

# BIOSAFETY CABINETS

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**Biosafety**

# Objective

- Upon completing the lecture, participants will be to:
- Discuss the class I, class II, and class III Biosafety Cabinets.
- Discuss safer behaviors when working inside a biosafety cabinet.
- Demonstrate Last-In and First-Out rule.
- Demonstrate Butt Rule (with glove removal and disinfection).
- Demonstrate working clean to dirty using the Two Hand rule.

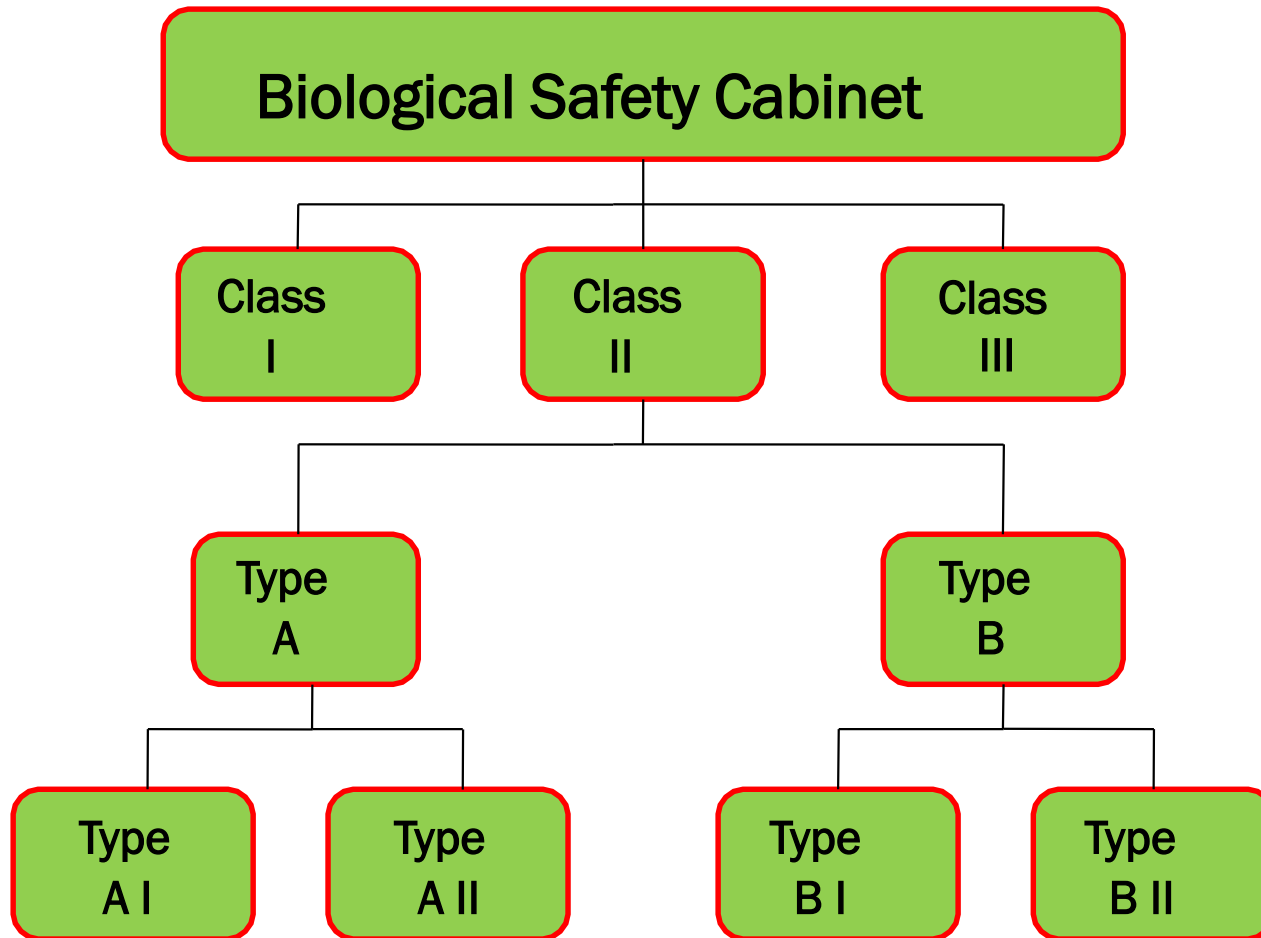
# BIOSAFETY CABINETS

- Biosafety Cabinet is an enclosed, clean, ventilated work space for safely working with pathogens like viruses, GMO, Toxins requiring a defined biosafety level.
- Biosafety Cabinet are designed to protect you, your laboratory staff and your surrounding environment from harmful exposure of these agents.

# BIOSAFETY CABINET



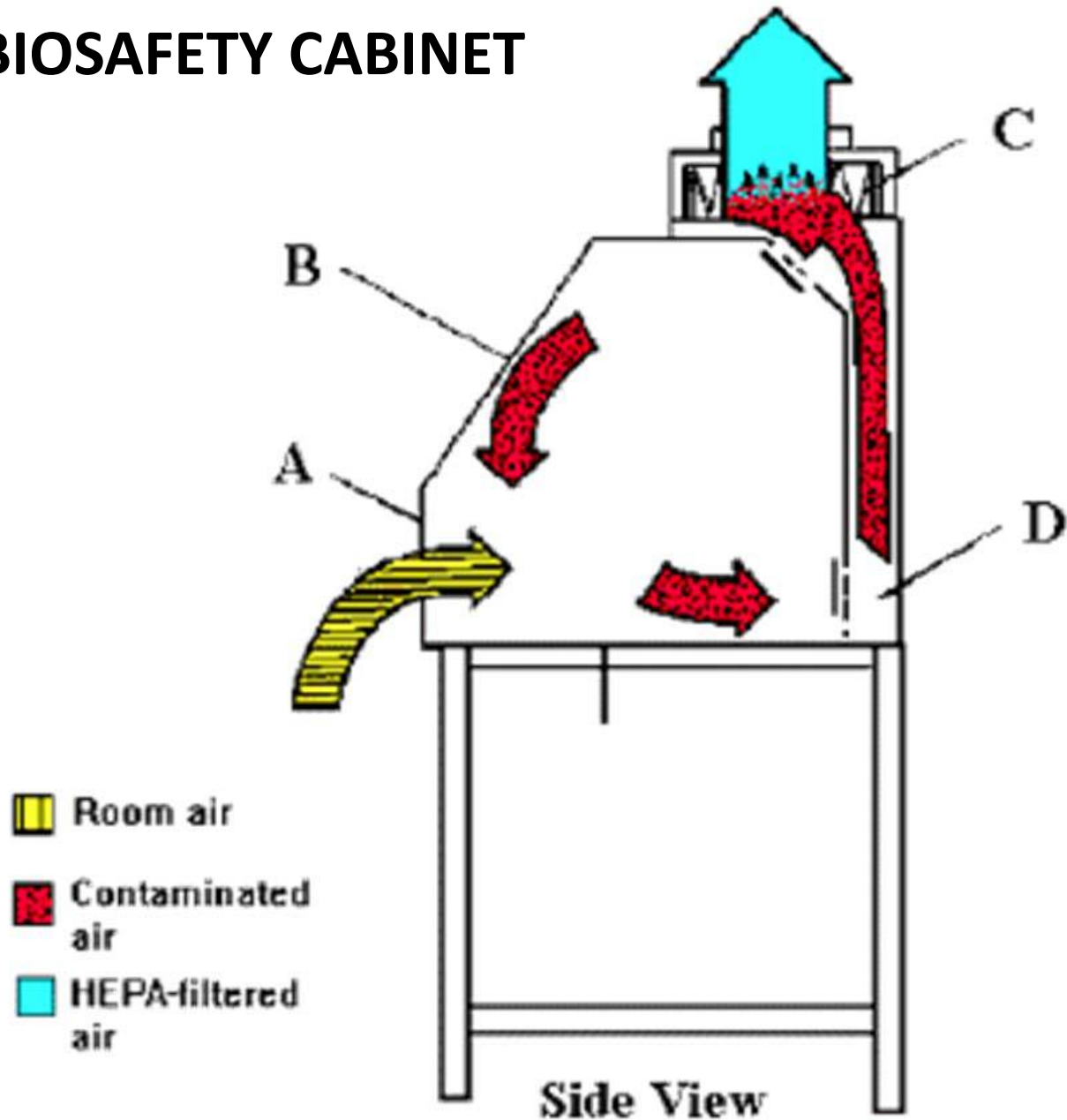
# Classification of Bio Safety Cabinet



# CLASS I BIOSAFETY CABINET

- Protects person and environment.
- DOES NOT protect product.
- Protects the person with 75 lfpm directional
- airflow into the cabinet.
- Protects the environment with HEPA filtered
- exhaust.
- 70% recirculation – 30% exhaust.






# CLASS I BIOSAFETY CABINET

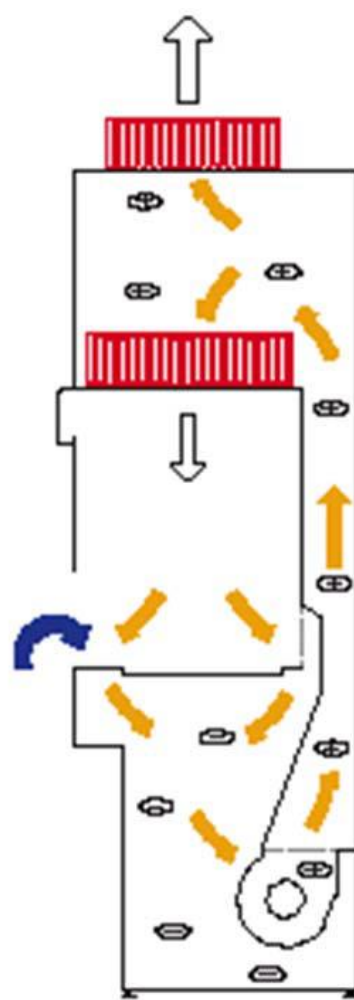


# CLASS II A1 BIOSAFETY CABINET

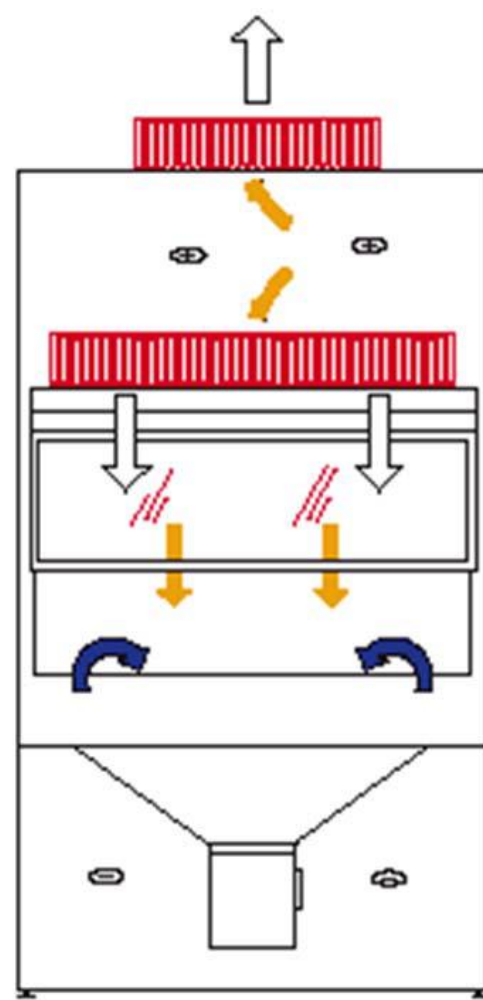
- Protects person, product and environment.
- + pressure plenum.
- Protects the person with 75 lfpm directional airflow into the cabinet.
- Protects the environment with HEPA filtered exhaust.
- Protects the product with HEPA filtered laminar airflow.
- 70% recirculation – 30% exhaust.



-  HEPA filter
-  Room Air
-  Potentially contaminated air
-  HEPA Filtered air
-  Positive pressure
-  Negative pressure



Section View



Front View

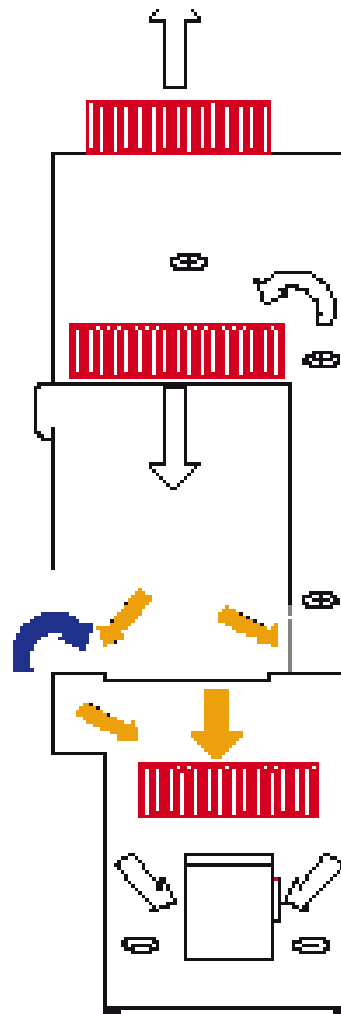
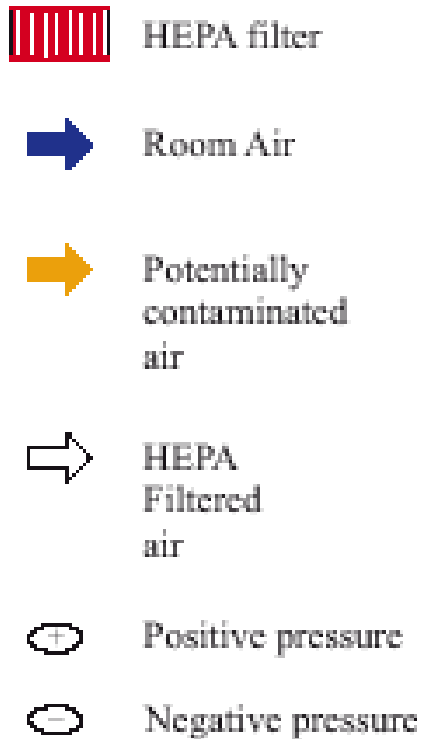
# CLASS II A2 BIOSAFETY CABINET

- Protects person, product and environment.
- - pressure plenum.
- Protects the person with
- 100 lfpm directional airflow into the cabinet.
- Protects the environment with HEPA filtered
- exhaust.
- Protects the product with HEPA filtered
- laminar airflow.
- 70% recirculation – 30% exhaust

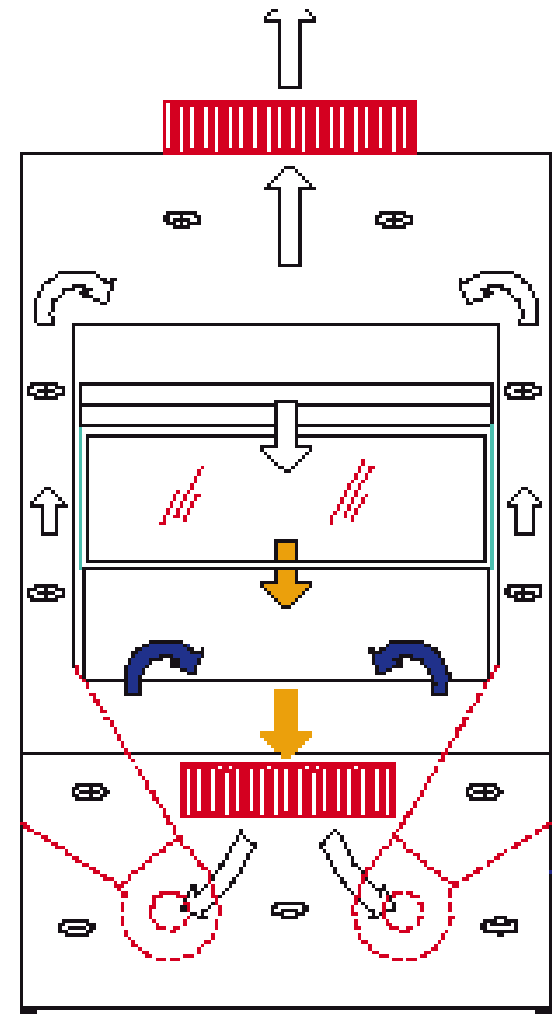
# CLASS II B1 BIOSAFETY CABINET

- Protects person, product and environment.
- **Must be hard-ducted (can work with minute amounts of chemicals)**
- Protects the person with
- 100 lfpm directional airflow into the cabinet.
- Protects the environment with HEPA filtered
- exhaust.
- Protects the product with HEPA filtered
- laminar airflow.
- 30% recirculation – 70% exhaust.

# CLASS II B1 BIOSAFETY CABINET



Section View

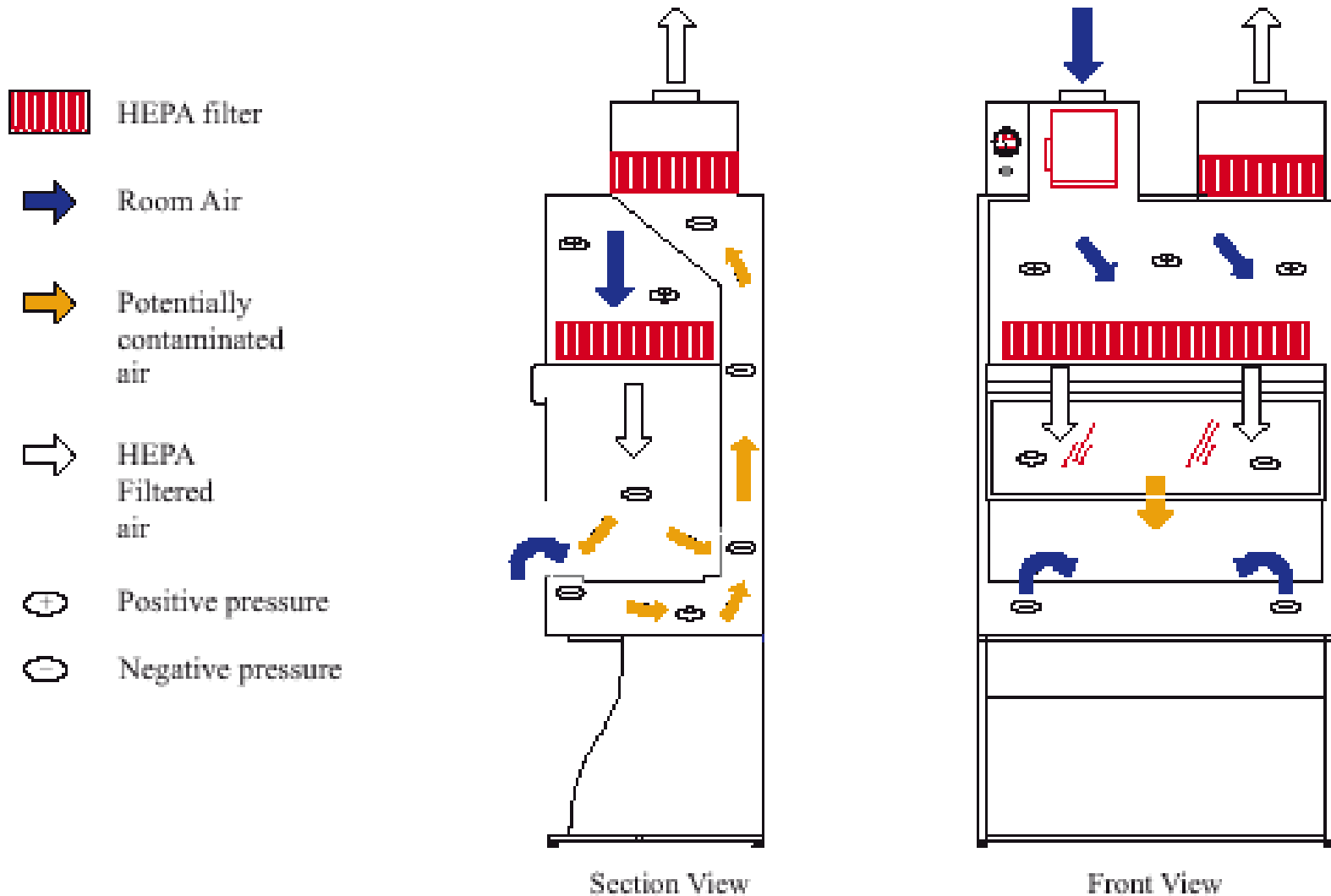


Front View

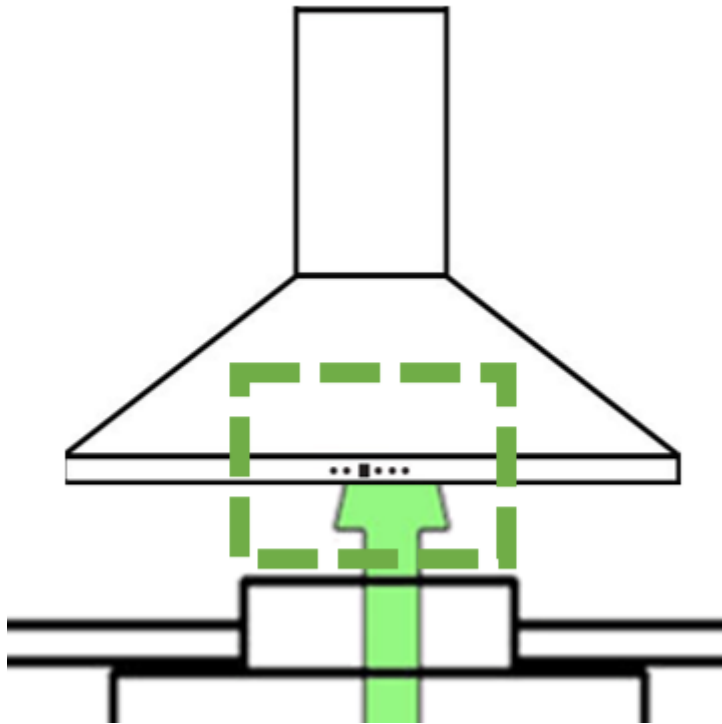
# CLASS II B2 BIOSAFETY CABINET

- Protects person, product and environment.
- **Must be hard-ducted (can work with small amounts of chemicals)**
- Protects the person with
- 100 lfpm directional airflow into the cabinet.
- Protects the environment with HEPA filtered exhaust.
- Protects the product with HEPA filtered
- laminar airflow.
- 0% recirculation – 100% exhaust.

# CLASS II B2 BIOSAFETY CABINET



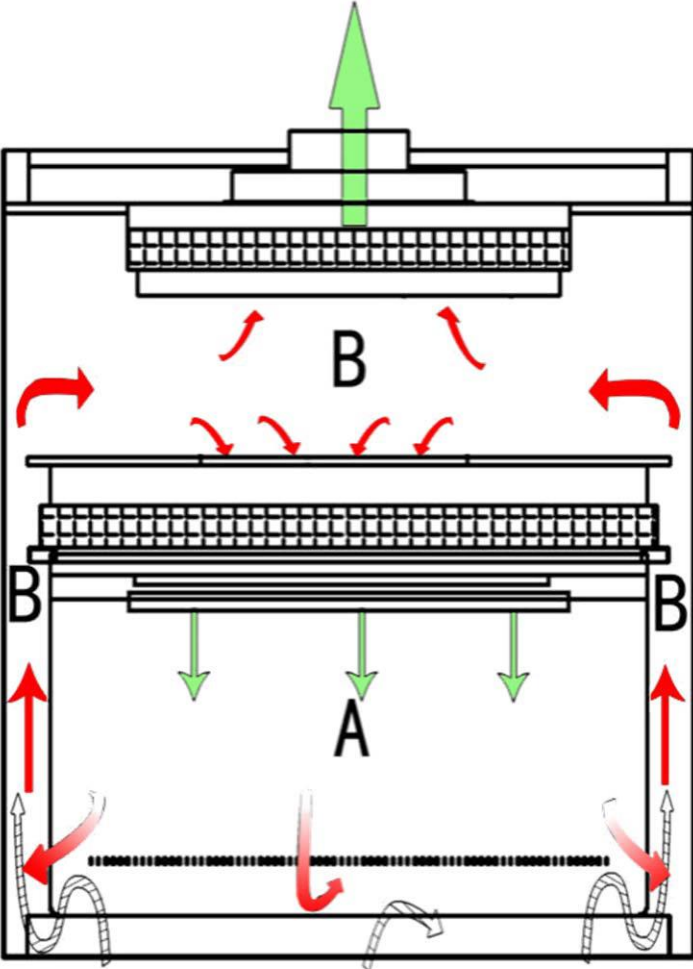
# THIMBLE CONNECTION



## BENEFITS OF A THIMBLE CONNECTION

1. Saves \$\$ (Energy) – A2 for the benefit of a B2.
2. Minimize scents –smelly work.
3. You can shut off biosafety cabinet – and room continues to exhaust.

# THIMBLE CONNECTION

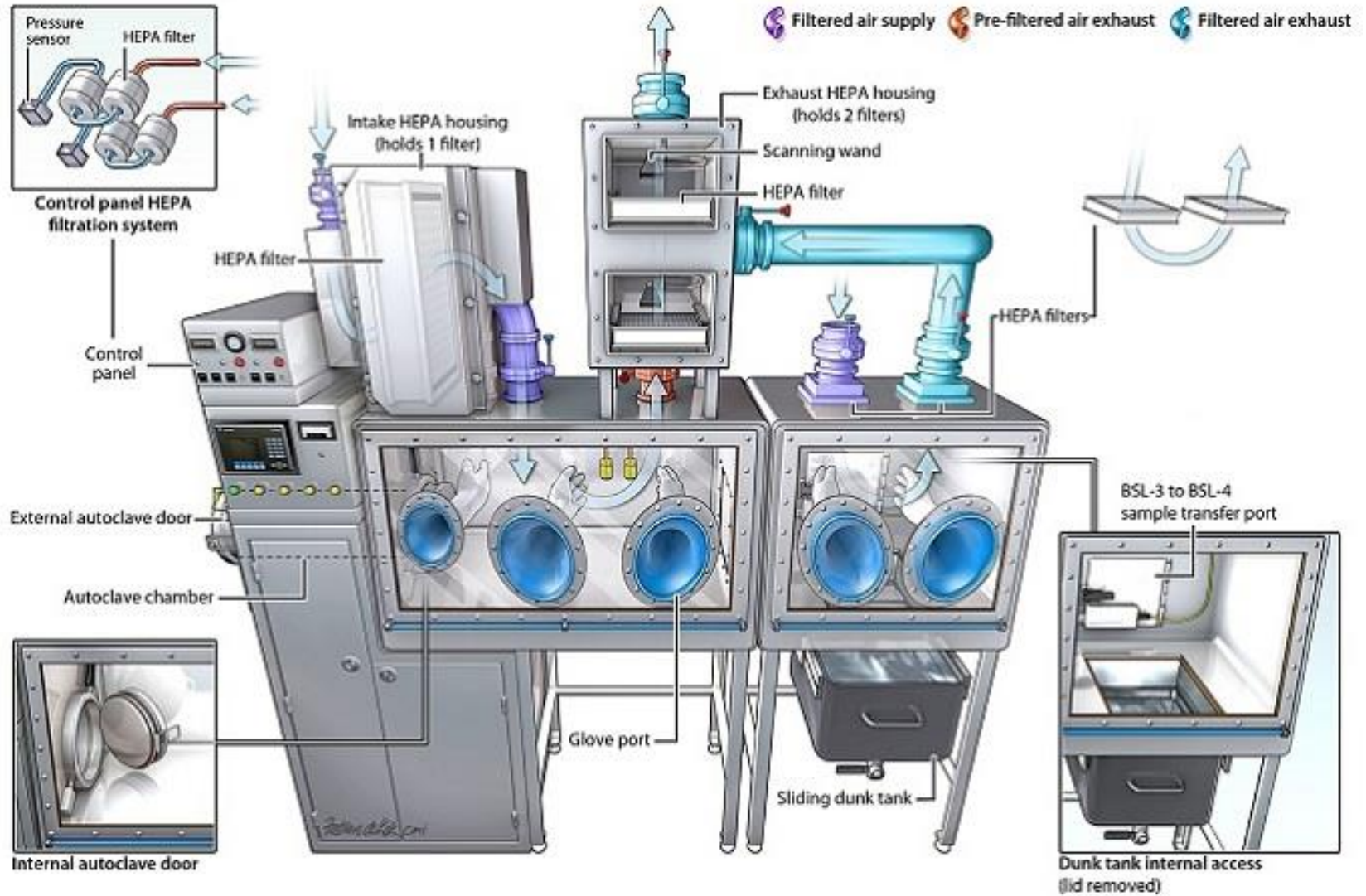




# CLASS III BIOSAFETY CABINET

- Protects person and environment.
- Must have single-HEPA filter supply – double-HEPA filtered exhaust.
- Must be sealed.
- Must have process for decontamination.
- May have double-door (interlocked) sample transfer port.

# CLASS III BIOSAFETY CABINET



# WORKING INSIDE THE BSC

- Purge biosafety cabinet (4 mint)
- Wipe down inside of BSC (clean to dirty)
- Using a checklist consistent with the procedure-set-up the BSC
- Once the BSC is completely set-up, bring the agent into the BSC
- **THE AGENT IS ALWAYS LAST THING TO BE PUT INTO THE BSC**

**Last in -  
preparing to work  
inside a BSC**

# EXAMPLE: BSC CHEK LIST

- **Gather items needed**

- Stabilized 1:10 bleach spray bottle.
- 70% ethanol spray bottle
- Waste tray
- Waste bucket
- Wyp All towels
- Syringe with tubing
- Bottle of PBS
- Pipette tips
- Pipette

- **Complete the following processes**

- Turn on BSC, open sash to appropriate height.
- Purge BSC for 4 mints.
- Adjust chair to appropriate height.
- Wipe down BSC and all items in BSC with disinfectant.
- Setup BSC with waste trays, waste bucket, syring, bottle of PBS, pipette tips, pipettes etc.
- Setup disinfectant towel
- Bring agent in BSC

# WORKING INSIDE THE BSC

- Secure the agent inside the cabinet
- Place the agent in secondary container and wipe container with appropriate disinfectant
- Place secondary container on cart.
- Disinfect outer gloves. Remove outer glove. Exit BSC and don new glove.
- Store agent
- Clean and decontaminate BSC

**First Out –  
Finishing work inside  
a BSC**

**THE AGENT IS ALWAYS THE FIRST THING  
REMOVED WHEN FINISHED WITH WORK**

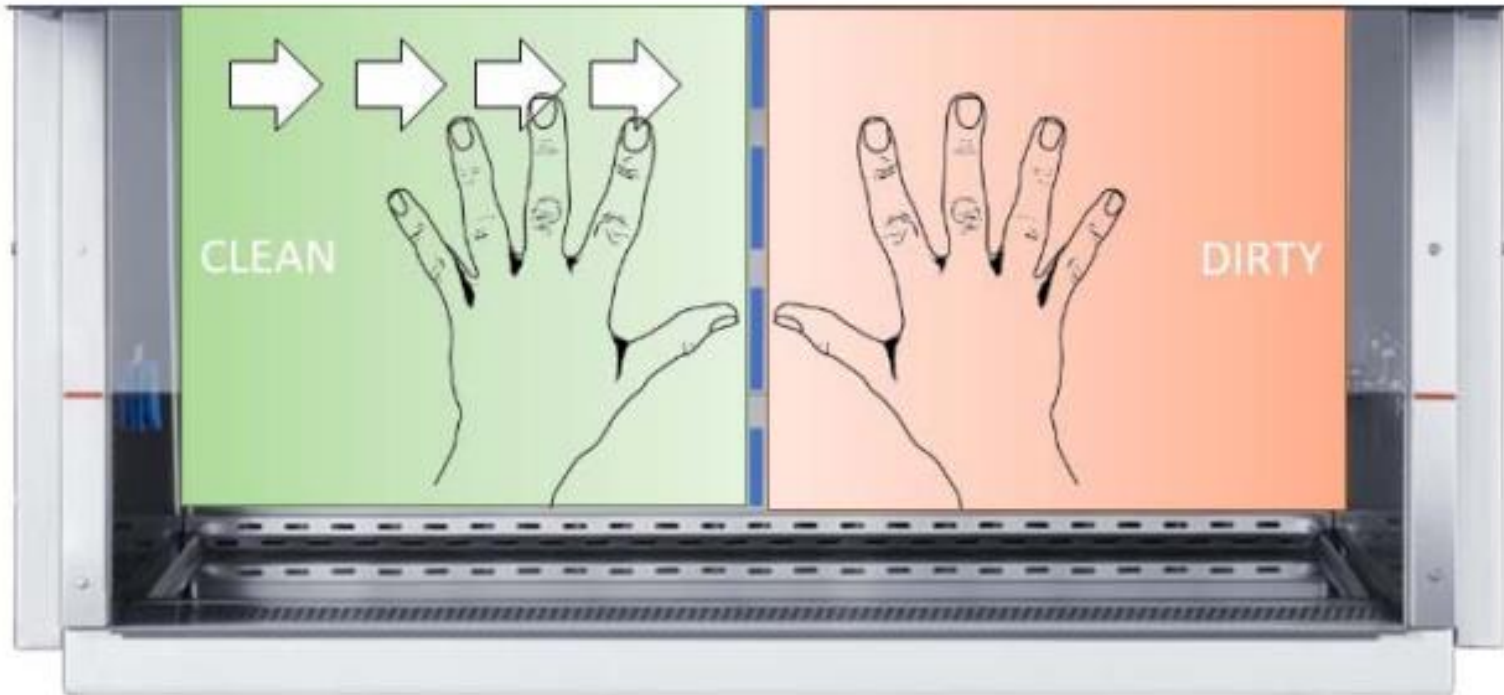
# WORKING INSIDE THE BSC

- ✘ It is recommended that BSC carts are used to minimize moving around the laboratory with contaminated gloves.
- ✘ Gloves MUST always be disinfected prior to being removed from the BSC.
- ✘ If the laboratory staff is going to remove their "BUTT" from the chair, gloves should be disinfected, removed, and replaced before touching anything in the laboratory.
- ✘ If a single pair of gloves is being worn, laboratory staff disinfect gloves in BSC, remove their hands from the BSC, doff gloves outside the BSC, and immediately don new gloves.

## Butt Rule—

Don't track what's inside the bsc outside the bsc!

# WORKING CLEAN TO DIRTY USING THE TWO HAND RULE



Do your best to work from clean to dirty – using two hands – one staying on the clean side and the other staying on the dirty side.

Thank  
you



