

Spotlight On Safety

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Safe Use of Cryogenic Liquids

Cryogenic liquids (liquid nitrogen, helium, oxygen) are, by definition, extremely cold. Contact between cryogenic liquids and exposed skin can produce painful burns. A splash of cryogenic liquid to the eye can cause loss of vision.

Hazards

- These materials are extremely cold (-100°C to -270°C) and, upon contact, can instantly freeze other materials. Serious tissue damage may occur upon exposure.
- Boiling of liquefied gases within a closed system increases pressure resulting in explosions (never contain liquid in a closed system)
- Liquid nitrogen/helium may fractionally distill air, causing liquid oxygen to collect in the cryogenic container, increasing combustibility of many materials and creating potentially explosive conditions (provide adequate venting in a closed system/space)
- If vented into a closed space, a cryogenic liquid will vaporize, displacing oxygen and possibly causing asphyxiation (never store in a closed space)
- 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 to evaporate in a fume hood or other well ventilated area; materials exposed to cryogenic temperatures for long periods must be examined regularly for cracks and warping)



Cryotube Explosions

- Cryotubes used to contain samples stored in liquid nitrogen may explode without warning
- Explosions are caused by liquid nitrogen entering the tube through minute cracks and then expanding rapidly as the tube thaws

Good Practices

- Avoid condensing oxygen (blue in color) and/or contact with organic material when using liquid nitrogen
- Condensed oxygen when contacted with organic materials can cause a powerful explosion - flush cold traps with nitrogen or keep under vacuum to avoid condensation of oxygen from air within the trap
- Long pants, close toed shoes, lab coat, safety glasses and cryogenic gloves should be worn when handling cryogenic liquids

For more information please visit www.ehs.ucr.edu or call 951-827-5528.