

SAFE TRANSPORTATION AND USE OF LIQUID NITROGEN DEWARS

Properties and Hazards of Nitrogen

Colourless, odourless and tasteless, non toxic and does not support life or combustion

Can produce local oxygen-deficient atmospheres which will cause asphyxia if breathed (especially in confined space areas such as lifts)

Asphyxia is often rapid with no prior warning to the victim

Prolonged contact with liquid nitrogen can cause severe skin damage. Protective clothing should always be worn

Manual Handling

Dewars must only be transported if correctly and clearly labelled

Keep vessel upright at all times except when pouring from specifically designed Dewars

Try to avoid spillage during handling as this can lead to burns, O₂ depletion and cause damage to labelling

Large Dewars 25litres and above must be moved using a suitable trolley

Protective Clothing

Eye protection:

Goggles or face mask should be used to protect the eyes and face where spraying or splashing of liquid may occur

Protective clothing preferably without pockets or turn-ups where liquid could collect should be worn

Trousers should be worn outside boots for the same reason

Gloves should be non-absorbent leather that are loose fitting so that they can easily be removed if liquid should splash into or on them. Gauntlet gloves **ARE NOT** recommended

Movement of Cryogenic Vessels in Lifts

Small dewars- 2litre and below MUST NEVER be transported in the lift. Movement between floors is via the STAIRS ONLY. If anyone is caught with Dewar containing liquid nitrogen in ANY of the lifts within the building they will be severely reprimanded

Transportation of cryogenic vessels through confined areas of lifts could potentially cause release of the product due to:

Spillage

Venting of the open Dewar or

Via the relief valve/ burst disc.

Hazards arising from such releases include:

Cold burns, frost bite or hypothermia, breathing difficulties or asthma attack also embrittlement to materials causing failure

A dramatic change in the surrounding atmosphere due to expansion of the evaporating liquid leading to oxygen deficiency and resulting in possible asphyxia

Before transporting in lift

1. All cryogenic dewars are transported on suitable well maintained trolleys
2. Pressurised vessels should be vented to atmosphere (in a suitable safe area) until the pressure falls below 50% of relief valve set pressure. All valves should then be closed and the pressure gauge monitored to ensure liquid stability before entering lift.
3. Check open dewars for excessive boil-off and ensure neck plug is fitted correctly

When in Lift

A key is available from the basement workshop which must be signed out and returned immediately after transportation has been completed.

The key should be used in the **PRIORITY SERVICE** lock to prevent access to the lift on any floors other than the basement and the floor onto which the dewar is being transported.

Vessels should be moved between floors **unaccompanied**

Where possible a buddy system should be used, one at the entry and one at the exit of the lift, to prevent public access

Signs shall be placed on the doors of the lift warning of the danger and preventing access

Personnel involved in the transportation of such Dewars are trained and aware of the potential hazard and of the actions to be taken in the event of an emergency

Emergency Procedure

Actions in the event of a spill

Evacuate the area as quickly as possible

Ensure personnel attending the incident are wearing the appropriate PPE

Close doors to prevent the gas flowing along the ground

Open windows and exterior doors to encourage safe evaporation of the nitrogen gas

Do not allow personnel to enter the cloud of condensed water vapour which will be created and restrict visibility

Make sure that the gas has completely dispersed and the air is safe to breathe before allowing anyone to re-enter the area. If in doubt use an oxygen monitor to check levels.

First Aid Treatment for Minor Burn Injuries:

Move victim to comfortable room if possible

Ensure clothing is loose to prevent unrestricted circulation

DO NOT remove clothing stuck to the body until thoroughly thawed

Place affected part in TEPID WATER or run TEPID WATER over for half an hour until skin changes from pale yellow to pink or red. DO NOT use hot water or any other form of direct heat

Cover affected part with bulky dry sterile dressing

Send victim to casualty department of hospital

First Aid Treatment for Asphyxia

If the casualty exhibits any of the following: rapid and gasping breath, rapid fatigue, nausea, vomiting, collapse or unusual behaviour they may be suffering from asphyxia.

Remove the casualty to the open air and follow up with artificial respiration if necessary. Arrange for transportation to hospital without delay

Major Injuries

Send for ambulance (RING 2222)

Follow minor injury procedure as much as possible

N.B All accidents, dangerous occurrences or near misses involving Liquid Nitrogen should be reported to Safety Services using an accident report form AC11 available from the Safety Officer or the General Office