

# Safely Working with Liquid Nitrogen

Liquid Nitrogen (LN<sub>2</sub>, N<sub>2</sub>), is commonly used in UCSC research. Its properties allow for rapid cooling of materials, but also pose unique worker safety hazards. Below are guidelines for how to work with LN<sub>2</sub> safely.

## HAZARDS OF LN<sub>2</sub>

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- **Contact Hazard:** At -321 °F (-196 °C), skin contact with LN<sub>2</sub> can lead to severe frostbite; skin cells freeze and become damaged very quickly.
- **Asphyxiation Hazard:** LN<sub>2</sub> will evaporate (change from liquid to gas) at any temperature above -320 °F. This may release substantial volumes of N<sub>2</sub> (1 Liter = 704 liters gas @ room temp), which can displace oxygen quickly in the air around the LN<sub>2</sub>, causing difficulty breathing, loss of consciousness and death. This is especially of concern in non-ventilated or confined spaces.
- **Explosion Hazard:**
  - Due to the rapid emission of large volumes of N<sub>2</sub> gas, any LN<sub>2</sub> that is stored in a closed container can pressurize the container. Given enough time at normal room temperature, such a container may explode if the gas is not able to escape.
  - LN<sub>2</sub> can condense oxygen, which can cause explosions. Liquid oxygen is a pale blue. Do not leave LN<sub>2</sub> traps open to the atmosphere.

## HANDLING LN<sub>2</sub>

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Use the following precautions when handling LN<sub>2</sub>:

- Wear appropriate eye protection, including safety glasses and/or a face shield, as well as a laboratory coat.
- Use loose-fitting, thermally insulated “Cryo” gloves to manually transfer LN<sub>2</sub> between containers. Nitrile exam gloves will not provide

enough protection. **Never handle LN<sub>2</sub> with bare hands.** Contact [ppe@ucsc.edu](mailto:ppe@ucsc.edu) for assistance in obtaining Cryo gloves.

## STORAGE AND DISPOSAL

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- Always store LN<sub>2</sub> containers (Dewars) in a well-ventilated location.
- Do not store LN<sub>2</sub> in confined areas with limited ventilation. This includes cold rooms, walk-in refrigerators and environmental chambers.
- Never store LN<sub>2</sub> in a tightly sealed container, such as a plastic or glass bottle, or any container with a screw-top lid that will not vent.
- To dispose of LN<sub>2</sub>, place it in a well-ventilated area at room temperature; the remainder will evaporate away.
- Never dispose of LN<sub>2</sub> in a trash can, chemical waste container or other garbage/waste can.
- Never dispose of LN<sub>2</sub> in a sink, toilet or other fixture; the temperature difference can crack the plumbing.
- Do not leave LN<sub>2</sub> unattended in open areas.

## TRANSPORTING LN<sub>2</sub>

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- Only place LN<sub>2</sub> in containers that are appropriate Dewars, with a loose fitting lid to allow gas to escape.
- Use Dewars that have handles. For Dewars which are >500 mL, place the Dewar on a wheeled cart.

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For questions about working with LN<sub>2</sub>, contact EH&S at [ehs@ucsc.edu](mailto:ehs@ucsc.edu) or 831-459-5114.