

# Biosafety & Security

*College of Dentistry  
University of Babylon*

*"3"stage*

**lab 6**

## **Working Principle and use of Biosafety Cabinet**

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# BIOSAFETY CABINET

- A biosafety cabinet is also called a biological safety cabinet or microbiological safety cabinet. It is an enclosed, ventilated laboratory workspace for safely working with materials contaminated with pathogens requiring a defined biosafety level.
- There are different classes of biological safety cabinets.
- Biological safety cabinet or biosafety cabinet (BSC) classes are categories describing how the cabinet works and what it protects. These “categories” are Class I, Class II and Class III.

## Biosafety Cabinets



**Class I**



**Class II**



**Class III**

# Class I Biosafety cabinet

A class I biosafety cabinet is defined as a ventilated cabinet for personal and environmental protection **only**.

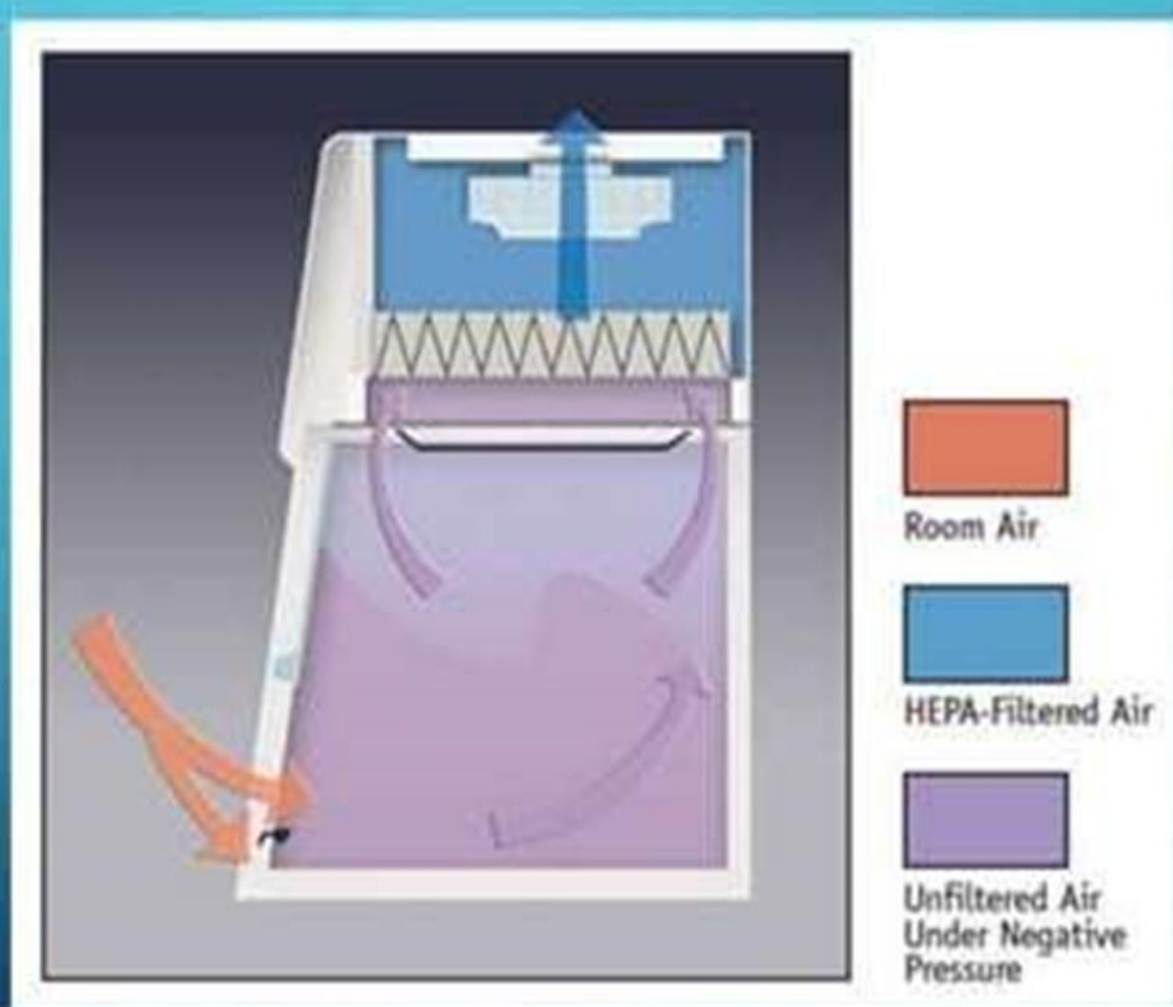
class I cabinets do not offer product protection from contamination , significantly limiting their applications.

Air flow directed away from researcher, but is not HEPA filtered, therefore there are not protect protection .

Similar to A fume hood with a HEPA filter on the exhaust system to protect against release of biohazards

Can use with radioisotopes and some toxic chemicals

# BIOSAFETY CABINET CLASS I



# Class II Biosafety cabinet

A class II biosafety Cabinet is defined as a ventilated cabinet for personnel , product and environmental protection for microbiological work or sterile pharmacy compounding .

Class II BSCs are designed with

an open front with inward airflow (personal protection ),

downward HEPA- filtered laminar airflow (product protection)

and HEPA-filtered exhaust air (environment protection).



It is amore widely used cabinet medicine preparation , research developmental

# Class II Biosafety cabinet

These cabinets are further differentiated by types based on construction ,airflow and exhaust systems.

the types include A1,A2,B1,B2and C1

They require all biological contaminated ducts and plenums to be under negative pressure .

Like class I cabinets , class II cabinets are safe for work using agents requiring biosafety level 1,2,or 3 containment

# Class II Type A1

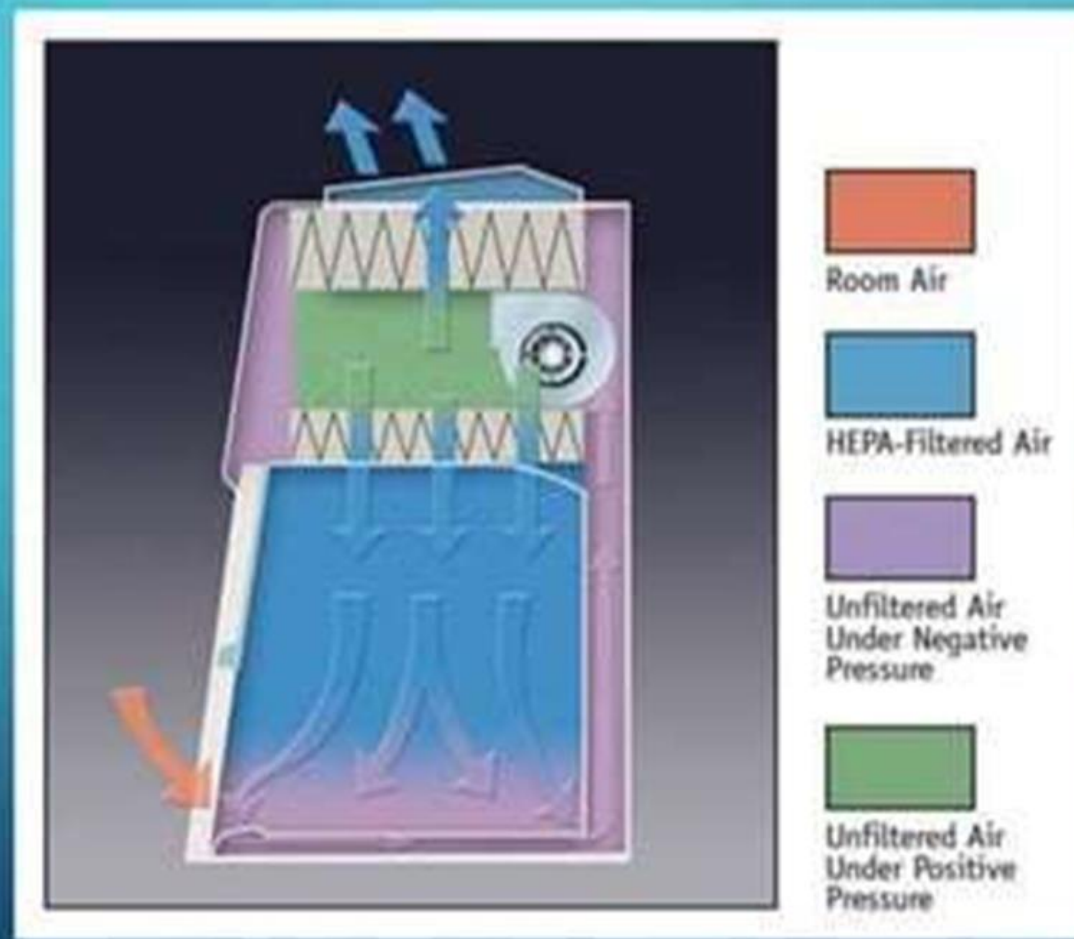
Type A1 cabinet must maintain a minimum average inflow velocity of 75 fpm through the sash opening

They may exhaust HEPA -filtered air back into the lab, or may be exhaust outside using a canopy connection

They are suitable for using biological agents without volatile toxic chemicals and volatile radionuclides , but not for sterile hazardous pharmacy compounding



## CLASS II, TYPE A1



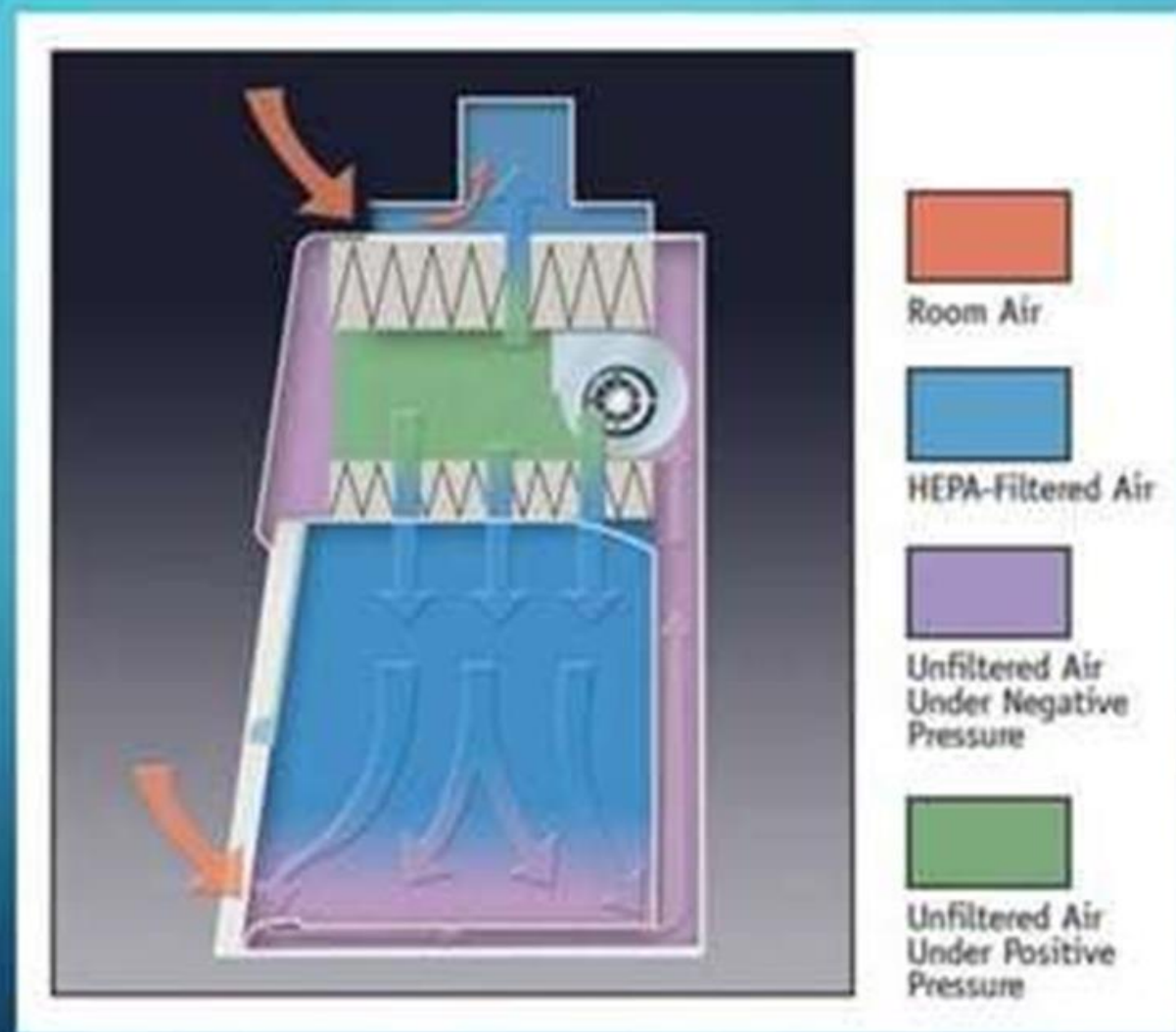
# Class II Type A2

Type A2 cabinet must maintain a minimum average inflow velocity of 100 fpm through the sash opening

Like type A1 They may exhaust HEPA -filtered air back into the lab, or may be exhaust outside using a canopy connection

Type A2 cabinets with a canopy connection are safe for work involving biological agents treated with minute quantities of hazardous chemical

## CLASS II, TYPE A2



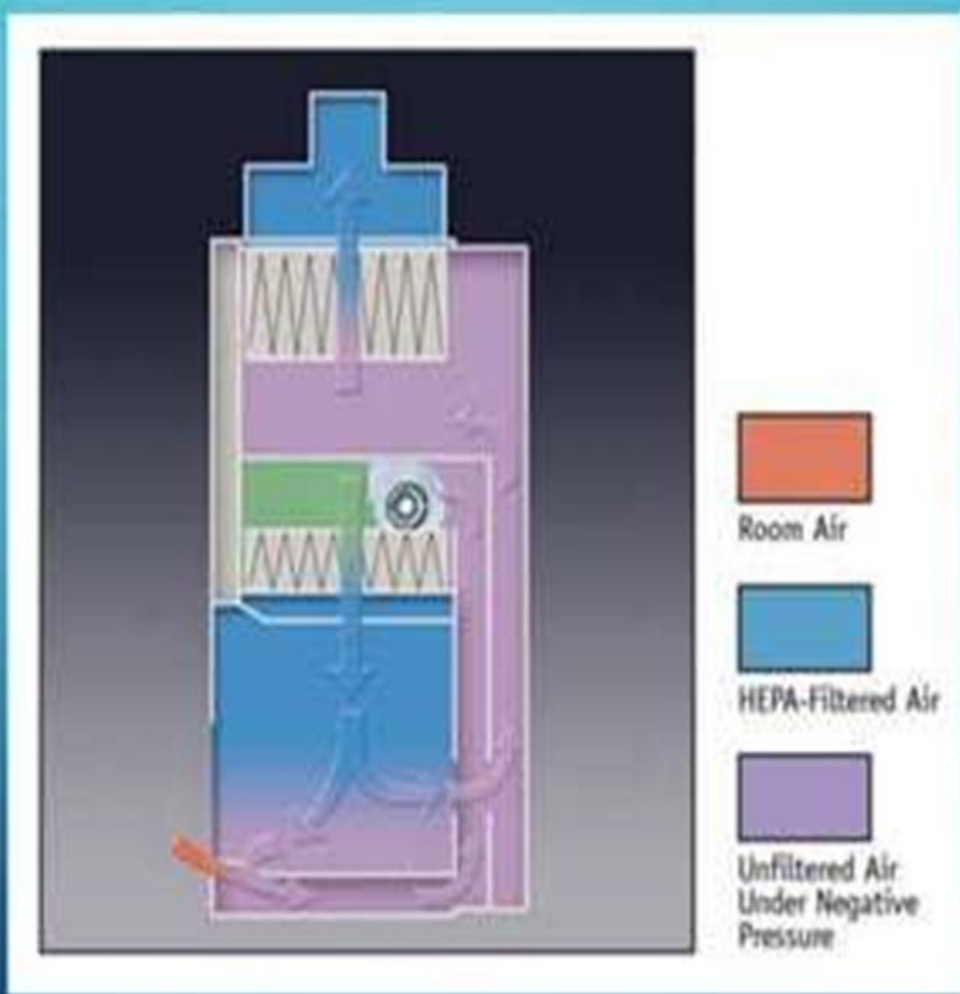
# Class II Type B1

**Class II Type B1 Cabinet** must maintain a minimum average inflow velocity of 100 fpm through the sash opening

They have HEPA – filtered downflow air composed mostly of uncontaminated recirculated inflow air.

Similar to Type A2 cabinets are safe for work involving biological agents treated with minute quantities of hazardous chemical and tracer quantities of radionuclides won't interfere with the work if recirculated in the downflow air

## CLASS II, TYPE B1



# Class II Type B2

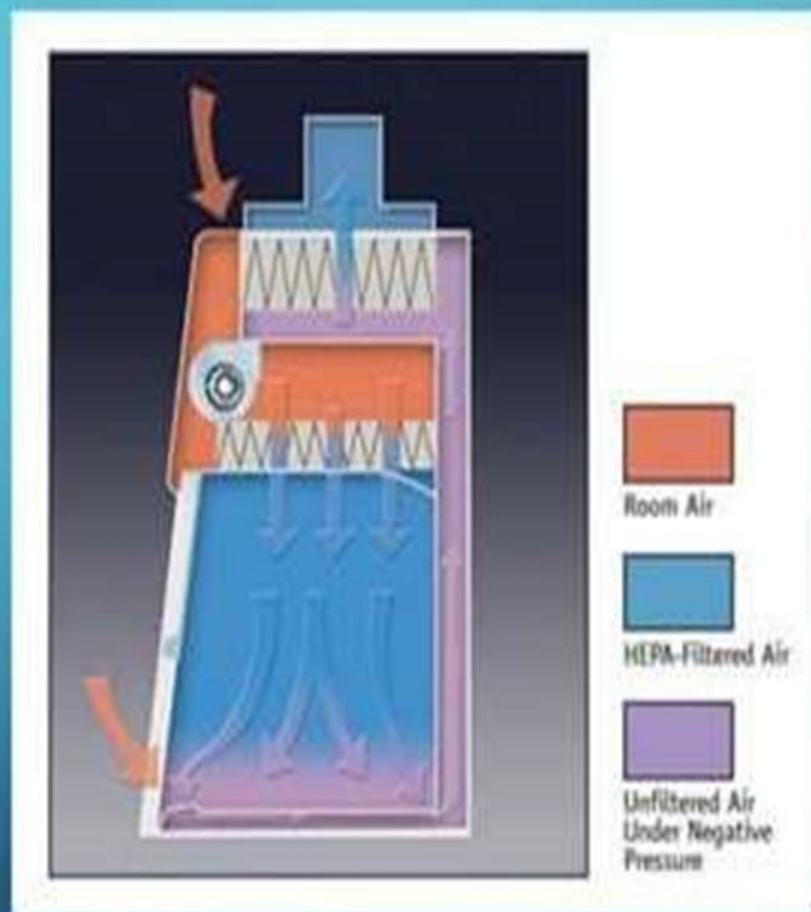
**Class II Type B2 Cabinet** must maintain a minimum average inflow velocity of 100 fpm through the sash opening

They have HEPA – filtered downflow air drawn from the Lab or the outside the air and exhaust all inflow and downflow air to the atmosphere after filtration through a HEPA filter without recirculation in the cabinet or return to the Lab

Because of this they are referred to as 100% Exhaust or Total Exhaust cabinets.

Type B2 cabinets are suitable for work involving biological agents treated with hazard chemicals and radionuclides require in microbiology application

## CLASS II, TYPE B2



# Class II Type C1

**A Class II Type C1 Cabinet** must maintain a minimum average inflow velocity of **105** fpm through the sash opening

Type C1 cabinets **are unique** in that they can operate as either a type A cabinet when in recirculating mode or a type B cabinet when Exhausting

C1 cabinets can be quickly changed from one mode to the other by connecting or disconnecting the exhaust.

The type C1 also features a marked work area with direct exhaust for use with hazardous vapor or radionuclides



# Class III Biosafety cabinet

**A class III cabinet is defined** as a totally enclosed, ventilated cabinet with leak-tight construction and attached rubber gloves for performing operations in the cabinet.

Class III biosafety cabinets are called glove boxes.

The cabinet has transfer chamber that allows for sterilizing materials before they leave the glove box

The cabinet is maintained under negative pressure and supply air is drawn is through HEPA filter



Thank  
you