Safe Method of Use – Liquid Nitrogen

HAZARDS

- · Cold contact burns may result from contact with body
- Asphyxiation may occur due to depletion of Oxygen in surrounding air
- Explosion of storage vessels may occur as result of pressure build-up

NOTES

- The temperature of liquid nitrogen of -196°C.
- Liquid nitrogen readily evaporates back into gas and undergoes a large expansion in volume as it does so 1L of liquid nitrogen will produce 680L of nitrogen gas.

TRAINING

• All users of liquid nitrogen must be trained the safe use of this substance – including the contents of this SMoU as well as any equipment/procedures specific to the site of use.

PERSONAL PROTECTIVE EQUIPMENT		
Work with small volumes (<20L) or immersing/removing items only (no decanting)	 Wear safety glasses, laboratory coat, enclosed footwear. Use cryoprotective gloves where practical, but disposable gloves permitted where high level of dexterity required. 	
Transferring/decanting liquid nitrogen from storage vessels ≥20L.	 Wear full face shield, protective apron over laboratory coat, cryoprotective gloves and enclosed footwear. 	

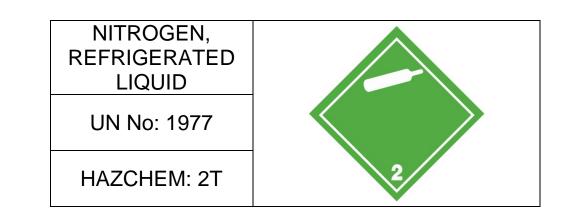
STORAGE

- Do not store in confined and/or poorly ventilated spaces, including cold rooms or basements*.
- Keep volumes stored in laboratories below 50L*.
- Use cryogenic rated storage vessels only DO NOT use domestic thermos flasks.

*Storage of larger volumes or in poorly ventilated areas may be permitted only in association with a documented risk assessment of the Oxygen depletion hazard and with provision of additional control measures (e.g. Oxygen depletion alarms) where necessary (contact H&S Office for a risk assessment).

LABELLING

• Label storage containers (≥20L) as follows:



EMERGENCY PROCEDURES			
Cold contact burns		 In event of cold cold contact burns from extended liquid nitrogen contact: MOVE to a safe distance from any spilled liquid nitrogen REMOVE any saturated clothing RINSE affected area with cold/tepid water using eyewash, drench hose or safety shower DO NOT rub or heat the affected area – seek medical advice for burn injuires. In event of serious injury CALL 111 (1-111 from a University phone) and ask for AMBULANCE. 	
Oxygen depletion/as An oxygen d alarm has be activated, or A large spill liquid nitroge occurred, or Personnel w with liquid ni display signs asphyxia (se	epletion een (>2L) of en has orking trogen s of	 If Oxygen depletion or asphyxiation is suspected: DO NOT enter a suspected Oxygen depleted area. WARN others in vicinity and EVACUATE (activate a FIRE ALARM from a safe place). CALL 111 (1-111 from a University phone) and ask for FIRE. Inform the Fire Service what has happened (Oxygen depletion suspected, nitrogen gas present) Do not re-enter building until the Fire Service advise you it is safe to do so 	
	SIGNS OF ASPHYXIA FROM OXYGEN DEPLETION		
Oxygen Concentration in the air	Signs and symptoms of Asphyxia		
>19.5 - 21%		None (normal air concentration of oxygen is 20.9%)	
>18 - 19.5% >15 - 18%	May affect physical and intellectual performance without person's knowledge. Decreased ability to work strenuously. May impair co-ordination and may induce symptoms in persons with coronary, pulmonary, or circulatory problems.		
>12 – 15%	Respiration deeper, increased pulse rate, and impaired co-ordination, perception and judgment.		
>10 – 12%	Further increase in rate and depth of respiration, further increase in pulse rate, performance failure, giddiness, poor judgment, blue lips.		
> 8 - 10%	Mental failure, nausea, vomiting, fainting, ashen face, blue lips.		
>6 - 8%	Loss of consciousness within a few minutes, resuscitation possible if carried out immediately.		
0 - 6%	Loss of consciousness almost immediate, death ensues, brain damage even if rescued.		

RECORD OF TRAINING I have read and understood the contents of this SMoU:		
Name:		
Signature:		
Date:		