



CRYOGENIC VIAL SAFETY

Cryopreservation refers to the storage of biological samples at low temperatures (-196°C), typically in a dewar filled with liquid nitrogen. Liquid nitrogen hazards include severe frostbite¹ and asphyxiation from liquid nitrogen evaporating in an enclosed area.² Liquid nitrogen can also leak slowly into improperly sealed cryogenic vials over time. During vial thawing, the liquid nitrogen evaporates and expands at a ratio of 1:696 (liquid:gas), which can result in an over-pressurized vial that can rupture. Injury to personnel can occur from flying debris, as well as from exposure to the potentially biohazardous contents of the vial.³

Training and Personal Protective Equipment

- Complete Stanford University health and safety training for Cryogenic Liquids & Dry Ice. Contact EH&S at 723-0448 to request training. Researchers must also complete laboratory specific Tier III training.
- Wear proper personal protective equipment (PPE) when handling liquid nitrogen. This includes:
 - Thermally insulated gloves
 - Face shield **and** ANSI z87.1 safety glasses
 - Lab coat in conjunction with proper street clothes (including long pants and closed toe shoes)

Cryogenic Vial Selection

- Use vials rated for cryogenic use that have a silicone O-ring. Vials with internally threaded caps are preferable.



← O-ring

Cryogenic vial with O-ring and internal threads (source: Corning Website)

- Vials must be made of polypropylene and NOT be made of glass.

Storage of Cryogenic Vials

- Avoid liquid phase storage of vials within cryogenic dewars. Liquid nitrogen that leaks into the vials may cause vial over pressurization during thawing.
- If liquid phase storage is necessary, use cryogenic heat shrink tubing to fully encase the cryogenic vial.

Cryogenic Sample Thawing

- Always wear proper PPE described previously.
- Thaw the vial in a thick walled container (i.e. desiccator with lid) or within a fume hood or biosafety cabinet.
- Remove the contents of the vial when completely thawed. Discard the vial – do not reuse.

Questions and Concerns

Contact Environmental Health and Safety at 650-723-0448.

References

1. Roblin et al. (1997) *Burns* 23 (7/8): 638-40
2. Tabata et al For. Sci. Int. 1995)
3. Occupational Health and Safety Unit, University College London, Hazards of Liquid Nitrogen Cryovials, 2006, www.ucl.ac.uk/medicalschoo/lsa/safety/docs/cryovials.pdf