



Guidance Document

Glove Boxes

Glove boxes allow the user to perform operations in an atmosphere different from the ambient. Gloves are built into the sides or front of a chamber. Placing hands inside the gloves allows the user to manipulate objects without breaking the seal or allowing injury to the user.

There are two types of glove boxes. One type is designed to allow a person to work with hazardous substances, such as radioactive materials, highly toxic substances or infectious disease agents. This type of glove box is generally maintained at a lower pressure than the surrounding atmosphere. Microscopic leaks would allow air to flow inward rather than allowing the hazard to flow out.

The other type of glove box is used for handling air- and/or water-reactive materials (e.g. organometallics in Chemistry or lithium metal in Metallurgy). This second type of glove box is designed to contain a high purity inert atmosphere (e.g. argon or nitrogen). Inert atmosphere glove boxes are usually kept at a pressure slightly higher than the surrounding air, so that any small leaks would be inert gas leaking outward instead of air leaking inward.

Other considerations

- Training – Any person using a glove box must have been adequately trained.
- Flammable materials – A hazard evaluation should be performed before flammable materials are used in a glove box. These materials should be avoided or kept at minimum practical amounts.
- Type of glove box – Glove boxes under pressure are not intended for use with hazardous materials. Such boxes must be clearly identified and controlled administratively to avoid misuse.

- Appurtenances - Glove boxes for hazardous materials often use HEPA filters in the exhaust to capture materials in use. Some boxes employ equipment (filters, drying agents) which purify gases introduced into the box.
- Gloves – Most glove box failures occur at the glove ports. The ports are capped when not in use. The flexing of the gloves, deterioration from corrosives, exposure to UV light gradually reduce glove life. A well planned inspection and replacement schedule should be followed.
- Vacuum gauges – These gauges indicate the negative pressure inside a glove box used for handling hazardous materials. Before use of a box, the gauge should be checked to ensure that the box is in safe operating condition.
- Ports – Material is introduced or removed through airtight ports. Ports may be small doored air locks or larger bag covered ports. These must be designed to prevent loss of negative pressure inside the main box while the port is in use. Ports shall be kept free of contamination.
- Additional information or questions – Contact the PI in charge or contact EHS