Liquid Nitrogen Safety Stats and Facts

FACTS

Nitrogen gas is odorless, colorless, and tasteless. When liquid nitrogen evaporates it reduces the oxygen concentration in the air and may act as an asphyxiant in confined spaces. A person can become unconscious without any warning symptoms.

1. **Extreme Cold.** The vapor of liquid nitrogen can rapidly freeze skin tissue and eye fluid, resulting in cold burns, frostbite, and permanent eye damage even by brief exposure.
2. **Asphyxiation.** Liquid nitrogen expands 695 times in volume when it vaporizes and has no warning properties such as odor or color. Hence, if sufficient liquid nitrogen is vaporized to reduce the oxygen percentage to below 19.5%, there is a risk of oxygen deficiency which may cause unconsciousness.
3. **Oxygen Enrichment.** When transferring liquid nitrogen, oxygen in the air surrounding a cryogen containment system can dissolve and create an oxygen-enriched environment as the system returns to ambient temperatures. Since the boiling point of nitrogen is lower than oxygen’s, liquid oxygen evaporates slower than nitrogen and may build up to levels which can increase the flammability of materials such as clothing near the system.
4. **Pressure Buildup and Explosions.** Without adequate venting or pressure-relief devices on the containers, enormous pressures can build upon cryogen evaporation.
5. **Cold burns.** Due to its extremely low temperature, the cold vapour and gas that are produced when LN2 boils can give rise to cold burns or frostbite upon contact with unprotected skin.
6. **Fire in oxygen-enriched atmosphere.** LN can condense oxygen from the atmosphere. Liquid oxygen creates potentially flammable or explosive conditions by greatly increasing the

combustibility of many materials (e.g. solvents, hydrocarbons).

STATS

- Nitrogen is the most common gas in the earth’s atmosphere. Approximately 78 % of the air you breathe is nitrogen. In its liquid form, nitrogen is used in many industries.
- In enclosed areas, liquid nitrogen leaks can become deadly by pushing away breathable air, the U.S. Chemical Safety Board has warned. In 2020, 14 people died from asphyxiation linked to nitrogen in 12 separate workplace accidents, according to the U.S. Occupational Safety and Health Administration.
- In 2019, a Georgia sheriff’s deputy died after inhaling liquid nitrogen while attempting to rescue an employee at a sperm bank where liquid nitrogen was used as a refrigerant.
- In 2021 – 6 people died and a dozen more were injured at a Gainesville poultry plant where liquid nitrogen created a hazmat situation when a line carrying liquid nitrogen ruptured.
- When liquid nitrogen vaporizes, it expands 695 times in volume with no warning signals detectable by color or odor. If oxygen levels drop below 19.5%, there is a risk of oxygen deficiency that may result in loss of consciousness and/or death.