressure, etc.

Material
304 - 304 Stainless
304L - 304L Stainless
316 - 316 Stainless
316L - 316L Stainless
ALZ - Aluminized

Housing Width
05W - 1/2 Wide
10W - 1 Wide
15W - 1-1/2 Wide
20W - 2 Wide
25W - 2-1/2 Wide
30W - 3 Wide

Housing Height
05H - 1/2 High
10H - 1 High
15H - 1-1/2 High
20H - 2 High
25H - 2-1/2 High
30H - 3 High

BAG IN/BAG OUT HEPA FILTER SECTION ONLY

HEIGHT CODE	OVERALL HEIGHT (INCHES)	FILTERS WEIGHT LBS	WIDTH CODE							
			OVERALL WIDTH (INCHES)							
			15	27	39	51	63	75	87	102
			05W	10W	15W	20W	25W	30W	35W	40W
05H	17-3/4	Filters Weight	1D 176	1C 185	1C,1D	2C	2C,1D	3C	3C,1D	4C
10H	29-3/4	Filters Weight	1B 170	1A 204	1A,1B 257	2A 309	2A,1B 358	3A 407	3A,1B 566	4A 618
15H	47-1/2	Filters Weight	1B,1D	1A,1C	1A,1B,1C,1D	2A,2C	2A,1B,2C,1D	3A,3C	3A,1B,3C,1D	4A,4C
20H	59-1/2	Filters Weight	2B 362	2A 545	2A,2B	4A 618	4A,2B 716	6A 814	6A,2B 1,163	8A 1,236
25H	77-1/2	Filters Weight	2B,1D	2A,1C	2A,2B,1C,1D	4A,2C	4A,2B,2C,1D	6A,3C	6A,2B,3C,1D	8A,4C
30H	89-1/4	Filters Weight	3B 612	3A 770	3A,3B	6A 927	6A,3B 1,074	9A 1,221	9A,3B 1,697	12A 1,854
35H	107	Filters Weight	3B,1D	3A,1C	3A,3B,1C,1D	6A,2B	6A,3B,2C,1D	9A,3C	9A,3B,3C,1D	12A,4C
40H	119	Filters Weight	4B 816	4A 1,026	4A,4B	8A 1,236	8A,4B 1,432	12A 1,628	12A,4B 2,262	16A 2,472

A = 24 X 24" Actual Sized Filter

B = 24 X 12" Actual Sized Filter

C = 12 X 24" Actual Sized Filter

D = 12 X 12" Actual Sized Filter

BAG IN/BAG OUT PREFILTER & HEPA FILTER SECTION

HEIGHT CODE	OVERALL HEIGHT (INCHES)	FILTERS WEIGHT LBS	WIDTH CODE							
			OVERALL WIDTH (INCHES)							
			15	27	39	51	63	75	87	102
			05W	10W	15W	20W	25W	30W	35W	40W
05H	17-3/4	Filters Weight	1D 215	1C 248	1C,1D	2C	2C,1D	3C	3C,1D	4C
10H	29-3/4	Filters Weight	1B 248	1A 292	1A,1B 364	2A 436	2A,1B 504	3A 572	3A,1B 722	4A 872
15H	47-1/2	Filters Weight	1B,1D	1A,1C	1A,1B,1C,1D	2A,2C	2A,1B,2C,1D	3A,3C	3A,1B,3C,1D	4A,4C
20H	59-1/2	Filters Weight	2B 584	2A 728	2A,2B	4A 872	4A,2B 1,008	6A 1,144	6A,2B 1,444	8A 1,744
25H	77-1/2	Filters Weight	2B,1D	2A,1C	2A,2B,1C,1D	4A,2C	4A,2B,2C,1D	6A,3C	6A,2B,3C,1D	8A,4C
30H	89-1/4	Filters Weight	3B 876	3A 1,092	3A,3B	6A 1,308	6A,3B 1,512	9A 1,716	9A,3B 2,166	12A 2,616
35H	107	Filters Weight	3B,1D	3A,1C	3A,3B,1C,1D	6A,2B	6A,3B,2C,1D	9A,3C	9A,3B,3C,1D	12A,4C
40H	119	Filters Weight	4B 1,168	4A 1,456	4A,4B	8A 1,744	8A,4B 2,016	12A 2,288	12A,4B 2,888	16A 3,488

A = 24 X 24" Actual Sized Filter

B = 24 X 12" Actual Sized Filter

C = 12 X 24" Actual Sized Filter

D = 12 X 12" Actual Sized Filter

1. Units over 3H require flat bed trucking
2. Units over 3W may require flat bed trucking



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BIBO Rev. 0 April 2007