

# How to Trap, Eliminate, and Dispose of the Virus

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# Understanding the Role of BIBO Systems in Containment

## Overview of Virus Containment Challenges

Viruses can be airborne and easily transmitted in controlled environments. Proper containment is essential to prevent outbreaks, especially in labs and healthcare settings. Standard filtration methods may not be sufficient to ensure complete isolation of harmful pathogens.

## Importance of Proper Filtration and Disposal

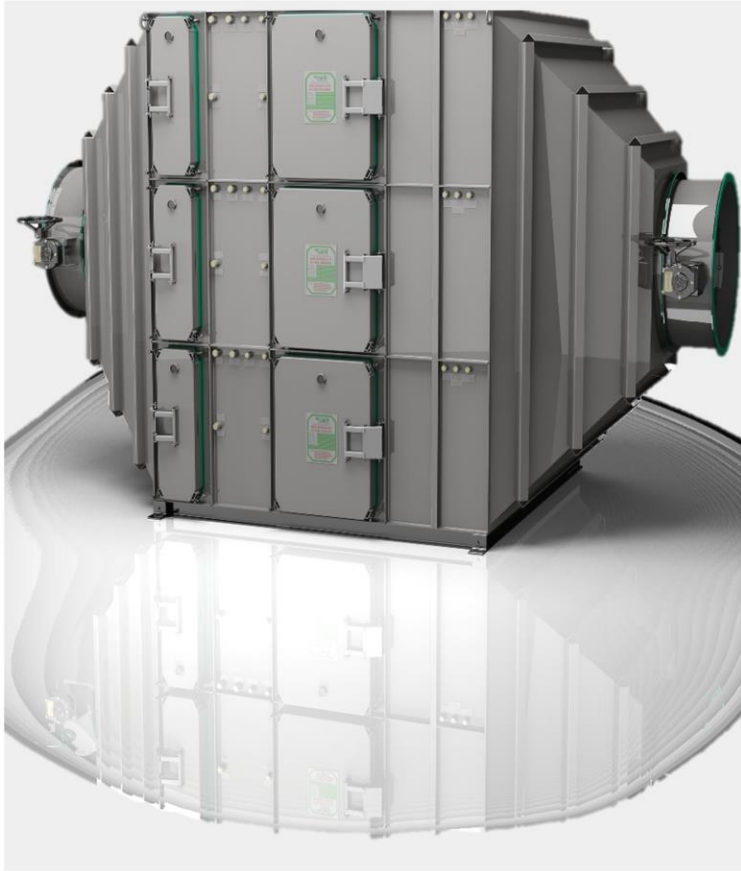
Effective filtration (HEPA/ULPA) is needed to trap viral particles. Improper disposal of contaminated filters can lead to secondary exposure. Compliance with regulatory standards ensures safety for workers and the environment.

## Introduction to the BIBO System

A BIBO (Bag-In, Box-Out) is a specialized filtration system designed for handling hazardous materials, particularly in pharmaceutical, biotech, and chemical industries. It ensures safe containment and removal of toxic or hazardous particles from air filtration units.



## Why Use a Bag in Bag out?



**Worker Protection:** Prevents exposure to hazardous contaminants, reducing the risk of infection for personnel handling hazardous materials.

**Prevents Cross-Contamination:** Ensures that airborne viruses and particulates are fully contained within the filtration system, preventing spread to clean environments.

**Regulatory Compliance:** Meets OSHA, EPA, and industry standards, ensuring adherence to safety protocols for hazardous material handling.

**Safe & Efficient Filter Replacement:** Eliminates direct contact with contaminated filters by using a sealed bagging system, reducing potential exposure and simplifying filter change processes.



# How a BIBO System Works

## Sealed Containment:

The BIBO system is designed to fully enclose contaminated filters, preventing airborne particle release during removal.

## Step 1: Preparation:

Operators wear PPE and ensure the containment area is properly sealed before starting the replacement.

## Step 2: Bag-In Process:

A new filter is placed inside the BIBO housing using a specialized flexible bag system.

## Step 3: Old Filter Removal:

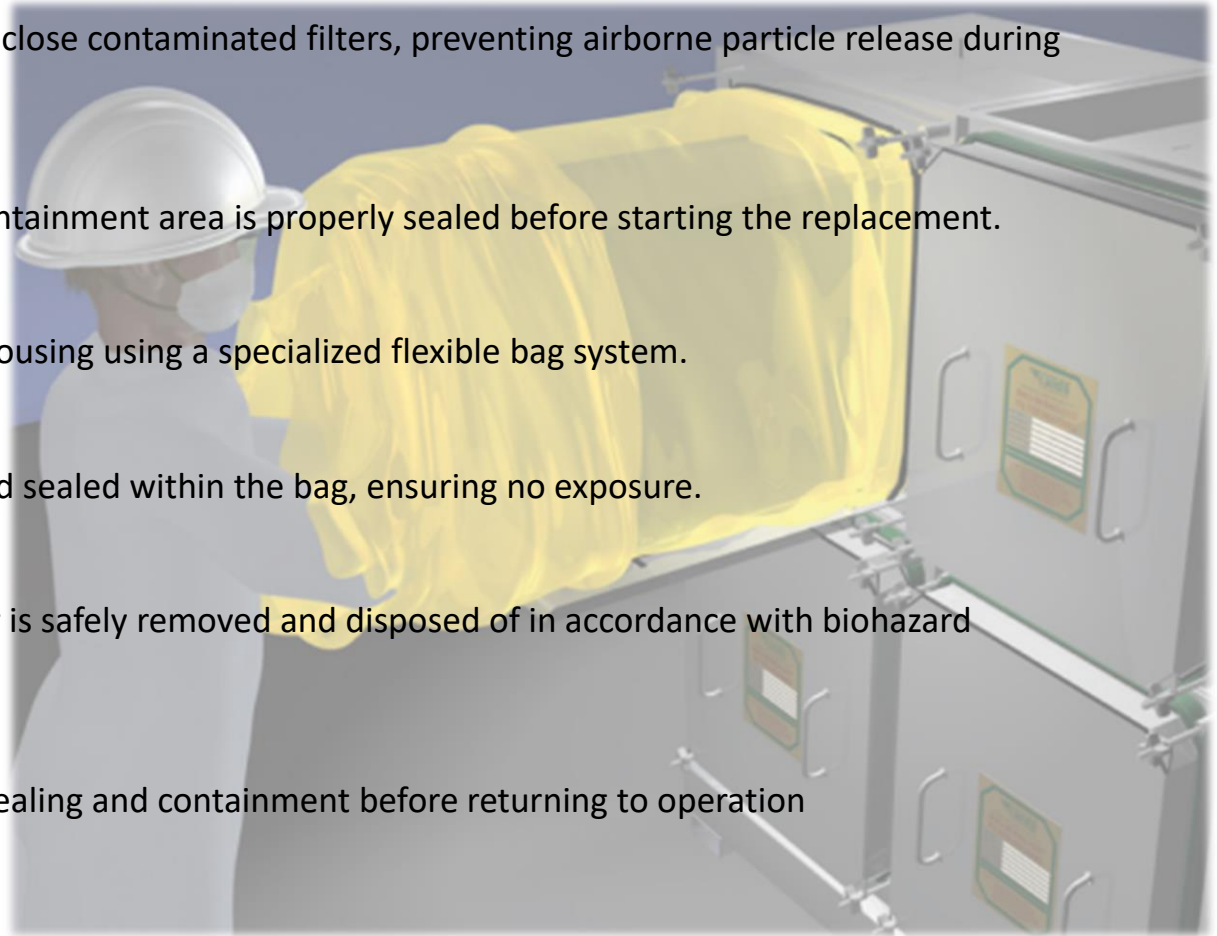
The contaminated filter is detached and sealed within the bag, ensuring no exposure.

## Step 4: Bag-Out Process:

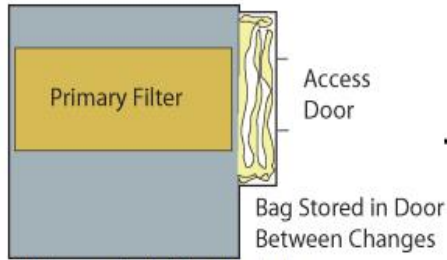
The sealed bag containing the old filter is safely removed and disposed of in accordance with biohazard protocols.

## Step 5: Final Check:

The BIBO unit is inspected for proper sealing and containment before returning to operation

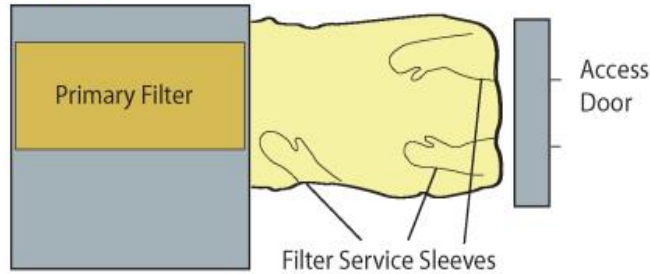


**STEP 1**



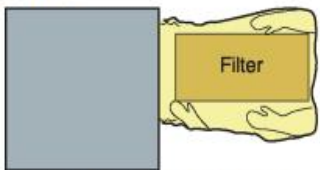
During operation the filter (s) are in place and the bag is stored in the door

**STEP 2**



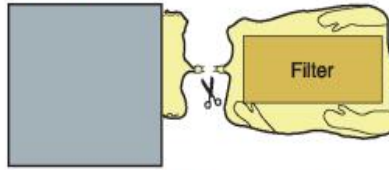
After removing the access door, extend the bag, and use the bag gloves to carefully move the contaminated filter into the bag.

**STEP 3**



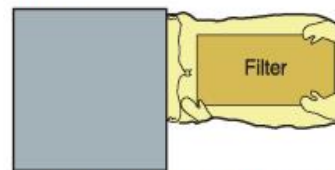
Remove the contaminated filter from the housing, supporting the filter on a table, or optional change-out tray.

**STEP 4**



Seal the bag with banding ties between the filter and the door opening. Cut the bag with shears to contain the used filter.

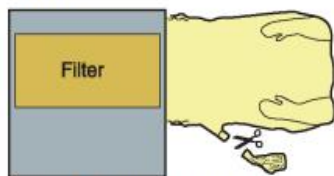
**STEP 5**



Place a new filter in a new bag and secure the new bag opening to the housing door opening. Move the old bag stub into the new bag cavity and install the filter.

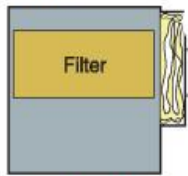
1 High by 2 Wide Housing

**STEP 6**

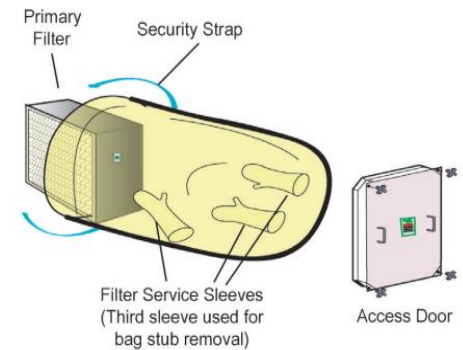
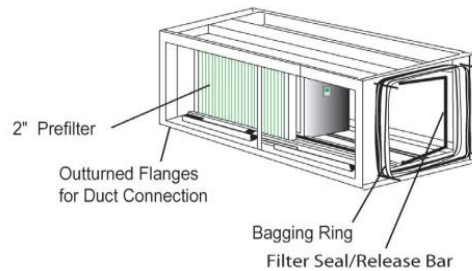


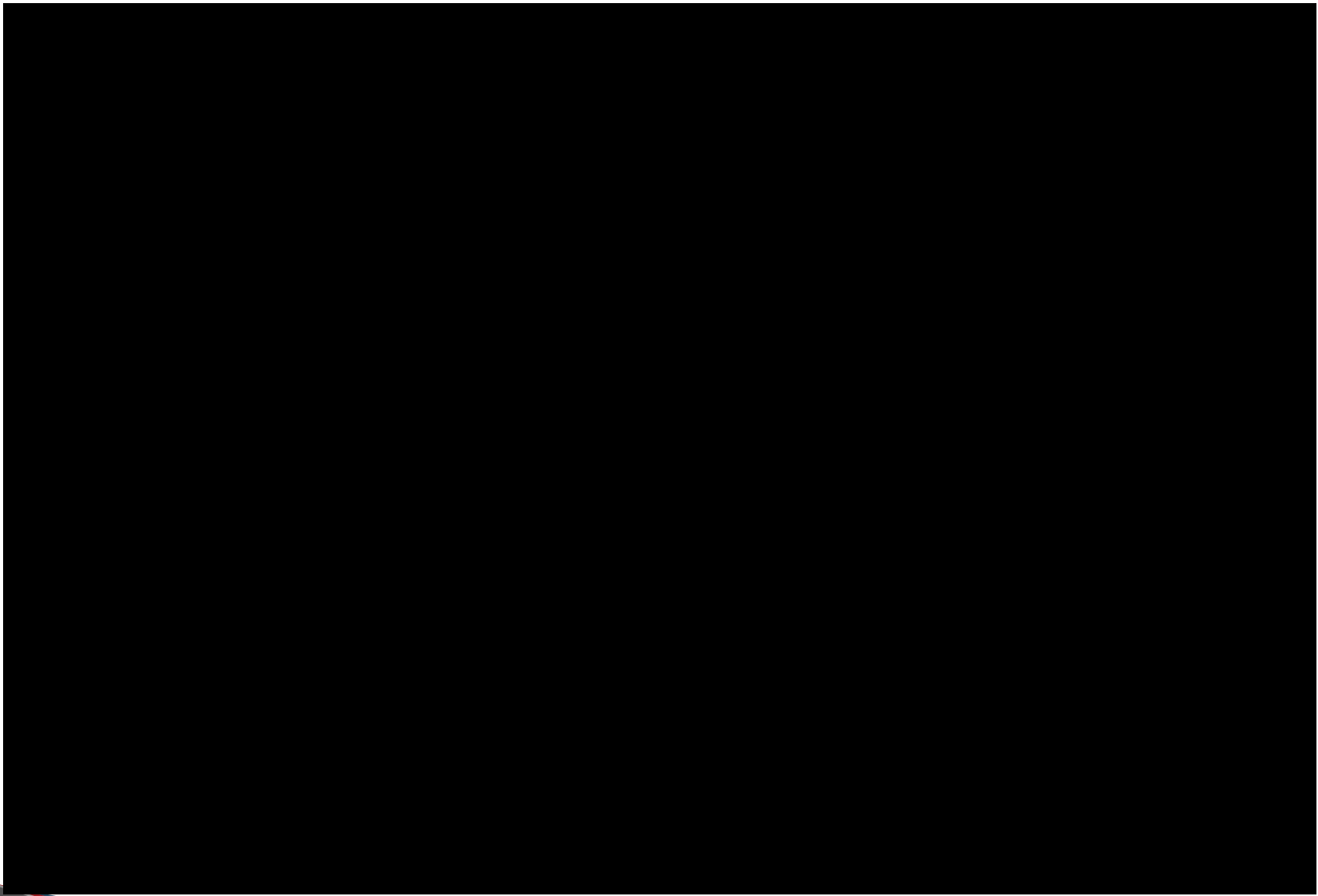
Move the old bag stub into the third service glove sleeve and seal the sleeve with banding ties between the bag body and the glove sleeve.

**STEP 7**



Carefully fold the bag and place in the door cavity. Replace door.





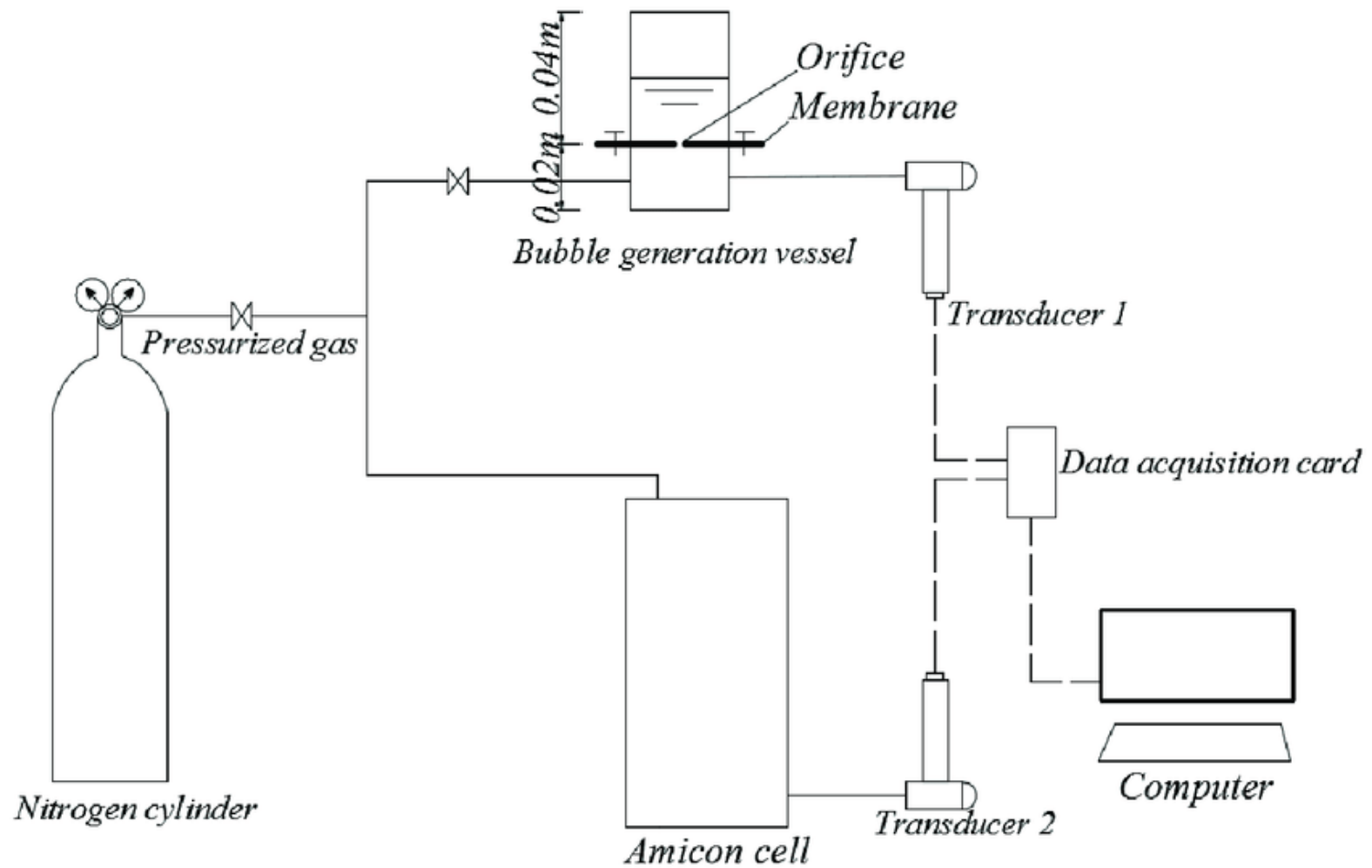
# How to Test a BIBO

- ▶ **Pressure Decay Test (per N510):**
  - ▶ This test verifies the airtight integrity of the BIBO system by measuring pressure loss over a set period. Camfil recommends using precision monitoring equipment to ensure compliance with containment standards.
- ▶ **Filter Integrity Testing:**
  - ▶ Ensures HEPA/ULPA filter efficiency using DOP (Dispersed Oil Particulate) or PAO (Poly Alpha Olefin) testing, which verifies that the filter meets the 99.99% capture efficiency standard. Camfil's filters undergo rigorous testing before installation.
- ▶ **Leak Testing:**
  - ▶ Conducted using aerosol particle testing or smoke testing to detect breaches in containment. Camfil's containment housings are designed to minimize potential leakage risks.
- ▶ **Visual & Physical Inspection:**
  - ▶ Regularly checking for wear, seal integrity, and damage to prevent system failures. Camfil recommends periodic inspections and proper maintenance protocols to maintain efficiency.



# How to Perform a Pressure Decay Test

- ▶ Step 1: Isolate the filter housing – Ensure the filter housing is fully sealed, with no airflow entering or exiting the system. It is recommended sealing all access points before testing.
- ▶ Step 2: Apply pressure – Using a calibrated test rig, introduce a controlled pressure (as specified by N510 standards) into the system.
- ▶ Step 3: Monitor for Pressure Decay: Observe the system for any decrease in pressure over a set period, indicating potential leaks.
- ▶ Step 4: Compare results to N510 standards – Evaluate the decay rate against regulatory limits. A properly functioning BIBO system should maintain pressure within acceptable limits. Any significant drop indicates a potential breach.



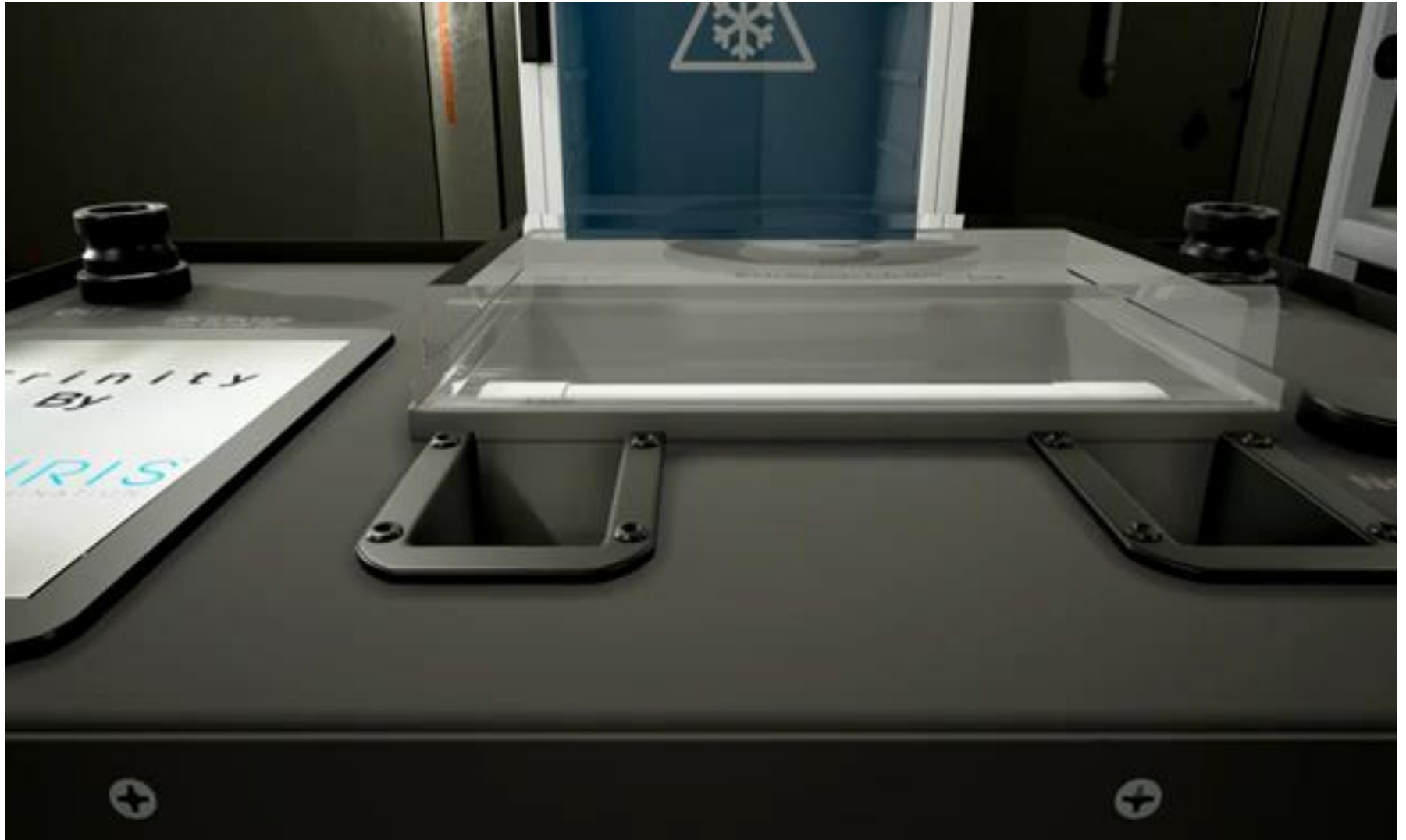
# How to Decontaminate a BIBO System

- ▶ **Chemical Decontamination:** Hydrogen peroxide vapor ( $H_2O_2$ ), chlorine dioxide, or peracetic acid mist can be used to neutralize viral contaminants inside the BIBO housing. It is a recommendation validated decontamination cycles to ensure complete pathogen elimination.
- ▶ **Physical Cleaning:** Wiping down external surfaces with disinfectants such as isopropyl alcohol or bleach-based solutions to remove residual contaminants. We would advise on using disposable wipes and strict hygiene protocols to avoid cross-contamination.
- ▶ **Proper Disposal of Used Filters:** Used filters are classified as biohazardous waste and must be double-bagged before disposal. We recommend following local and international regulations for hazardous waste handling.
- ▶ **Airflow Purging & Verification:** After decontamination, the system should be purged with clean air and tested to verify no residual contamination remains before resuming normal operation.
- ▶ **Visual Representation:** Diagram showing the decontamination steps, including chemical fogging, physical cleaning, and filter disposal.

# How to Decontaminate a BIBO System Using the CURIS Trinity Cart

- ▶ Introduction to the CURIS Trinity Cart: This all-in-one system combines the CURIS 3 + TRINITY™ device to provide a seamless, hands-free decontamination solution for closed-loop chambers.
- ▶ Preparation – Ensure the BIBO housing is sealed, and personnel are evacuated from the area. The TRINITY™ device is connected to the BIBO system via a quick-connect interface.
- ▶ Activation – The CURIS 3 disperses hydrogen peroxide vapor through the TRINITY™, ensuring thorough decontamination within a closed-loop system.
- ▶ Dwell Time – The vapor remains inside the system for a controlled period, effectively neutralizing viral and bacterial contaminants.
- ▶ Aeration & Clearance – The CURIS 3 transitions to aeration mode, breaking down hydrogen peroxide into oxygen and water vapor, leaving no harmful residues.
- ▶ Final Testing – The decontaminated BIBO system is tested using chemical indicators or biological indicators to confirm successful disinfection. Modular Design Advantage: The CURIS 3 can be quickly detached from the TRINITY™ and used as a portable room generator to disinfect surrounding environments.





# Thank you

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