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BAG IN BAG OUT HEPA

Operation and Maintenance Manual

Cobeal

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Manufacturer’s Message

Cobeal’s Bag In / Bag Out (BIBO Series) is designed to protect facility personnel and the general public from dangerous materials by filtering those particles into HEPA filters that you replace. It is important to follow these instructions carefully for your BIBO filtration system to work as efficiently as possible. While no filtration method is 100% effective, the bagging method of changing a filter is the safest practical method available for replacing a contaminated filter.

This manual does not address the multitude of housing designs and configurations Cobeal offers, but it does cover the concepts of installing a new filter into a new system, as well as replacing dirty filters in existing operating systems. Once the key concepts are understood, maintenance and safety personnel can adapt the most suitable method to use in consideration of the housing location, type of filter, and relevant specifications that affect safety.

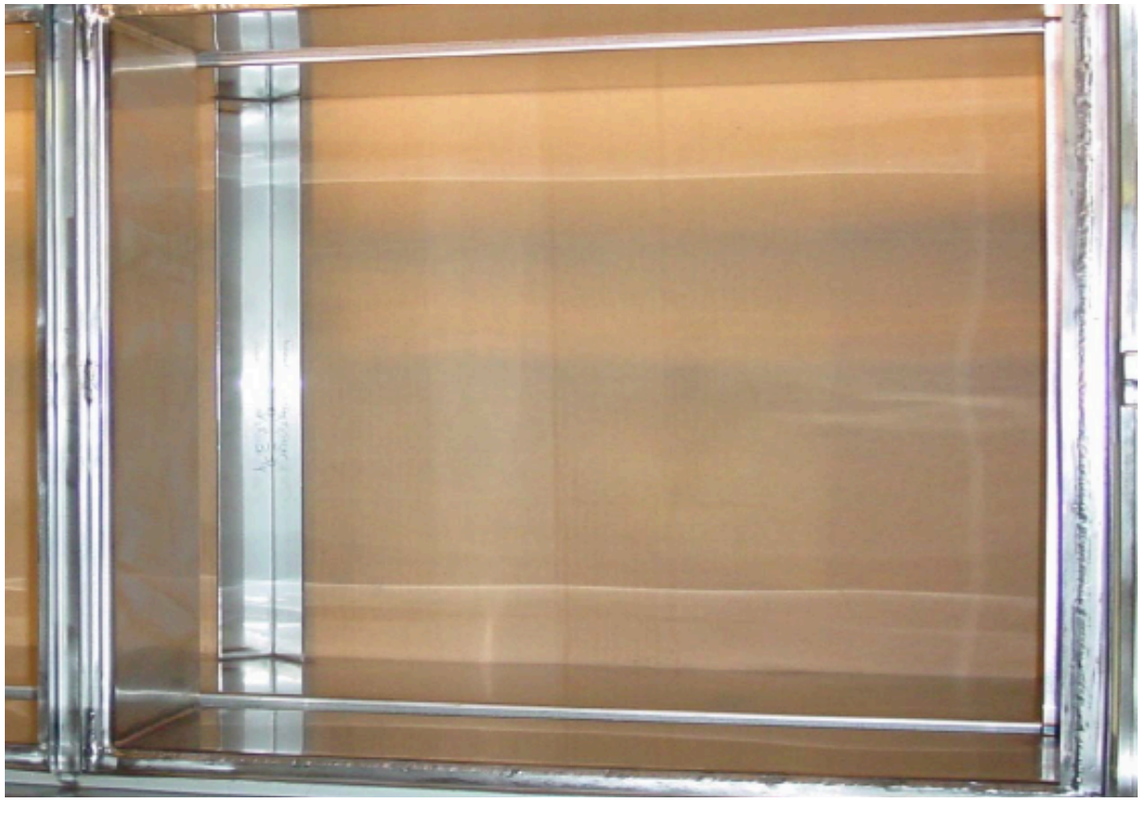
Carefully review this manual to ensure that you understand all the steps in the procedure before changing the filter. Make sure you have all the necessary tools ready before you begin work.

The important thing to remember is to take all reasonable precautions to prevent yourself and the immediate environment from being contaminated with the material captured by the filter.

Cobeal's BIBO filter housings for fluid or gasket seal primary filters are side-loading filter housings which have been designed to meet the air filtration needs of industries and research facilities that handle dangerous, toxic, biological or carcinogenic material. To minimize exposure to harmful contamination while replacing used filters, the housing incorporates a ribbed BIBO ring, over which a heavy-duty plastic filter bag is attached (see left).

After the initial filters are installed and the first bag is attached, all filters - clean and dirty - are to be handled through the bag using the procedures described in detail throughout this manual. Depending upon the user's requirements, the housing may have an assortment of filter arrangements, including prefilters, HEPA filters and other types of filter media. Regardless of the combination of filters installed in the filter housing, the change-out procedure is the same.

NOTE: The filter change-out is INCOMPLETE unless the new filters have been sealed to the housing frame and an IN PLACE LEAK TEST has been performed.

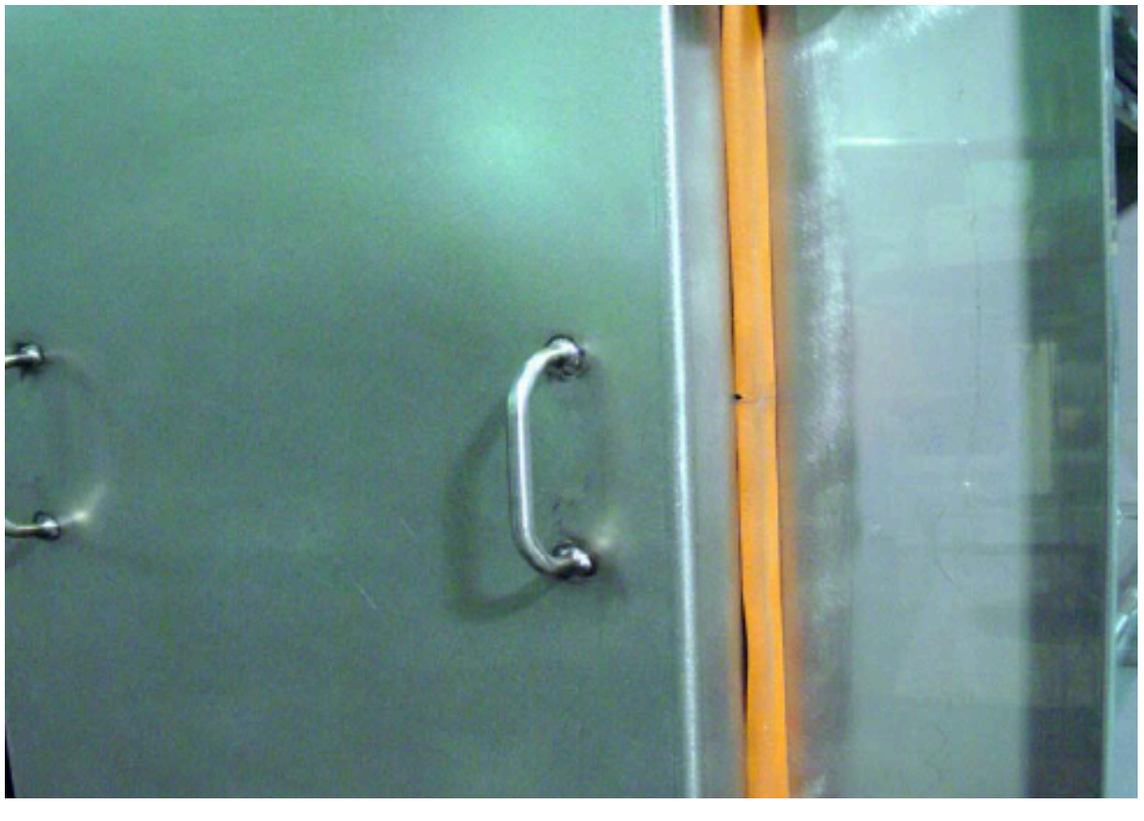


Fluid Seal Design Concept

The filter to housing-gel-seal is effected by means of a continuous knife-edge on the interior of the housing. This mates into the gel-filled perimeter channel on the face of the filter. To effect the seal, the locking mechanism forces the filter against the knife-edge. The knife edge penetrates the gel and a uniform seal is produced on the filter face (top left).

Description of Fluid-Seal Filter Locking System

The fluid seal BIBO housing has a filter-locking arm in each tier to operate the replaceable filter locking mechanism. By operating the internal filter-locking arm inside the PVC bag and access door, the filter is engaged on, or disengaged from the housing knife-edge (internal sealing frame). The filter-locking arm and the access door interface to minimize the possibility of the door being closed until the filters are correctly sealed in the housing and sealed to the mountain frame (left bottom).



Gasket Seal Design Concept

Cobeal's 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 locking mechanism forces the filter against the mounting surface (top left).

Opening and Closing Gasket Seal Locking Mechanism

By turning the drive bolt(s) clockwise located at the front exterior of the housing, independent pressure bars with preloaded sprints, located in the filter locking mechanism, force the filter against the interior-mountain frame (there are two drive bolts per filter). Preloaded springs on each pressure bar, for each filter element, apply consistent pressure to maintain the filter seal. The applied force has a minimum-clamping load of 1,400 pounds per perimeter of the filter. This force should be applied as an even, uniform load along the top and bottom of each filter frame. The gasket shall be compressed and not exceed ⅛".

CAUTION: Over-compression of the gasket can lead to leaks. The standard locking mechanism hardware is 18-8 stainless steel with a 360-brass nut (bottom left).

Handling and Storage of Filter Elements

Particulate filters include a wide range of filter types, sizes and performance capabilities. These filters are designed to remove airborne particulates from an air stream. Filters can consist of 30% efficiency prefilters (according to ASHRAE) and up to 99.97% efficient HEPA filters. All particulate air filters are FRAGILE and should be HANDLED WITH CARE. The following precautions should be observed for storing filters:

- Store in a clean, low humidity air-controlled environment.
- Keep filter in its original packaging until in use.
- Do not stack filters on top of each other.
- Restrict moving the filters too often to avoid damaging fragile filter media.
- Shelf life: 3 years (gasket and gel seal filters).
- Follow manufacturer's instructions and warnings.

Installation of New Housings

1. Position the housing adjacent to the ductwork. Housing should be welded, bolted or permanently gasketed to the ductwork.
2. Housing should be securely mounted to either a base or other permanent edifice.
3. Unit should be oriented in a way that the access door(s) can be easily removed and replaced.
4. Following installation, ductwork and housing should be cleaned to eliminate all contaminants as well as any other items, which may have been stored in the unit during shipping.
5. Install filter(s).
6. Perform designated leak test / DOP test to insure that the unit is working properly and is not leaking.

Start-Up Procedures

- Shut down the system prior to performing any filter installation or removal. Airflow should be stopped or a bypass of the air system must be made. Any leakage through either the dampers or other airflow device will cause the gag to suck tightly against filter(s) and possibly damage the bag.
- Consult with your Safety Officer to perform a Job Safety Analysis prior to installing or removing any filter(s). Make sure all personnel are wearing the required personal protective equipment (PPE).

Filter insertion

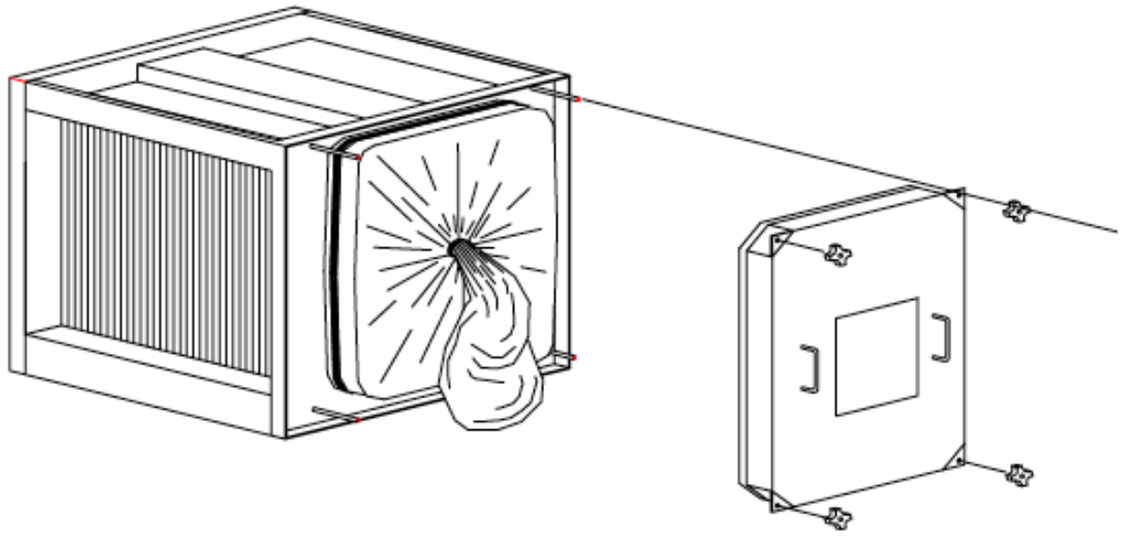
Filter insertion, with PPE

Elastic bag strap
placed inside 2nd rib

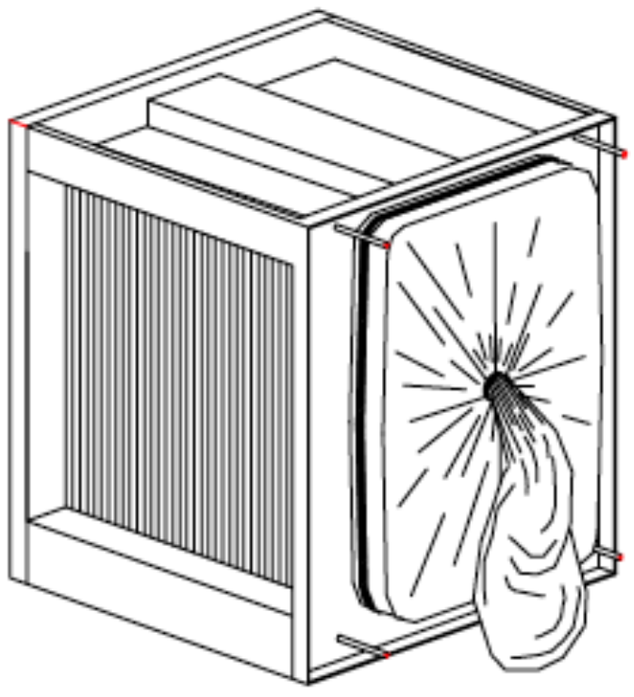
Safety strap between ribs

Start-Up Procedures (Instructions)

1. Clean the outside door, work area and all stainless steel surfaces.
2. Make sure you have all of your replacement filters prior to replacing each tier with a HEPA or prefilter.
3. A factory supplied support shelf should be located immediately outside and a few inches below the door of the tier to rest the HEPA filter during change.
4. Position one new factory specified PVC bag for each filter tier. Always inspect the bag for rips or tears before using (middle left, left side).
5. A factory supplied banding kit should be used to tie off the PVC bag. The safety strap should be cinched so that it lies flat against the sealing lip between the two protrusions (middle left, right side).



Note bag safety strap and cinch strap



Cinch strap in center

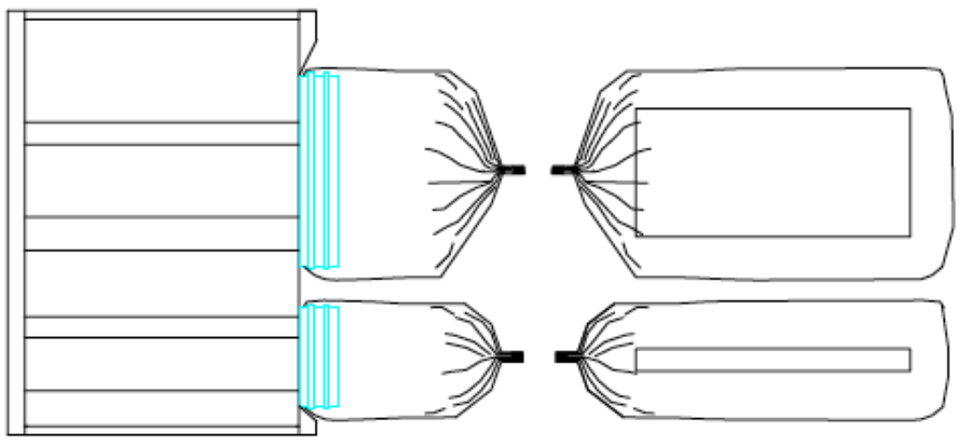
6. Loosen all doorknobs where the filter(s) are to be replaced. Place door(s) in a safe location.

7. Remove cinching strap and open the bag (make sure the safety strap remains on the bag out port).

8. Using safety mittens (which are either incorporated into the bag or supplied separately), release the filter-locking latch. For a fluid seal housing, press the arm firmly inward towards the filter at a point near the latch to relieve the tension and the latch will automatically spring to one side, releasing the arm. Next, pull the arm all the way outwards to the open position. This allows the filter to be released from the knife-edge (internal sealing frame). For a gasket seal housing, unlock the filter by turning both bolt locking mechanisms counterclockwise with a ratchet. This will release the filter from the flat edge.

9. Use the filter retrieval rod to latch onto and pull the filter into the PVC bag. You can also reach inside the unit and pull the filter out. Slide the filter as far into the bag as possible. If there is a residual bag stub from the previous filter change, this should be removed along with the filter.

10. Seal the bag by cinching the bag twice with the metal bands between the removed filter and the housing. Cinches are provided in the banding kit.



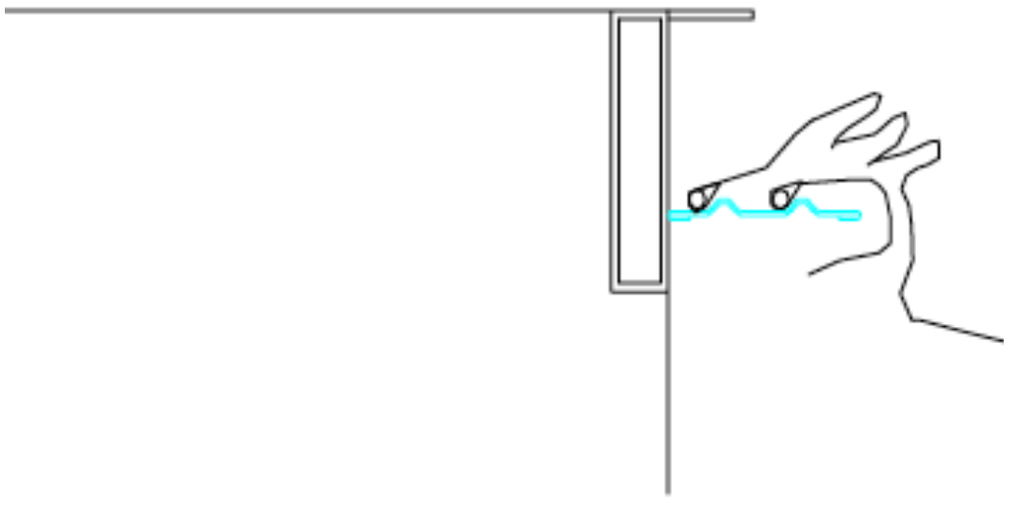
Top view of both a pre-filter and HEPA filter change out-sealing lip in blue

If a factory approved tape is used, twist the bag and tightly tape a six-inch section.

11. Cut the bag between the two cinches (approximately ¼" to ½" apart). Once cinch will remain with the removed filter while the other will seal off the housing. If tape is used, cut in the middle of the taped-off section and immediately retape the exposed stubs (top left).

Note: If there are multiple filters per tier, prior to moving onto step 12, repeat steps 9-11 until all filters are removed.

12. Remove bag(s) with dirty filter(s) and dispose in accordance with all applicable state and federal laws.



Bag cords on sealing lip-profile, sealing lip in blue

13. Remove safety strap from the sealing lip and slide the shock cord of the bag from the inside rib to the center of the bag-bagging ring between the two ribs.

14. Place the new filter in a new PVC bag. NOTE: Only the frame of the filter should be touched. Located the new bag's shock cord around the bag out port on the inside rib (where the previous bag was located). Make sure the stub from the previous bag is within the new bag.

15. Tighten the safety strap on the new bag until it is immobilized and cannot move.

16. Pull the old bag and stub into the new PVC bag and away from the new filter.

17. Slide the filter(s) into the housing and engage the locking mechanism to seal-off the filter(s) on the knife edge(s).

18. Close the swing bar and latch for a gel seal filter or screw down drive bolts clockwise on the gasket seal filter.

19. Cinch the bag so it is taught across the surface of the sealing lip. CAUTION: Do not cinch the bag so tightly that it causes the shock cord to slip off the sealing lip.

20. Roll up the bag. Replace the door and tighten all door latches.

CONTACT COBEAL IF YOU HAVE ANY QUESTIONS OR DO NOT UNDERSTAND HOW TO REPLACE THE FILTERS IN YOUR UNIT.

AFTER YOU HAVE REPLACED YOUR FILTER(S) AND BAG(S), MAKE ANY ADDITIONAL NOTES IN YOUR MAINTENANCE LOG AND ATTACH THOSE INSTRUCTIONS TO THIS MANUAL. THIS WILL SERVE AS A HELPFUL REMINDER FOR FUTURE FILTER CHANGES.

Appendix A

Cobeal recommends that the buyer inform Cobeal about any concerns regarding the operating conditions of the ventilation system prior to installing a Bag In Bag Out (BIBO) contamination system. Location-specific conditions may prevent the system from operating according to Cobeal's specifications. Any non-factory alternations to the product may result in a compromised installation. Please contact Cobeal for any questions not addressed in this manual.

Appendix B: Locking Tray Change Out

Please be advised that any locking tray mechanism replacement or change out should be done in a decontaminated environment. Due to sharp edges, placing a metal locking tray in a PBC bag is not recommended. However, one of the advantages of Cobeal's HEPA Sealed BIBO contamination housing is the ability to change out the locking trays in the field.

Chang out is a simple task. The same concept applies to locking mechanisms as it does to filters.

First, remove all of the filters from the Cobeal HEPA Sealed BIBO Contamination System following the **Start Up Procedures** (pgs. 6-10). Insert a new bag with a standard ratchet with a ½" socket in the bag. For gel-seal units, a ⅜" socket will be required. Position the new PVC bag's shock cord the same way you would a PVC bag with a new filter inside. Remove the old bag stub inside the new bag.

Fluid Seal Method

1. Using the ratchet with the 1/2" socket, remove the two hex nuts and washers for both the top and bottom locking trays.

2. Switch to the ⅜" socket and remove the hex nut and washers from the linkage to the doors swing arm.

3. Remove both the top and bottom parts to each pair of locking trays and pull into the PVC bag.

4. Treat the locking mechanism as a dirty filter and continue the appropriate steps.

WARNING: The ratchet and socket MUST remain INSIDE THE BAG. DO NOT REMOVE.

Downstream view of locking tray mechanism

Contact Cobeal by phone at +52 55 4324 7603, or by email at Info@Cobeal.com, if you have any questions or concerns about how to safely replace your Cobeal BIBO Contamination System's filter(s) or bag(s).

Thank you for choosing Cobeal to protect your building environments!

Gasket Seal Method

1. Using the ratchet with the ½" socket, remove the two hex nuts and washers for both the top and bottom locking trays.
2. Lift the top half of each locking tray off of the studs and into the bag.
3. Remove the pipe bearings from the locking mechanism and loosen the drive bolts to release the bottom locking trays.
4. Remove the bottom-locking tray and pull it into the PVC bag.
5. Treat the locking mechanism as a dirty filter and continue the appropriate steps.

WARNING: The Ratchet and socket must remain inside teh bag. DO NOT REMOVE.