

CRYOVIAL SAFETY INFORMATION

Cryovial Safety Guidelines:

Laboratory personnel must use extreme caution when preserving samples in liquid nitrogen (LN₂). Liquid nitrogen can leak into vials, which may result in the vial exploding/spraying its contents when the vial warms and the liquid nitrogen expands from the liquid to gas phase.

Observe the following guidelines when handling cryovials:

- Wear proper personal protective equipment, including cryoprotective gloves and eye protection, when handling cryovials.
- Treat all vials as having the potential to explode. Be aware of the potential exposure hazard to the sample in the vial.
- Samples for freezing/storage should be placed in appropriate containers such as polypropylene cryovials. Glass or polystyrene may crack.
- Only vials certified for use in liquid nitrogen should be used.
- Cryovials should not be overfilled, as this may increase the risk of cracking.
- Caps should not be over tightened before freezing. This may damage the gasket.
- Avoid liquid phase storage of vials in favor of gas phase storage. If liquid phase storage is necessary, use cryogenic heat shrink tubing to fully encase the vial.
- Internally threaded cryovials (male caps) with a silicone gasket should be used when storing samples in their liquid phase.
- When thawing a cryovial, do so in a thick walled container, fume hood or biosafety cabinet.

Personal Protective Equipment:

The following personal protective equipment is required when handling or using LN₂:

Hands must be protected with water proof thermal insulated gloves (e.g. cryo gloves) that can be quickly removed if LN₂ is spilled on them. Even with insulated gloves, hands should not be submersed into LN₂.

Bodies must be protected with long pants, lab coats, and closed-toe shoes. Thermal insulated aprons should also be available.

Eyes are incredibly sensitive to the extreme cold of LN₂ and its vapors. Over-pressurization may result in the explosion of improperly vented equipment. Chemical splash goggles and a full face shield must be utilized when handling LN₂ and sealed containers that have been stored in LN₂.



Health Hazards:

- Direct exposure to LN₂ or cold nitrogen vapors can cause extensive tissue damage or burns.
- When liquid nitrogen vaporizes it can expand to 700x its volume. This may create an explosion hazard in unvented containers or equipment, including cryovials.
- The expansion of nitrogen vapor may also displace oxygen to the levels low enough where asphyxiation can occur. Inhalation of oxygen deficient air can cause dizziness, nausea, vomiting, loss of consciousness, and death.

If you have further questions regarding Cryogenic Hazards please review the UNC [Laboratory Safety Manual](#) (Chapter 3), and/or the [Compressed Gas Safety Training](#).

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