Lec.13

Microbial Safety Cabinet

- Types of safety cabinet.
- Principal and uses.
- Maintenance of safety cabinet.

Biosafety cabinet or Microbiological safety cabinet, also called a **biological safety cabinet** is an enclosed, ventilated laboratory workspace, for safely working with contaminated materials or potentially contaminated pathogens, which require a defined biosafety level. Several different types of BSC exist, differentiated by the degree of biocontainment required.

Purposes

The primary purpose of a Biosafety cabinaet is to serve as a means **to protect the laboratory worker and the surrounding environment from pathogens.** All exhaust air is **HEPA-filtered** as it exits the biosafety cabinet, removing harmful bacteria and viruses.

HEPA ("high-energy particulate arresting")

Neither are most BSCs safe for use as **fume hoods**. Likewise, a fume hood fails to provide the environmental protection that HEPA filtration in a BSC would provide.

Classes

The U.S. Centers for Disease Control and Prevention (CDC) classifies BSCs into three classes. These classes and the types of BSCs within them are distinguished in two ways: 1) the level of personnel and environmental protection provided and 2) the level of product protection provided.

Class I

Class I cabinets provide personnel and environmental protection but no product protection. In fact, the inward flow of air can contribute to contamination of samples.

These BSCs are commonly used to enclose specific equipment (*e.g.* centrifuges) or procedures (*e.g.* aerating cultures) that potentially generate aerosols. BSCs of this class are either ducted (connected to the building exhaust system) or unducted (recirculating filtered exhaust back into the laboratory).

CLASS II

Class II cabinets provide both kinds of protection (of the samples and of the environment) since makeup air is also HEPA-filtered.

There are five types:

Type A1 (formerly A), Type A2 (formerly A/B3), Type B1, Type B2 and Type C1. About 90% of all biosafety cabinets installed are Type A2 cabinets.

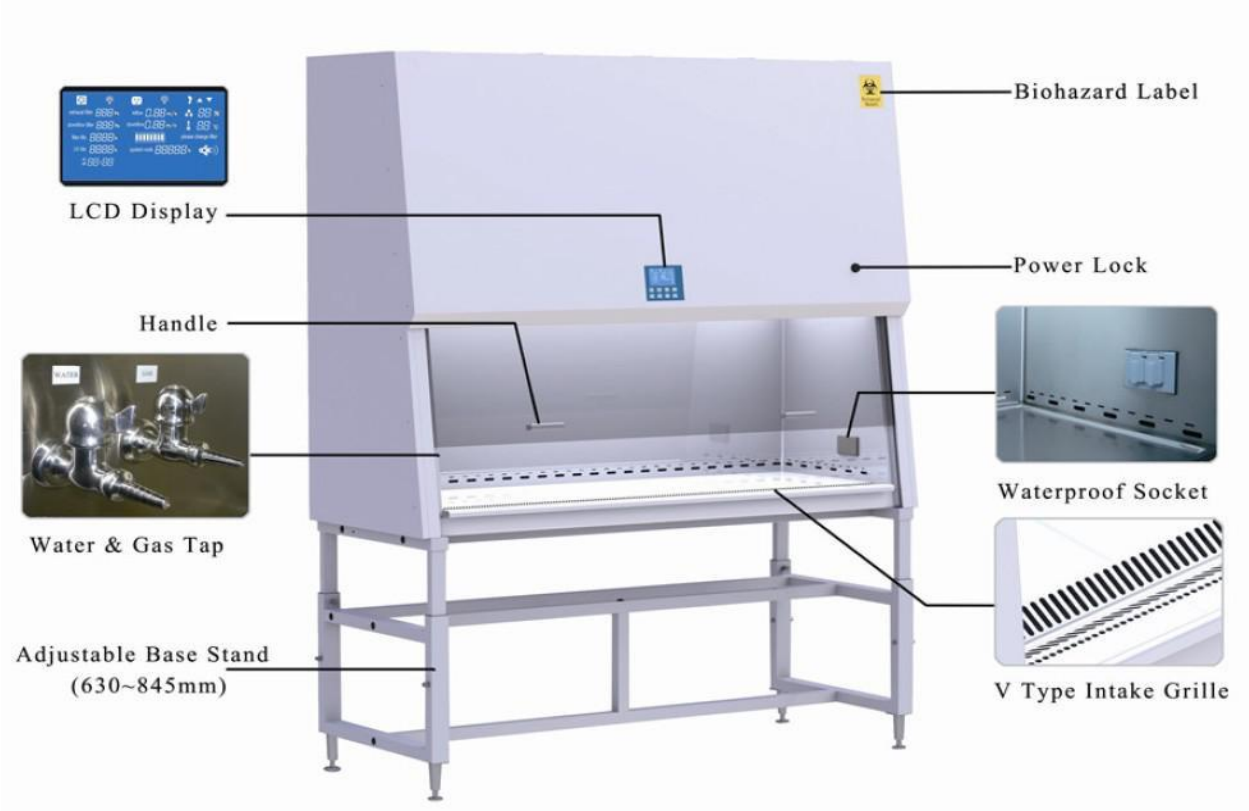
CLASS III

The Class III cabinet, generally only installed in maximum containment laboratories, is specifically designed for work with Bio Safety Level-4 BSL-4 pathogenic agents, providing maximum protection. The enclosure is gas-tight, and all materials enter and leave through a dunk tank or double-door autoclave. Gloves attached to the front prevent direct contact with hazardous materials (Class III cabinets are sometimes called glove box). These custom-built cabinets often attach into a line, and the lab equipment installed inside is usually custom-built as well.

Maintenance and service

Cabinets need to be maintained on a regular schedule. During this certification check, the airflow and the filter capacities are verified. The filters have a limited lifespan - determined by the air quality within the laboratory space and the amount of particles and aerosols generated inside the BSC' work zone. As these filters load, the internal fan is required to do more work to push/pull the same volume of air through them. Newer cabinets measure the air flow constantly

and self-compensate fan performance to ensure constant volumes of air moving through the filters and the cabinet.




Class III Biological safety Cabinet
Pressure meter
Work Area
Gloves
Remote Control
Power Switch
Pass Box
Draining Valve