

# Liquid Nitrogen

## Summary of Hazards:

- One Litre of Liquid Nitrogen will make **683** litres of Nitrogen gas.
- Liquid Nitrogen 'boils' at **minus 196°** Centigrade
- Extreme cold causes some materials to become brittle.

## Fault reporting & Emergency Contacts

If a 'Fan Fail' light (Red) is lit or any other fault is showing on the panel



Please report to:

### Carol Wollaston:

Tel 650 3551  
Mob 07917 688050

### Deborah Allen:

Tel 650 3114  
Mob 07769 695387  
e-mail:  
[cip-support@ed.ac.uk](mailto:cip-support@ed.ac.uk)

### Out of Hours Contact: Security: 650 2257

**Liquid Nitrogen is potentially lethal. You must abide by the rules.**

## Hazards

Nitrogen composes approximately 80% of the atmosphere.

It is colourless, odourless, tasteless, and it replaces oxygen very quickly.

Nitrogen is heavier than air so fills the room from floor level upwards.

One litre of Liquid Nitrogen will expand to **683 litres** of nitrogen gas and can deplete the oxygen in a confined space very quickly, therefore it can cause asphyxiation.

The boiling point of Liquid Nitrogen is **-196°C** thus any liquid spilt on exposed skin or clothing will cause cryogenic burns.

When materials such as metal, stone or plastic are exposed to cryogenic liquids they become brittle and get damaged if dropped or knocked.



## Instructions for the Buddy

The victim may not be aware that asphyxia is setting in. This is why we have a mandatory **buddy** system.

### The buddy must be an authorized Liquid Nitrogen user

The Buddy should stand outside the room. Be on the lookout for any unusual behaviour in the worker or their collapse.

If the alarm light on the panel starts to flash, tell the worker to exit immediately.

Should collapse happen, without putting yourself in danger, Shout loudly for help.

Take a deep breath and hold it.

Pull the casualty out into fresh air.

Phone reception for first aiders and defibrillator.

If the Oxygen level in the room drops to 17.5% the siren will activate.

When the alarm activates you must leave the room until the oxygen level rises above 19.5% and the alarm can be reset.

The full alarm mode shuts off the supply of Nitrogen from the external supply tank and it must be reset by an authorized person.

## First Aid for Cryogenic burns

Flush affected areas with copious amounts of tepid water for a minimum of 15 minutes.

Do not apply any form of direct heat.

Loosen restrictive clothing.

Protect frozen parts with loose, dry, sterile dressings. Do not apply any creams.

Keep the patient warm.

Arrange transport to hospital.

Ensure ambulance crew or hospital is advised of details of accident and first aid treatment already administered.

# Safe working procedures

The following rules **MUST** be followed:-

- Only **AUTHORISED** personnel are permitted to work within the Liquid Nitrogen store.
- **Out of hours access (Weekends/evenings) is only permitted after risk assessment - see Deborah Allen for details.**
- Supervisors must ensure that all new users are adequately supervised until they are judged competent.
- **Liquid Nitrogen must not be transported in a lift.**

- All users **MUST** read and sign the Risk Assessment form available on G12 door.
- If all three of the fans fail (red lights on the ventilation control panel are illuminated) **IT IS FORBIDDEN TO ENTER THE ROOM.**
- If the alarm is sounding then you must leave the room until the Oxygen level rises above 19.5% and the alarm can be reset.

- If decanting, both the user and the buddy must sign the record sheet.
- Open valve slowly to enable pressure release before decanting from mobile vessel.



## Personal Protective Equipment

**Personal Protective Equipment (PPE) must be worn when handling liquid nitrogen or materials that have been stored in it.**

This includes:

- Laboratory coat
- Gloves \*
- Eye/face protection\*

\*These should not be removed from G12.



- Shoes that cover the feet (i.e. no open-toed shoes)

All incidents/near misses must be reported to emergency contacts or at  
<http://www.ed.ac.uk/schools-departments/health-safety/accident-reporting>

## Sample Storage Guidance

### Storage Vials (1ml – 2ml)

Leaks can occur if stored in liquid phase meaning that, expansion of liquid nitrogen inside the vial into gas at room temperature can cause an explosion.

**Your eyes are at risk.**

Samples may become contaminated

Thermal gloves and eye protection **must be worn** when storing or recovering samples. Forceps are recommended to aid dexterity when manipulating sample vials wearing gloves.



### Sample sorting

Close cryostore lid when sorting samples to reduce vapour escape from store.

### Manual Handling

When lifting sample towers out of the cryostore ensure good posture and support lower back to prevent over extension.