

# Safe Work Practice: Handling Liquid Nitrogen in Medical Clinics

## Purpose

To establish a standardized procedure for the safe storage, handling, and use of liquid nitrogen at the clinic.

## Scope

This procedure applies to all staff in the clinic who store, handle, or use liquid nitrogen.

## Hazards

- **Cryogenic Burns:** Liquid nitrogen is extremely cold (-196°C). Direct contact with the liquid or surfaces cooled by it can cause severe frostbite.
- **Asphyxiation:** When liquid nitrogen warms to room temperature, it rapidly expands into a gas, increasing its volume by 700 times. This can displace oxygen in the room, creating a risk of suffocation. Nitrogen gas is colourless and odourless.
- **Explosion:** Liquid nitrogen naturally transitions to a gas at room temperature. If stored in a sealed container, this expansion can cause the container to explode.

## Safe Work Practices

### Storage

- Secure cylinders in an upright position.
- Only store liquid nitrogen cylinders in well-ventilated areas. Store in a controlled area away from common spaces like lunchrooms or locations frequently occupied by people.

### Decanting or Dispensing

- **Never handle liquid nitrogen with bare hands or without eye protection.** Use appropriate personal protective equipment (PPE):
  - Wear clothing that covers arms, legs, wrists, ankles, and feet.
  - Wear eye protection such as goggles, safety glasses, or face shields.
  - Wear cryogenic gloves when handling liquid nitrogen or touching any object cooled by liquid nitrogen. When handling small amounts and high dexterity is essential (e.g., during a medical procedure), the use of medical gloves, such as nitrile gloves, is permitted.
- Only handle and use liquid nitrogen in well-ventilated areas.
- Dispense less than 100 mL of liquid nitrogen into a properly insulated container in the designated area where the liquid nitrogen tank is stored. Never overfill the container.

- The dispensing method depends on the liquid nitrogen container: either decant with a transfer vessel or pour directly. Follow equipment-specific procedures provided by the manufacturer.
- Avoid dispensing above waist height.
- When pouring, place an appropriate receiving container on a stable surface and do not leave it unattended. Take extra precautions to prevent tipping and spills.
- When handling liquid nitrogen during medical procedures, use containers designed for cryogenic liquids such as a reusable stainless steel cryogun.
- Other insulated containers, like Styrofoam cups, reusable cryogenic foam dewars, or double-walled insulated containers (e.g., thermos), can be used. To prevent tipping and spills, take extra precautions with these wide-opening containers during transportation and usage.
- If using self-venting lids, ensure they are loose-fitting to allow gas to escape.
- Paper, plastic, and glass containers are unsuitable for liquid nitrogen handling due to inadequate insulation properties.
- Transport liquid nitrogen cautiously to avoid splashing and spillage if storage and usage locations differ.
  - If spilled, allow liquid to evaporate – a spill kit and WorkSafeBC incident report are not required for small spills that do not result in injury or equipment damage, but they should be reported to the employer as a near miss.

## Disposal

- Allow remaining unused liquid nitrogen to evaporate in a well-ventilated area.
- If the liquid nitrogen container has not been contaminated with other chemical or biological hazards, it can either be re-used or discarded in the regular garbage.

## Other Precautions

- Cryogenic gloves need to be loose-fitting so they can be readily removed if liquid nitrogen splashes into them.
- Ensure that all closed containers have a pressure release valve. **Never store liquid nitrogen in a sealed container as this will create a major explosion hazard.**
- Never allow any unprotected part of the body to come into contact with the liquid.
- Never use hollow rods or tubes to scoop liquid nitrogen as this can cause liquid splash from the top of the tube.

## First Aid Treatment

- If liquid nitrogen gets between the PPE and the skin, immediately remove the PPE covering the area to let the liquid nitrogen fall out or evaporate.
- Do not rub frozen body parts to prevent tissue damage.
- Place the affected part of the body in a warm water bath (not above 40 °C).
- Never use dry heat.
- In case of eye contact, rinse the eye with water immediately.
- Refer to the Safety Data Sheet (provided by vendor) for further information on first aid and other response measures.

## Training

Managers must ensure employees who use or are exposed to liquid nitrogen must review and understand this document before handling or being exposed to liquid nitrogen.

## Annual Review

This policy and procedure will be reviewed annually and updated as needed.

## References

- [Workplace Hazardous Materials Information System 2015 \(WHMIS\)](#)
- [Nitrogen, refrigerated liquid: Safety Data Sheet E - 4630](#)
- [WorkSafeBC Occupational Health and Safety Regulation 5.26](#)
- [Occupational Safety and Health Association Laboratory Safety: Cryogenics and Dry Ice](#)

## Approval

Employer/Manager:	Date:
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