

UAB SAFETY SHORT

Cryovial Safety

Different types of cryovials are used in laboratories to store biological specimens/cell lines in liquid nitrogen (LN2). Some plastics caps can get brittle at very low temperatures, thus allowing liquid nitrogen to seep into the vials. Once the vial is outside the freezer and thawing, the LN2 trapped inside the vial will expand rapidly (700 times) to the gas phase. If not handled properly, the cryovials can explode causing physical injuries and hazardous material exposure to individuals around the area.

How to Choose the Right Vial?

- Use only those vials that are approved by the vendor for cryogenic use.
- Polypropylene vials are best suited for LN2 storage. Glass and polystyrene vials can crack easily.
- Another factor to consider when selecting the vial is the cap type; male caps with internal threads are safer than female cap with external threads (Fig. 1).



Fig. 1



Fig. 2

How to Handle Cryovials Safely?

- Anyone handling cryovials must have the training on how to work with cryogenic materials and how to safely freeze/thaw cryovials. The PI is responsible for ensuring that the lab members have appropriate training.
- Appropriate lab attire (long pants, lab coats, and closed-toe shoes) and PPE (cryo-apron, safety goggles, thermally insulated gloves and face shield) are required for anyone handling cryovials (Fig. 2). This PPE requirement is applicable to anyone else in the vicinity who could be at risk.
- Never fill cryovials beyond the designated fill line, as this may increase the risk of cracking.
- Caps should not be overtightened to avoid damaging the gasket which increases the risk of liquid nitrogen getting into the vial.
- Cryovials should be stored in the vapor phase above the liquid nitrogen rather than immersing in the liquid to avoid liquid nitrogen seeping into the vials. Thawing of vials must be done in a thick-walled container, fume hood or biosafety cabinet.
- If you have to store cryovials immersed in LN2, tubes must be thawed in a sealed, unbreakable plastic container. To avoid shattering, the vials may also be moved from liquid-phase to the vapor-phase at least 24-48 hours prior to removing them from the freezer.