

# LABORATORY SAFETY

## QUICK FACTS

### CRYOVIAL SAFETY

#### Purpose:

Cryovials are specialized containers designed for the safe storage of biological samples at ultra-low temperatures ( $-80\text{ }^{\circ}\text{C}$  to  $-196\text{ }^{\circ}\text{C}$ ). Proper use ensures sample integrity, prevents contamination, and protects personnel.

**CAUTION:** Laboratory personnel must exercise extreme caution when preserving samples in liquid nitrogen ( $\text{LN}_2$ ). If  $\text{LN}_2$  infiltrates cryovials, it can rapidly expand during thawing, causing the vial to rupture or spray its contents.

#### Cryovial Handling Guidelines:

- Always wear proper personal protective equipment, including cryoprotective gloves and eye protection.
- Assume all cryovials may rupture; treat them as potential exposure hazards.
- Use polypropylene cryovials for freezing and storage. Avoid vials made of glass or polystyrene, which may crack.
- Use only vials certified for  $\text{LN}_2$  use, especially for liquid phase storage.
- Do not overfill vials; excess volume increases the risk of cracking.
- Avoid over tightening caps before freezing, as this may damage the gasket.
- Prefer gas phase storage over liquid phase. If liquid phase storage is required, encase vials in [cryogenic heat-shrink tubing](#).
- Do not store vials with internal threads directly in liquid phase nitrogen; trapped liquid can expand and cause vial rupture.
- Thaw cryovials in a secure location, such as a thick-walled container, fume hood, or biosafety cabinet.
- Avoid rapid warming; thaw samples gradually to reduce stress on the vial and sample.
- Use cryo-resistant labels or markers; avoid paper labels that detach in cold storage.
- Maintain an updated inventory and inspect vials regularly for cracks, leaks, or compromised seals and O-rings.
- Use cryogenic storage boxes or racks for transport to minimize handling time outside freezers.



#### Required Personal Protective Equipment:

The following personal protective equipment is required when handling or using  $\text{LN}_2$ :

- **Hands:** Waterproof, thermally insulated gloves (e.g. cryogenic gloves) that can be quickly removed. Do not immerse gloves into  $\text{LN}_2$ .
- **Body:** Long pants, lab coats, and closed-toe shoes. A thermal apron should also be available.
- **Eyes/Face:** Chemical splash goggles and a full-face shield to protect against cold vapors and potential over-pressurization.



#### Health Hazards:

- **Tissue damage or burns** from direct contact with  $\text{LN}_2$  or cold vapors.
- **Explosion risk** due to  $\text{LN}_2$  expanding up to 700-times its volume in unvented containers.
- **Asphyxiation hazard** from oxygen displacement by nitrogen vapor. Symptoms may include dizziness, nausea, vomiting, loss of consciousness, or death.



For more information on [cryogenic safety](#) please visit the EHS website.

Document #: BS-Cryo1	Version: v2.0	Date: February, 2026
Environmental Health & Safety: Research Safety		Contact: 919-515-6859