

# Glove Box User Manual

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## Purpose

This manual is intended to standardize the safe and proper operating procedures for the biological glove box. It aims to ensure user safety, protect experimental samples, maintain equipment performance, preserve environmental cleanliness, and prolong the service life of the device.

## Scope of Application

This protocol applies to personnel operating the biological glove box in the Avant Laboratory.

## Safety Warnings

Mandatory Warnings for Glove Box Users

- Biological or volatile materials must only be handled when the glove box is operating normally and a negative pressure environment has been established with the air pump turned on.
- The air pump must be set to its maximum power to create sufficient negative pressure. Ensure that the exhaust outlet is connected to the laboratory's ventilation system.
- Turn on the UV sterilization strip before operation for disinfection. During disinfection, activate the filter and air pump, but it is not necessary to create a negative pressure environment.
- Open flames are strictly prohibited inside the glove box! High temperatures may disrupt airflow patterns and damage the HEPA filters.
- Operators must be familiar with glove box procedures and emergency protocols.
- Avoid water pump short circuits caused by exposed wires.
- Do not run the air pump or water pump continuously for extended periods to prevent overheating. The air pump must be turned on during all experiments.
- After daily experiments, activate the glove box's auto-clean function by pressing the blue button. At least 15L of water is recommended for cleaning—preferably distilled water, though tap water is acceptable. After cleaning, use the drainage pump to remove residual water. Remaining water can air dry naturally during off-hours with the UV lamp turned on. The air pump may be used at low power to accelerate drying.

- For optimal visibility during experiments, turn on the soft LED lighting strip inside the glove box.
- The glove box is made of acrylic and is not suitable for use with highly corrosive substances, which may cause leakage.
- Do not use UV light for disinfection when personnel are present.
- Do not transfer materials directly from the pass-through chamber to the working area. Items must remain in the chamber before being retrieved by internal gloves. The same applies when removing materials.

### General Warnings

- Read this manual thoroughly and undergo proper training before use.
- Do not use the glove box when it is malfunctioning or showing alarm signals.
- Do not block the air inlet or exhaust vents.
- Regular performance tests—such as airflow velocity and HEPA filter integrity—are mandatory.
- Regular inspections of the glove box's airtightness (e.g., tubing and connection points) are mandatory.
- Always wear appropriate personal protective equipment (PPE), including lab coats, gloves (double-gloved if needed), goggles or face shields when there is a risk of splashes. Gloves are mandatory inside the glove box.
- Observe electrical safety protocols.

## Pre-Operation Preparation

### Personal Preparation

- Wear clean lab attire; tie back long hair.
- Wash and disinfect hands thoroughly.
- Wear all necessary PPE (lab coat, gloves, etc.).

### Environmental Preparation

- Clear the workspace of unnecessary items to ensure sufficient operating space.

- Close lab doors and windows to reduce airflow disturbances caused by people moving around.

## Device Preparation

### Startup

- Inspect the glove box and turn on internal lighting 10–30 minutes before operation.
- Turn on the UV light for at least 10 minutes before and after use. After UV sterilization, turn off the lamp and wait 5 minutes for ozone to dissipate.
- After disinfection, activate the air pump to establish a negative pressure environment. Wait approximately 10 minutes before beginning operation.

### Inspection

- Check negative pressure: Ensure airflow from the exhaust vent and observe the gloves—if they are slightly inflated inward, negative pressure has been achieved. If not, inspect the pump or for possible leaks.
- Clean the workspace: Wipe down all internal surfaces with 75% ethanol using a lint-free cloth or paper towel. Clean from top to bottom, inside to outside. Allow the disinfectant to fully evaporate.

### Materials Preparation

- Disinfect all material surfaces with 75% ethanol before placing inside.
- Organize materials logically to avoid obstructing air inlets or outlets.
- Minimize items inside the box—only include materials essential to the current procedure.

## Operating Procedures

### User Position and Movement

- Sit or stand upright facing the front window of the glove box.
- Move arms and objects slowly and steadily. Avoid rapid arm movements, frequent in/out motions, or moving items horizontally near the pass-through chamber opening—these actions disrupt airflow. Pulling too hard may tear gloves and cause contamination or leaks.

- Minimize the frequency of moving arms in and out. Plan tasks in advance.
- Insert arms deeply enough into the workspace to avoid compromising the barrier.

### Material Handling

- Perform all operations in the center of the work surface, at least 10–15 cm from the front window edge.
- Do not stack items too high, as this blocks airflow.
- When opening petri dishes or reagent bottles, do so gently and tilt the opening downward. Avoid fully upright positions.
- Conduct pipetting steadily to prevent aerosol formation. Use filtered pipette tips for biological samples.
- Dispose of waste materials (e.g., pipette tips, gloves, contaminated materials) immediately in the designated biohazard container inside the glove box. Do not accumulate or temporarily store waste on the surface. Containers should not exceed  $\frac{3}{4}$  capacity.
- Prevent spills. If a spill occurs, follow laboratory bio/chemical spill protocols. If a large spill occurs inside the glove box, activate the air pump, water pump, and UV light for full disinfection.

### Special Requirements

- Always maintain the front window at a safe working height.
- Do not insert your head or upper body into the glove box.
- If temporarily leaving or adding materials, move slowly and minimize front window opening time.
- Strictly avoid using volatile or radioactive materials.

## Post-Operation Procedures

### Workspace Cleaning

- Remove all unnecessary items and waste containers. For biological safety cabinets: seal waste containers before removal.
- Thoroughly clean all internal and external surfaces with 75% ethanol and a lint-free cloth or paper towel. Follow the cleaning procedures outlined in the inspection section.

### Preparation for Next Use

- At the end of the day, activate the glove box's auto-cleaning function and start the water spray pump. Use at least 15L of water—distilled water is recommended, but tap water is acceptable.
- After cleaning, activate the drainage pump to remove remaining water.
- Allow residual water to air dry during non-operational hours with the UV lamp turned on. The air pump may be turned on at low power to accelerate drying; maximum power is unnecessary.