

# Safety Precautions for Cryogenic Liquids

SafetyNet #: 58

## General Information

Cryogenic liquids such as liquid nitrogen, helium, and oxygen are, by definition, extremely cold. Contact between cryogenic liquids and exposed skin can produce a painful burn. A splash of cryogenic liquid to the eye can cause loss of vision. Always wear proper personal protective equipment including a buttoned lab coat, cryogenic apron and long pants or a long skirt, heavy leather gloves (or cryogen handling gloves), safety goggles, and a face shield (when the risk of splash is high) whenever handling cryogenic liquids.

## Other Hazards Associated With Cryogenic Liquids

- **Pressure buildup.** Boiling of liquefied gases within a closed system increases pressure. Users must make certain that cryogenic liquids are never contained in a closed system. Cold fingers and similar devices have exploded when either an ice dam is formed within the apparatus or when users create a closed system by shutting off all valves. Users should also tape exposed glass parts to minimize the hazard of flying glass shards in the event of an explosion.
- **Oxygen enrichment.** Liquid nitrogen and liquid helium may fractionally distill air, causing liquid oxygen to collect in the cryogenic container. Liquid oxygen increases the combustibility of many materials, creating potentially explosive conditions. When working with cryogenic liquids in a closed system, be sure to provide a relief valve in case of over-pressurization.
- **Asphyxiation.** If vented into a closed space, a cryogenic liquid will vaporize, displacing oxygen and possibly causing asphyxia. For this reason, never store a container of cryogenic liquid in an enclosed space.
- **Embrittlement.** Do not dispose of cryogenic liquids down the drain! Ordinary materials such as metal or polyvinylchloride (PVC) piping in laboratory sinks may not be able to withstand cryogenic temperatures. Allow cryogenic liquids to evaporate in a fume hood or other well ventilated area. Materials exposed to cryogenic temperatures for long periods or materials that have undergone periodic warming and freezing must be examined regularly for cracks and warping.
- **Cryotube Explosions.** Cryotubes used to contain samples stored under liquid nitrogen may explode without warning. Tube explosions are caused by liquid nitrogen entering the tube through minute cracks or cap threads and then expanding rapidly as the tube thaws. In addition to wearing proper safety equipment, when thawing cryotubes place the cryotube in a heavy walled container (e.g., a desiccator) or behind a safety shield to protect yourself in the event that the tube shatters.

## Contact

### Research Safety

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### More information

<https://safetyservices.ucdavis.edu/research-safety-staff-listing> [1]

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