

WORKING SAFELY WITH LIQUID NITROGEN

HAZARDS OF LIQUID NITROGEN



LN₂ containers

Liquid nitrogen (LN₂) is nitrogen gas in a liquid state at a temperature of -196°C/-321°F. The hazards arising from LN₂ are related to either temperature or expansion to gas.

Extreme Cold

- Skin contact with the liquid or objects cooled by the liquid can cause severe tissue damage such as frostbite, cold burns or skin freezing to the object and tearing away.
- Materials such as carbon steel, rubber and plastics can become brittle and shatter when exposed to LN₂.
- Oxygen may condense in LN₂ containers and raise the potential for an explosive reaction with oxidizable material.

Gas Related

- **Asphyxiation**—LN₂ expands nearly 700 times when it boils off at room temperature. In poorly ventilated rooms it can quickly displace oxygen, creating an oxygen deficient atmosphere and causing possible death.
- **Explosion**—Closed vessels containing LN₂ may explode because of pressure build-up due to the boil off of nitrogen gas.



Cryogenic gloves

GENERAL PRECAUTIONS

- NEVER handle LN₂ with bare hands/skin.
- Use cryogenic gloves, eye protection, face shield, closed-toed shoes, and protective clothing when conducting transfer operations.
- Use only containers or systems designed specifically for LN₂ (e.g., dewars, cryogenic liquid cylinders, storage tanks).
- Do not use or store LN₂ in closets, small rooms, walk-in cold rooms, environmental chambers or other rooms without adequate ventilation.
- To prevent pressure build up and potential explosions, NEVER store LN₂ in a sealed, airtight container.
- Always check the type of container before use. LOW pressure is for delivery of liquid, operating at less than 22 psig. HIGH pressure is for delivery of both liquid and gas, operating at 230 psig or above.
- Use of large quantities of LN₂ may require additional ventilation and/or oxygen monitors with alarms. Review the [Cryogen SOP](#) located at www.safety.duke.edu or contact OESO for guidance and evaluation.



Oxygen monitor
with alarms