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Responsible Safety

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COSHH Assessment Form [02]

Name of Substance:	LIQUID NITROGEN	Reference:	CAS No. 7727-37-9	
1. Eliminating the hazardous substances: Is it possible to avoid the need to use the hazardous substance and safely dispose of existing quantities?			~~Yes~~	**No**
2. Substitution: Is it possible to use a less harmful substance to do the work?			~~Yes~~	**No**

Before beginning work on the COSHH assessment process ensure you have a copy of the latest Manufacturers Safety Data Sheet (MSDS) for the substance. MSDS's are available from suppliers and manufacturers of products.

3. Describe the activity or work process. Note: Include how long the task will take, how often it will be repeated and how much of the substance is used .	**TRANSFERRING or DECANTING** Description of use: Liquid nitrogen (-196 °C) is used to cool high-temperature superconducting samples below their transition temperatures. Process and exposure duration: The process consists of a trained person decanting from a 200 L liquid nitrogen Dewar into a 4 L hand-held plastic laboratory Dewar (this should take no more than 1.5 minutes) for either direct use at that location or manual transport to another nearby location by a course attendee from which it is then poured into the final sample Dewar. This process might need to be repeated multiple times. Substance amount and handling: When decanting from the 200 L Dewar into a smaller laboratory Dewar, no more than 4 L of liquid nitrogen will be transferred in one continuous period. **INITIAL WARNINGS**: Do not use liquid cryogens unless you have been adequately trained and you feel competent to do so. Always wear personal protective equipment and employ all good practices at all times.	**How long?**	**How often?**	**How much?**
		Explicit exposure to cold liquid <3 min	As often as required	<4 L at a time.

Location of work:	Laboratory							
Persons at risk:	Employees	✓	Students	✓	Others	✓	Vulnerable persons	✘

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Classification – Place an X in the box next to the appropriate sign. For a fuller understanding of symbols, abbreviations, risk and safety phrases click on this link http://www.hse.gov.uk/chemical-classification/labelling-packaging/index.htm								
 Irritant		 Flammable		 Oxidising	
 Toxic		 Compressed Gas	X	 Serious long term health hazard	
 Corrosive		 Explosive		 Dangerous to the Environment	

	
Skin Contact:	Contact with evaporating liquid may cause frostbite or freezing of skin. If clothing is saturated with the liquid and adhering to the skin then the area should be thawed with lukewarm water prior to removing the clothing.
Eye Contact:	Rinse the eye with water immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.
Ingestion:	Ingestion is not considered a potential route of exposure.
Inhalation:	May include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Indicate below which form the substance takes:															
Gas	✓	Vapour		Mist		Fume		Dust		Liquid	✓	Solid		Other	
Indicate below which route(s) of exposure the substance takes:															
Inhalation	✓	Skin	✓	Eyes	✓	Ingestion		Other							
Specific Hazards															
Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.															
Workplace Exposure Limits (WELs)															
Long-term exposure level (8hrTWA): **None**								Short-term exposure level (15mins): **None**							
List the risks to health below from exposure to the substance click here information on hazard statements http://www.hse.gov.uk/chemical-classification/labelling-packaging/hazard-precautionary-statements-signal-words.htm															
H281 : Contains refrigerated gas; may cause cryogenic burns or injury.															
Control Measures: List below control measures e.g. extraction, ventilation, supervision, include additonal controls for vulnerable persons where necessary															
1. Ventilation and/or extraction 2. Oxygen detector(s) fitted in laboratory								**Certain substances may react adversly if they come into contact with others, please list any compatibility warnings here:** Cryogenic liquids can cause embrittlement of some metals and alter the physical properties of other materials. No reaction with any common materials in dry or wet conditions.							
Is health surveillance or monitoring required? (remember health surveillance may be required for vulnerable persons e.g. pregnant/young workers those with asthma, dermatitis etc)								~~Yes~~ (refer to occupational health)		**No**					

Personal Protective Equipment (identify type and specification)			
 Dust mask	N/A	 Visor	Safety eyewear, goggles or face-shield to EN I66 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases
 Respirator	N/A	 Goggles	Safety eyewear, goggles or face-shield to EN I66 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases
 Gloves	Wear cold insulating gloves	 Overalls	Wear apron or protective clothing in case of contact.
 Footwear	Feet must be fully covered with shoes or boots in case of spillage. Footware should be easy and quick to remove and without open holes.	 Other	N/A

Fire (identify appropriate fire extinguishers)									
Dry Powder	✓	CO2	✓	Water	✓	Foam	✓	Fire Blanket	✓

During combustion substances may give rise to harmful vapours/gases etc please detail below:
No harmful substances are released during combustion, however, heat may cause the containers to explode.

Storage:
Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material.

Disposal of waste substances & containers please indicate below (for advice contact 46042)									
Hazardous Waste		General Waste		Biological Waste		Return to Supplier		Other	✓
If other please state: Do not discharge into any place where its accumulation could be dangerous. Vent to atmosphere in a well ventilated place.									

Risk Evaluation (using risk matrix)					
Uncontrolled risk level:	**ALERT**		**Controlled risk level:**	**CARE**	
Person(s) involved in COSHH assessment:	Dr. Mark J. Raine				
Date:	03/11/2026	**Signature:**	M. Raine	**Review date:**	03/11/2029

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RISK LEVEL		Likelihood of Occurrence			
		Very Unlikely Little or no chance of occurrence	**Unlikely** A rare combination of factors would be required for an incident to result.	**Possible** Not certain to happen but an additional factor may result in an accident	**Probable** More likely to occur than not
Hazard Severity	**Minor** No or minor injury (first aid)	**CARE**	**CARE**	**CARE**	**CAUTION**
	Moderate Off-site medical treatment or DAFW*	**CARE**	**CARE**	**CAUTION**	**ALERT**
	Serious More than one DAFW, long-term absence	**CARE**	**CAUTION**	**ALERT**	**STOP!**
	Major Permanent disability or harm, fatality	**CAUTION**	**ALERT**	**STOP!**	**STOP!**

***DAFW – Day Away From Work**

CARE	Minor harm possible, serious harm very unlikely to occur; implement controls and ensure care is taken when performing activity.
CAUTION	Minor harm probable, major harm unlikely to occur; follow all control measures, increased level of competence required and ongoing self-assessment of risks identified.
ALERT	Moderate degree of harm probable but major harm unlikely; critically assess the risks and appropriate controls. Specific competence required and ongoing assessment of risks by individual and/or supervisor.
STOP!	Serious or major harm will probably occur; stop the activity and critically assess the risks, review safety aspects of activity and implement further, appropriate controls. Consider referencing HSE or other Best Practice, consider involving HSS.