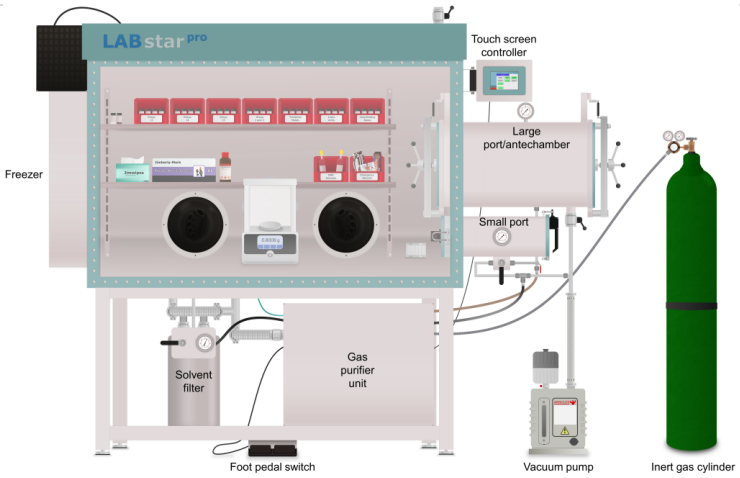
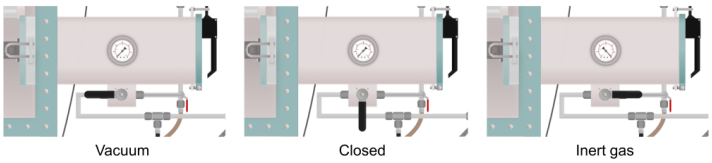
13: Gloveboxes



A typical glovebox.

Gloveboxes are large sealed containers that allow sensitive or hazardous materials to be handled under an inert atmosphere. In most chemistry laboratories, gloveboxes are primarily used for the storage of air and moisture sensitive solids, which would be difficult to manipulate using conventional Schlenk line techniques. It is common to prepare samples for NMR spectroscopy or to run test-scale reactions in the glovebox for convenience. Larger scale operations can also be performed inside the glovebox if suitable solvent filters and external vacuum pumps are employed. The inert gas (nitrogen or argon) is passed through a series of purifiers to remove oxygen and water, which maintains an atmosphere within the glovebox typically containing less than 0.1 ppm of oxygen and water.

Items are introduced into the glovebox through the small or large antechambers, and require three vacuum/inert gas cycles, similar to Schlenk line practices. It is recommended to have three 5 minute cycles for the small antechamber, and three 15-20 minute cycles for the large antechamber. The latter can be automated for some glovebox models. Glassware, including vials and pipettes, introduced into the glovebox should be dried in an oven prior to use.



Cycling items into the glovebox using the antechamber.

For a comprehensive guide and video on the principles of glovebox chemistry and standard operating procedure, consult the following JoVE.