



## ENVIRONMENTAL HEALTH & SAFETY

# Vacuum System Protection

Most research buildings are equipped with house vacuum lines. When setting up procedures that will involve a vacuum line, carefully consider how you will prevent gases, liquids, flammable vapors, infectious materials and other potential contaminants from being drawn into the vacuum system.

**Never use the house or area vacuum line to take up liquids.** Always place a trap between the equipment and the vacuum source. A proper trap is critical to:

- Ensure vapors do not become re-entrained in the lab space or other work areas
- Prevent potential for fire from vapors in unprotected pump motors
- Prevent damage to piping and pump (e.g., corrosion)
- Protect individuals that work on the vacuum system

A vacuum system is not a replacement for a hazardous materials exhausting system or hood. In some cases, the lines may be used to remove anesthetic gases in properly vented and filtered systems. Ensure that filters associated with the trap are routinely maintained.

The following filtration or trap system (as applicable) is recommended for placement between the vacuum source and the experimental apparatus to prevent contamination.

- For particulates, use filtration capable of efficiently trapping the particles in the size range being generated.
- For most non-volatile liquids, a filter flask at room temperature is adequate to prevent liquids from getting to the vacuum source (for non-hazardous liquid or water the use of moisture filter is acceptable).
- For solvents and other volatile liquids, use a cold trap of sufficient size and cold enough to condense vapors generated, followed by a filter flask capable of collecting fluid that could be aspirated out of the cold trap. Use a slush of dry ice and either isopropanol or ethanol is sufficient (to  $-78\text{ }^{\circ}\text{C}$ ). Avoid using acetone. Ethanol and isopropanol are cheaper and less likely to foam
- For highly reactive, corrosive or toxic gases, use a sorbent canister or scrubbing device capable of trapping the gas. Contact EHS for guidance on proper canister selection.

Liquid nitrogen may only be used with sealed or evacuated equipment, and then only with extreme caution. If the system is opened while the cooling bath is still in contact with the trap, oxygen may condense from the atmosphere and react vigorously with any organic material present.

### Biological materials in Vacuum Systems

Protect the building vacuum system during aspiration of any tissue culture media, infectious or potentially infectious fluids and aerosols using the system illustrated below. Glass vacuum flasks stored on the floor must be in secondary containment to prevent breakage due to being knocked over.

The first suction flask (A) is used to collect the fluids into a suitable disinfectant or for autoclave decontamination. The second flask (B) serves as a fluid overflow collection vessel and to minimize splatter (do not add liquid to flask B when setting up system). An in-line HEPA filter (C) is used to protect the vacuum system (D) from aerosolized microorganisms.

