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Do you know the difference between a chemical fume hood and a biological safety cabinet?

Can you distinguish between a biological safety cabinet and a clean air bench?

How about a laminar flow hood? How does it differ from a biological safety cabinet and a clean air bench?

These terms are often used interchangeably, causing confusion. This confusion can lead to:

- Exposure to workers
- Contamination of the product
- Hazardous release to the environment

Armed with this resource, you will be able to not only distinguish between the different types of laboratory equipment on campus, but also choose the right piece of equipment for the task at hand.

Click on each thumbnail to learn more.

Chemical Fume Hood

Biological Safety Cabinet

Laminar Flow Hood

Clean Air Bench

Chemical Fume Hood



Chemical fume hoods are ventilated enclosures that limit exposure to hazardous chemical fumes, vapours, dusts and gases and removes them as air flows into the hood and out via the laboratory exhaust system.

Items handled by chemical fume hoods, including but not limited to:

- ✓ odorous materials
- ✓ toxic gases
- ✓ chemicals that can spatter
- ✓ aerosols
- ✓ other toxic and volatile materials



Protects the worker



Air flow is drawn away from the worker and exhausted out of the building

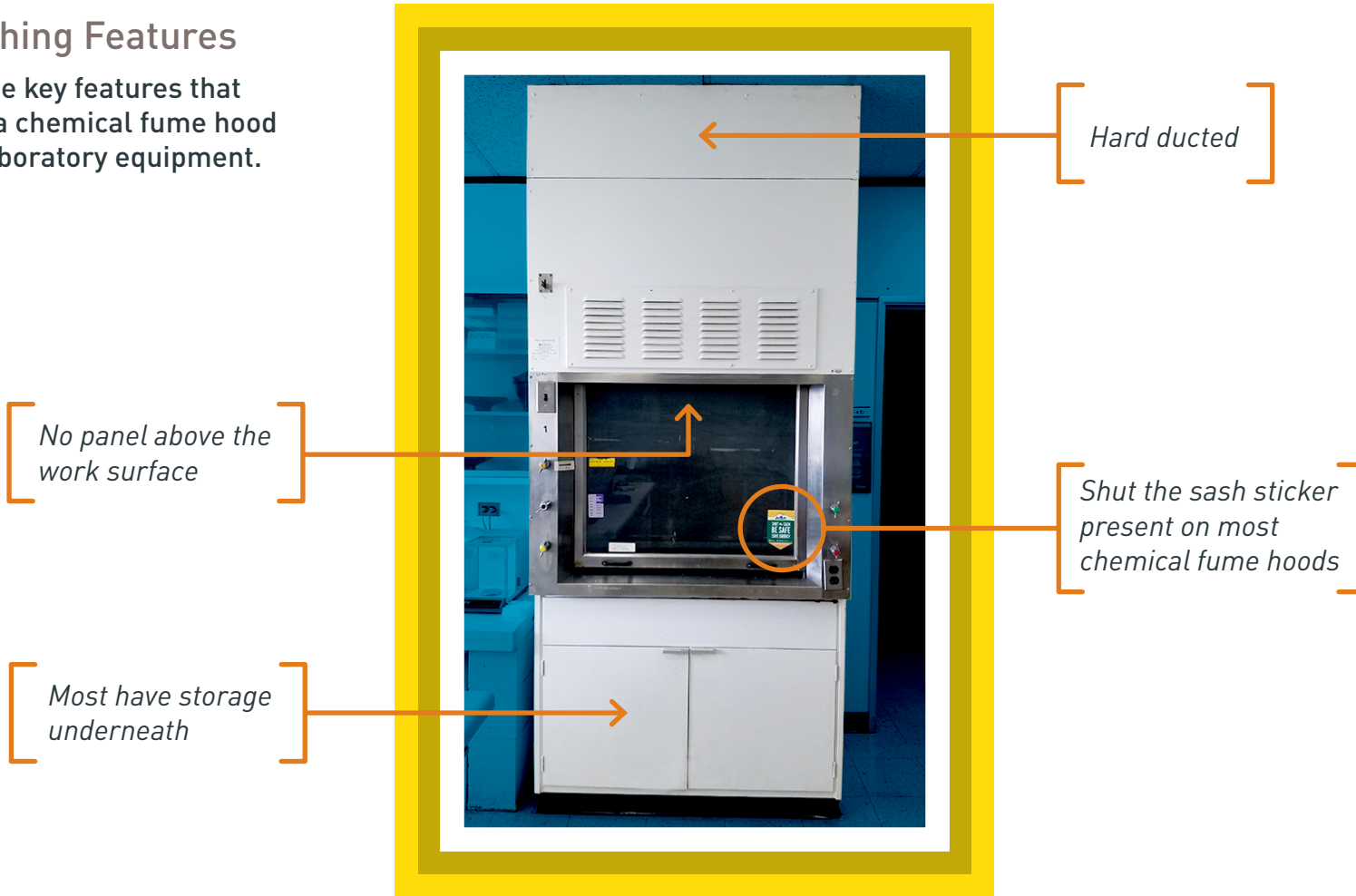


Used for chemical fumes, vapours, dusts and gases

Chemical Fume Hood

Distinguishing Features

Here are some key features that differentiate a chemical fume hood from other laboratory equipment.



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Biological Safety Cabinet



Class II Type A

Biological safety cabinets are containment devices that provide effective primary containment when working with biohazardous materials. All exhaust air is HEPA filtered as it exits the biological safety cabinet.

Items handled by biological safety cabinets, including but not limited to:

- ✓ Any microbe (bacteria, fungi, virus or prion agent) or eukaryotic cell line rated as risk group 2
- ✓ Viral based vector systems
- ✓ Fluids or tissue specimens from human or wild animals, including urine and fecal samples
- ✓ Allergens associated with laboratory or wild animals, or their carcasses
- ✓ Invasive plant species not native to Alberta or genetically altered plant strains




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Biological Safety Cabinet

Classes

Biological safety cabinets are divided into three classes. The classes and the types of biological safety cabinets within them are distinguished by the types of protection provided.

Here are the classes and types of biological safety cabinets available at the University of Alberta.

	Class I	Class II Type A Represents 99% of cabinets on campus	Class II Type B2
	Protects the worker & the environment	Three levels of protection - Worker, product & environment	Three levels of protection - Worker, product & environment
	Use of one HEPA filter - exhaust filter	Use of two HEPA filters - supply filter and exhaust filter	Use of two HEPA filters and exhausted out of the building
	Used for biohazards	Used for biohazards	Used for biohazards combined with volatile chemicals and/or radionuclides

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Biological Safety Cabinet

Distinguishing Features

Here are some key features that differentiate Class II Type A and Class II Type B2 biological safety cabinets from other laboratory equipment.



Class II Type A

Class II Type B2

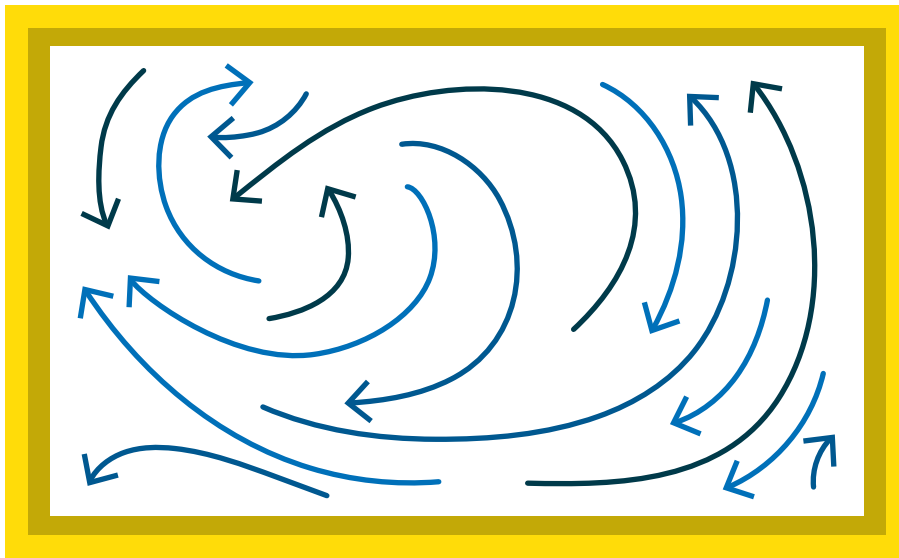
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Laminar Flow Hood

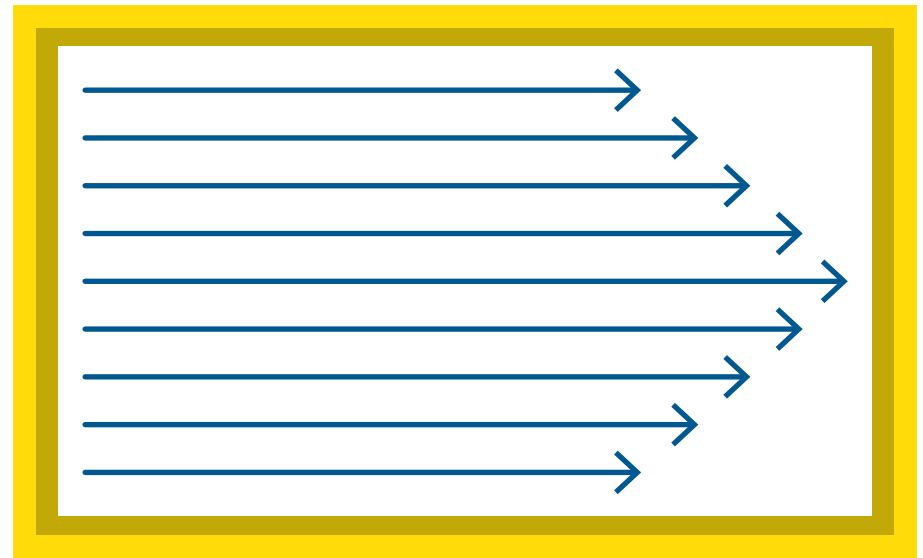
Laminar Flow Hood

The term “laminar flow hood” is often used interchangeably with biological safety cabinets and clean air benches, causing confusion.

Both biological safety cabinets and clean air benches are technically laminar flow hoods, but to reduce confusion, avoid using the term laminar flow hood at the University of Alberta. Use the terms biological safety cabinet or clean air bench instead.



Turbulence



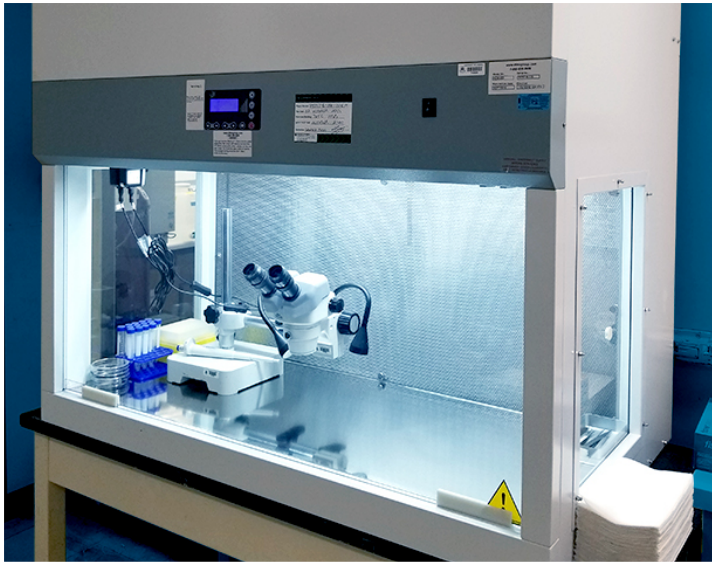
Laminar Air Flow

Both clean air benches and biological safety cabinets use laminar air flow. Laminar air flow is a system where there is no turbulence in the air. The air instead is moving smoothly in the same direction along parallel lines. **Note:** The air flow does not describe the level of protection.

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Clean Air Bench

Clean Air Bench



Clean air benches blow clean HEPA filtered air across the work surface to protect the product from contamination. Any air generated by the work activities is then blown directly at the worker.

Hazardous chemicals, potential biohazards, radionuclides and any material that is a potential allergen cannot be used in this type of equipment.

Items handled by clean air benches, including but not limited to:

- ✓ Dust-free assembly of sterile equipment or electronic devices
- ✓ Non-pathogenic cell cultures
- ✓ PCR



Protects the product only



HEPA filtered air



Used for non-hazardous materials

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Clean Air Bench

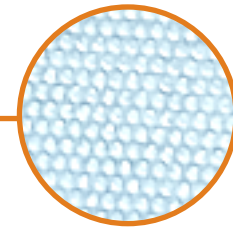
Clean Air Bench

Distinguishing Features

Here are some key features that differentiate a clean air bench from other laboratory equipment.



Not hard ducted at the top



Diffuser panel facing the worker. The holes in the panel give laminar flow

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Comparison Chart

This chart provides an at-a-glance overview of which piece of laboratory equipment you should use.

	Chemical Fume Hood	Biological Safety Cabinets			Clean Air Benches
		Class I	Class II Type A	Class II Type B2	
Protects the product			✓	✓	✓
Protects the worker	✓	✓	✓	✓	
Protects the environment		✓	✓	✓	
Can be used with biohazardous material		✓	✓	✓	
Can be used with volatile chemicals	✓			✓	
Can be used with radionuclides	✓			✓	
Uses laminar air flow			✓	✓	✓
HEPA Filtration		✓	✓	✓	✓
Exhausts air out of the building	✓			✓	