



This is a NO, NO.



Frostbite is no fun.



Neither is this.

CRYOGENIC LIQUIDS SAFETY GUIDELINES

Cryogenic liquids are very cold substances [gases which have been condensed into liquids at extremely low temperatures], and are used in research to provide extremely low temperatures for frozen storage and experimentation. Hazards associated with their use include personnel exposure (cold burns, frostbite), material and construction incompatibility, high pressure gases, explosions, implosions, and asphyxiation (to name but a few of the hazards).

- Understand the hazards of cryogenic liquids, their containers, and the system you will be using by reading the Material Safety Data Sheet, and receive training on the Standard Operating Procedures before beginning work.
- Wear eye protection, **at a minimum safety glasses with side-shields**, or goggles or a face shield may be used.
- Avoid eye or skin contact by wearing cuffless shirt and trousers that completely cover the tops of closed shoes (or quickly removeable shoes in case they do allow liquid to enter), and appropriate insulated gloves big enough to shed easily. Remove all watches, finger rings, bracelets, ear rings, nose rings and other jewelry when handling.
- Shield or duct tape the exterior surface of a glass dewar to prevent shattering in case of breakage. Keep metal and glass dewars uncovered, or cover with loose-fitting cap.
- Store secured containers in the upright position in a well ventilated location (at least 6 air changes per hour). Do not use or store in confined spaces where an oxygen deficient or hazardous atmosphere could develop.
- Handle objects in direct contact with cryogenic liquids with tongs, potholders, and/or insulated gloves. Do not touch bare metal or other conductive surfaces without appropriate personal protective equipment.
- Avoid transporting a container of liquid cryogen (>10 liters) on an elevator with any person in the elevator (asphyxiation hazard). The sender should lock out and activate the elevator to the desired floor, and another person could be available on the receiving floor to take the cryogenic liquid container off the elevator.
- Transfer cryogens slowly to prevent thermal shock or excessive pressure buildup. Exercise great care when using a funnel, do not fill above the funnel neck! Containers of flammable cryogens need to be bonded.
- Persons filling any containers or cylinders must be in constant attendance to the filling operation.
- Use only vessels designed for extreme cold. Not all dewars are rated for liquid nitrogen. Always follow manufacturers' guideline for use of cryogen vessels of any size.
- For short distances inside buildings, it is acceptable to hand-carry a small dewar of nitrogen *which has no handles*, if the dewar (no styrofoam cups!) is your only load, the vessel has a venting lid, you are using both hands, and you are wearing leather gloves and eye or face protection.
- The best transport for larger (>10 liters) cryogenic liquid containers, are dewars equipped with carrying handles.
- Ensure containers are properly labeled. Do not destroy or remove identification tags or labels.
- Push wheeled containers, and move other containers with a suitable handtruck. Do not place any cryogenic liquid container on its side during transportation.
- Cryogens colder than liquid oxygen (e.g. nitrogen, helium, hydrogen, carbon monoxide, argon and neon) can condense oxygen out of the atmosphere. **BEWARE!**
- Insulate pipes and other conductive surfaces, and otherwise design a cryogenic system with appropriate materials and provide enough headspace in containers or piping for liquefied gases to expand.
- Do not interchange adapters between different cryogens that are not compatible. Do not alter, obstruct, defeat, or tamper with relief valves, rupture discs, or fittings.
- Vent relief valves to the outside away from walkways or work areas. Notify CRLS or the supplier if a container or cylinder continuously vents through a relief device, as that is a sign of a ruptured diaphragm.
- Prevent ice build up and check/clean areas where ice might plug the system (e.g., cold traps).