

# Pharmatain

Wall Mount or Freestanding Bag-In/Bag-Out System for Containment of Hazardous Compounds



Hazardous compounds are isolated, protecting the HVAC system, people, and the environment.

Top photo: Pharmatain is modular dependent upon application demands, as an example, it may include, a prefilter, HEPA and a scan sections or other modular variations.

Photo right: Installed Pharmatain, 2 modules wide, with common exhaust inlet.

The Camfil Pharmatain addresses the concerns of the pharmaceutical industry and may be used in other applications where containment of hazardous or potent compounds is judicious and the convenience of service from within the conditioned space is an advantage. The Camfil Pharmatain:

- Ensures localized control of hazardous compounds eliminating the contamination of downstream ductwork.
- Ensures that the facility meets internally established limits for occupational exposure protecting facility workers. Facilities are also able to meet the requirements of Control Banding or Risk Based Exposure Control as defined by NIOSH/CDC.
- Is available with all containment-level components, including prefilter section, final filter section, test sections and isolation dampers.
- Includes aerosol injection and test ports to test filters to industry established recommended practices for filter testing.
- Is constructed of 304/304L stainless steel with a #4 finish on room side components for a pleasing room side appearance (also available in 316/316L stainless steel).
- Has been factory pressure decay tested at 10" w.g. at the HEPA filter sealing surface and at 15" w.g. for the overall system pressure boundaries.



## General Notes for Standard Units

- Unit is shipped without filters, contact factory for proper filter selection to suit application.
- Bag-in/bag-out doors have fixed latch retainers for safety.
- Requires a minimum of 4 feet clearance in front of the doors for filter service.
- Doors are available with hinge left (standard) or hinge right.
- Inlet grille is #4 finnish with 1-1/2" laser hole pattern on 1-7/8" centers.

Pleasing appearance cosmetic door (may be completely removed)

14 gauge SST hinged inlet screen (may be completely removed)



304/304L SST inlet plenum with polished welds & turning vane

## Downstream Sample Test Kit Installation

### 1. Downstream Test Kit Contents.

- (1) ea. DynAir instruments test port model PTP-1. The port includes a sponge neoprene gasket to seal to customer duct and a red molded high density plug, fitted with a neoprene O-ring.
- (1) ea. TyLok male elbow SST fitting SS-4-2ME-8 with downstream sample probe.
- (1) ea. Tylok male connector SST fitting SS-4-1MC-6.
- (25) ft. 1/4" OD Vinyl tubing.
- (2) ea. Hex head tek screw #10x3/4" long.
- (1) copy of this drawing.

### 2. Test Port Installation. (See Detail "A")

- 2.1 Find the proper location for the test port. The port should be located at least 10 duct diameters (or two 90° bends) downstream of the filter. Do not locate the port in the main ductwork (see Pharmatain and Pharmaseal details).
- 2.2 Place test port in desired location on ductwork. Mark location of access hole and the mounting holes. Drill the access hole 3/4" diameter max. Drill the two (2) mounting holes using a #30 drill bit.
- 2.3 Caulk the under side of the assembly between the gasket and the ductwork using customer 100% approved RTV silicone rubber.
- 2.4 Place test port and flat neoprene mounting gasket over the hole.
- 2.5 Fasten the test port to the duct using two (2) #10 tek screws. After installation is complete, caulk over the heads of the screws.

### 3. Connection Between the Test Port and Exhaust Hood/Housing. (See Detail "A" & "B")

- 3.1 Remove and discard red plug from test port. Replace the red plug with the Tylok SST elbow SS-4-2ME-8 with downstream sample probe.
- 3.2 Remove and discard 3/8" brass plug from the 3/8" coupling located on top of the exhaust Pharmaseal Hood/Housing. Replace the plug with the Tylok SST male connector S-4-1MC-6.
- 3.3 Cut the 1/4" OD Vinyl tubing to desired length and connect the two Tylok fittings together. Properly secure the tubing to the ductwork between the fittings.

### Specifications for Pharmaseal Hood (Exhaust) and Test Fixture

#### 4.0 Test Fixture

- 4.1 Test fixture shall be constructed from 0.063" thick aluminum and shall weigh approximately 18 lbs. [8.2kg].
- 4.2 Test fixture shall have a flange around the large end with a soft gasket and fasteners for connection to the hood during testing.
- 4.3 Test fixture shall have an inlet collar.
- 4.4 Features of the test fixture shall include an aerosol dispersion system, aerosol upstream sample port, and aerosol downstream sample port. These ports shall include 3/8" NPT chrome-plated brass quick disconnects or 3/8" NPT brass plugs. The aerosol downstream sample port shall have Vinyl tubing that allows connection to the hood before actually attaching the test fixture.

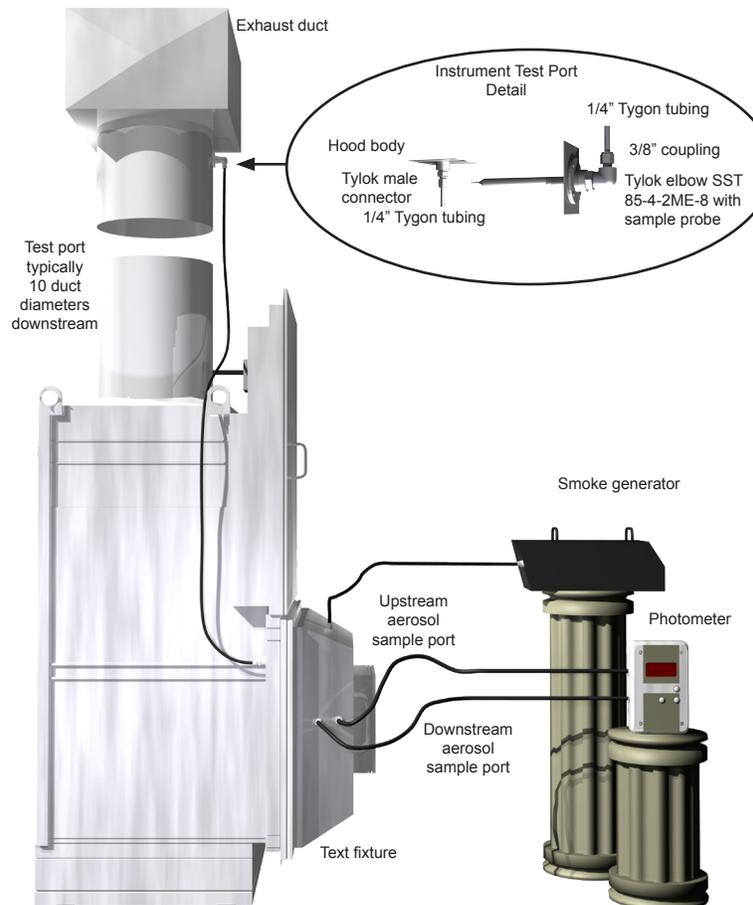
#### Testing Steps (Overall Penetration Method)

1. Remove grille from Pharmatain/Pharmaseal.
2. Install test fixture to system.

Note: The flexible hose of the downstream aerosol sample port in the test fixture must be attached to the quick disconnect fitting in the hood just before actually attaching test fixture to hood.

3. Connect photometer to test fixture upstream aerosol sample port and the downstream aerosol sample port.
4. Connect smoke generator to aerosol dispersion port.
5. Conduct test of filter.
6. If result is acceptable, remove test instruments and test fixture.
7. Replace grille on Pharmatain/Pharmaseal.

## Test Fixture Detail



## SPECIFICATIONS

This specification covers most options for the Pharmatain. **Selectable items are in bold text.**

1.0 - The following components of the system shall be constructed of T-304/304L stainless steel.

1.1 - HEPA filter section to be Camfil FB-Series Bag-in/Bag-Out type.

### [1.2 Test] [Choose 1]

1.2 - Manual scan test.

1.2 - Overall efficiency test port with downstream installation kit M80000452.

### [1.3 Inlet Plenum Design] [Choose 1]

1.3 - Inlet plenum shall include an all-welded turning vane for easy cleaning. Welds shall be smooth and wire brushed. Interior of inlet plenum shall have a 2B finish.



Smooth and wire brush example.

1.3 - Inlet plenum shall include an all-welded turning vane for easy cleaning. Welds shall be ground smooth and banded with a 2B finish. Interior of inlet plenum shall have a 2B finish.



Ground smooth and banded with 2B finish.

1.3 - Inlet plenum shall include an all-welded turning vane for easy cleaning. Welds shall be ground smooth and banded with a #4 finish. Interior of inlet plenum shall have a #4 finish.



Ground smooth and banded with #4 finish.

1.4 - Outlet transition with bolt flange.

1.5 - Bubble-tight isolation damper.

### [1.6 Stand] [Choose 1]

1.6 - Removable mounting stand with four (4) anchoring pads and four (4) leveling feet to assist in installation.

1.6 - Fixed mounting stand with four (4) anchoring pads and four (4) leveling feet to assist in installation.

1.6 - Seismic fixed mounting stand with four (4) anchoring pads and four (4) leveling feet.

1.7 - Lifting lugs.

1.8 - Static pressure ports, 1/4" SST half coupling piped to gages (stainless steel fittings and tubing).

### [1.9 Gages] [Choose 1]

1.9 - Provide Dwyer Series 2000 magnehelic differential pressure gages factory mounted and visible from room side. Housing to be die cast aluminum case and bezel, with acrylic cover. Exterior finish is coated gray to withstand 168 hour salt spray corrosion test. Gage to have accuracy of  $\pm 2\%$  of full scale throughout range at 70°F (21.1°C) and 4" (101.6 mm) Diameter dial face.

1.9 - Provide Dwyer Series 3000 photohelic gages factory mounted and visible from room side. Gage to have accuracy of  $\pm 2\%$  of full scale throughout range at 70°F (21.1°C) and 4" (101.6 mm) Diameter dial face.

1.10 - Inlet plenum cosmetic grille with a #4 finish and retained with four (4) hidden fasteners. Cosmetic grille fasteners shall be 316 SST ball-and-catch style. Holes shall be laser cut, de-burred and free of sharp edges. Percentage of open area and hole number/sizes to be calculated based on housing design flow.

### [1.11 Cosmetic Door] [Choose 1]

1.11 - Provide cosmetic door with #4 finish with acorn nuts and handles. Door to be constructed of 14 gauge 304 stainless steel. Extra handles to assist in door removal shall be provided if necessary. Cosmetic door to be designed to seal against front pan of system via gasket strips. Corners shall be dovetailed joints to prevent leakage. Grain direction of door must match the direction of trim and plenum grille.

1.11 - Provide cosmetic door with #4 finish with lift-off hinges, 1/4-turn latches and handles. Door to be constructed of 14-gauge 304 stainless steel. Extra handles to assist in door removal shall be provided if necessary. Cosmetic door to be designed to seal against front pan of system via gasket strips. Corners shall be dovetailed joints to prevent leakage. Grain direction of door must match the direction of trim and plenum grille.

1.12 - Provide 2" permanent cosmetic trim with a #4 finish on room

side. Trim to be constructed of 11 gauge 304 stainless steel. Trim flatness tolerance shall be  $\pm 1/16"$  across entire span to ensure proper fit with wall system.

2.0 - FB-Series Housing

2.1 - General

A. Housing shall be Camfil FB-Series side-access bag-in/bag-out, fluid seal housing. The housing shall be adequately reinforced to withstand a negative or positive pressure of 15.0" water gage [3.73 kPa].

B. Housing design and filter arrangement shall allow air to enter and exit housing without changing direction.

C. The housing shall accommodate standard size filters that do not require any special attachments or devices to function properly in the housing.

2.2 - Construction

A. Housing shall be constructed of 14 gauge and 11 gauge T-304/304L stainless steel metal with a 2B finish. Any hardware that is welded, and becomes part of the filter system "pressure boundary" shall be stainless steel. All other hardware such as replaceable filter clamping mechanism components, door handles, door bolts, and labels, shall be 300 series stainless steel. The filter access door knobs are cast aluminum (to prevent galling of threads).

B. The housing shall have a bagging ring around each filter access port that is sealed by a gasketed filter access door. The filter access door gasket shall be silicone and shall be replaceable, if necessary. The bagging ring shall have two (2) continuous formed raised ridges to secure the PVC change-out bag. The bagging ring shall be hemmed on the outer edge to prevent the change-out bag from tearing.

C. One (1) Camfil manufactured PVC change-out bag shall be furnished with each filter access port. Change-out bags shall be 8-mil. thick with a yellow translucent, non-sticking, matte finish with 16" clear at mouth of bag. It shall include a 1/4" diameter elastic shock cord hemmed into the opening of the bag so when stretched around the housing bagging ring flange, a secure fit is created. The bag shall include three (3) integral glove ports to assist in filter change-out. One (1) nylon security strap shall be included per filter access port to prevent the bag from sliding off the bagging flange during the change-out process. Design of components shall be such that all change-out operations shall be within the bag so there is a barrier between the worker and filter at all times. Filter bags shall be capable of continuous operating to temperature extremes of 0° F [-17.8° C] to 150° F [65.6° C].

2.3 - Replaceable Fluid Seal Filter Clamping Mechanism

The housing shall accommodate fluid seal filters which require a penetrating knife edge installed on all filter sealing surfaces. The knife edge shall insert into the fluid filled perimeter channel located on the face of the filter. By engaging the filter seal/released mechanism the filter shall move (push) the fluid filled channel to the sealed position. For removal of the air filters the filter seal/released mechanism shall remove (pull) the filter free of the blade type knife edge. This entire process is performed from inside the filter change out bag.

2.4 - Factory Testing and Quality Assurance

The filter housing shall be manufactured under a *Camfil Quality Assurance Program* that has been assessed and independently certified to meet the requirements of ISO 9001:2000 for design, manufacture and distribution of containment and HVAC air filtration products. The filter housing shall be factory tested for filter fit, alignment of filter sealing knife edge and operation of filter clamping mechanism. The filter sealing surface and the complete assembly pressure boundary shall be leak tested by the pressure decay method as defined in *ASME N510-1995 Reaffirmed, Testing of Nuclear Air Cleaning Systems*, paragraphs 6&7. The filter sealing surface shall be tested at +10" water gage [2.49 kPa] and have a maximum leak rate of 0.0005 cfm [0.0142 L/m] per cubic foot of housing volume. The overall system pressure boundary shall be leak tested at +15" water gage [3.73 kPa] and have a maximum leak rate of 0.0005 cfm [0.0142 L/m] per cubic foot of housing volume.

3.0 - Welding And Cleaning (Typical for all housings/dampers)

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3.1 - All pressure retaining joints and seams shall be continuously welded with no porosities. Joints and seams requiring intermittent welds, such as reinforcement members, shall be intermittently welded. Housing shall be free of all burrs and sharp edges. All weld joints and seams that are a portion of any gasket setting surface, (duct connection flanges and filter sealing surfaces), shall be ground smooth and flush with adjacent base metals.

3.2 - All welding procedures, welders, and welder operators shall be qualified in accordance with *ASME Boiler and Pressure Vessel Code*, Section IX. All welded joints and seams shall be wire brushed to remove heat discoloration. All production welds shall be visually inspected by qualified personnel, per Camfil standard procedure number *CFW-10001 Visual Inspection of Welds*, which incorporates the workmanship acceptance criteria described in section 5 & 6 of *AWS D9.1-1990, Specification for Welding of Sheet Metal*.

#### [4.0 Testing/Scanning] [Choose 1]

##### 4.0 - Overall Efficiency Port

4.1 - The system shall include a port connected to a sample test probe located downstream in the duct, providing the capability of performing overall efficiency test from the room side. An "Installation Kit" (M80000452) consisting of PVC tubing and fittings to connect the port on the hood to the probe port in the duct work shall be furnished with each system (installation by others). The sample port shall be permanently attached to the unit by continuously welding and be sealed using a 3/8" NPT chrome-plated brass Quick Disconnect with a snap-in barbed connector.

4.2 - Camfil Overall Efficiency Test Shroud required. Shroud body/plenum and dispersion plate shall be fabricated of 0.063 aluminum. Shroud shall be equipped with ports/tubing enabling personnel to inject, mix, and obtain upstream/downstream samples of challenge agent from the room side. Shroud to be validated and proven capable of testing for efficiency in accordance with IEST-RP-CC-007, ensuring filters meet IEST-RP-CC-001 Type A performance level.

##### 4.0 - Manual Scan Housing

###### 4.1 - General

A. Housing shall be Camfil ASTS test section. The housing shall be adequately reinforced to withstand a negative or positive pressure of 15" water gage [3.73 kPa].

B. Sizes shall be noted on enclosed drawings or other supporting materials.

###### 4.2 - Construction

A. Housing shall be constructed of 14 gauge and 11 gauge T-304 stainless steel metal with a 2B finish. Any hardware that is welded, and becomes part of the test section "pressure boundary" shall be stainless steel. All other hardware such as replaceable filter clamping mechanism components, door handles, door bolts, and labels, shall be 300 series stainless steel. The filter access door knobs are cast aluminum (to prevent galling of threads).

B. The housing shall have a bagging ring around each filter access port that is sealed by a gasketed scan access door. The scan access door gasket shall be silicone and shall be replaceable, if necessary. The bagging ring shall have two (2) continuous formed raised ridges to secure the PVC scan bag. The bagging ring shall be hemmed on the outer edge to prevent the scan bag from tearing.

C. One (1) Camfil manufactured PVC scan bag shall be furnished

with each scan access port. Scan bags shall be 8-mil. thick with a clear finish. It shall include a ¼" diameter elastic shock cord hemmed into the opening of the bag so when stretched around the housing bagging ring flange, a secure fit is created. The bag shall include three (3) integral glove ports to assist in the filter scan operation. One (1) nylon security strap shall be included per filter access port to prevent the bag from sliding off the bagging flange during the scan process. Design of components shall be such that all scan operations shall be within the bag so there is a barrier between the worker and scan probe at all times. Scan bags shall be capable of continuous operating to temperature extremes of 0° F [-17.8° C] to 150° F [65.6° C].

Note: Standard size dampers for Pharmatains:

Size	1 x ½	1 x 1	1 x 1	2 x 1	2 x 1
Airflow (cfm)	500	1,000	2,000	2,000	4,000
Diameter (inches)	8"	12"	16"	16"	20"

##### 5.0 - Camfil Damper

###### 5.1 - General

A. Damper shall be Camfil BTFB-Series, flat blade isolation damper. The damper shall be adequately reinforced to withstand a negative or positive pressure of 15" water gage [3.73 kPa].

B. Damper design and shall allow air to enter and exit damper without changing direction.

###### 5.2 - Construction

The damper shall be manufactured from 11 gauge T-304 stainless steel sheet metal. The damper body shall be cylindrical, and have two (2) 7 gauge T-304 stainless steel plates with a silicone gasket between them. Blade seal shall occur when the silicone gasket seats against the inside of the 11 gauge housing wall. Damper shall have a 1 ½" [38.1mm] wide X 3/16" [4.8mm] thick bolting flange on the inlet and outlet. Flanges shall have a factory drilled bolt hole pattern (7/16" [11.1mm] diameter bolt holes), and shall be no more than 4" [101.6mm] apart, as recommended in *ERDA 76-21, Nuclear Air Cleaning Handbook*.

###### 5.3 - Manual Actuator

Damper shall be factory equipped with a manual actuator and hand wheel. Actuator is equipped with a shaft that extends through the front panel for damper adjustment from inside the clean room. Actuator shall be quarter-turn manual worm geared type. Actuator housings and covers are cast iron, worms are heat-treated carbon steel, worm wheels are cast ductile iron, input shafts are carbon steel, shaft and worm seals are BUNA-N rubber, housing to cover seals are impregnated cellulose fiber, bushings are oil impregnated copper nickel steel alloy. Actuator maximum output torque is 4,500 in-lb [508.4 N ·m], with a gear ratio of 30:1.

###### 5.4 - Factory Testing and Quality Assurance

Camfil dampers shall be manufactured under a quality program that has been assessed and independently certified to meet the requirements of ISO 9001:2000 for design, manufacture and distribution of containment and HVAC air filtration products. The damper blade shall be tested in the closed position at +10" w.g. [2.49 kPa] and shall be bubble tight when tested in accordance with *ASME N510-1995 Reaffirmed, Testing of Nuclear Air Cleaning Systems*. The complete damper pressure boundary shall be leak tested at +15" water gage [3.73 kPa] and have a maximum leak rate of 0.0005 cfm [0.0142 L/m] per cubic foot of housing volume.

