STFC Risk Assessment

Ref:	Title: Transportation & Craning of Dewars in Experimental Halls, Transport of Dewars by Van
Assessment Date:22/05/2025	Rm/Building/STFC Site: Main Hall & Cryogenic Labs / R80 / R55 / RAL
Main Assessor: XXXXX XXXXXX	Department: ISIS
Assessment Team involved: XXXX XXXXX	Persons or Groups of people exposed: IEOD cryogenics team, beamline scientists, beamline users, other R80 / R55 main hall users
Activity/Task being assessed (and any other relevant details, e.g. photos or related risk assessments/COSHH assessments etc. and where to find them): Transport & craning of cryogenic dewars containing liquid helium or liquid nitrogen. See generic risk assessments for ISIS beamlines and halls on the ISIS-Safety risk assessment store: (https://stfc365.sharepoint.com/sites/ISIS-HealthAndSafety/SitePages/ISIS-Risk-Assessments.aspx). Procedure following a cryogenic spill/accident can be found at https://www.she.stfc.ac.uk/Pages/SC03-Appendix-4.aspx, and is pasted at the end of the RA.	

Step 1 What are the hazards (activities which may cause harm)? Hazard/Task or Situation	Step 2 Who might be harmed?	How might they be harmed?	Step 3: Existing risk control measures in place?	Level of risk? (see guidance attached) H Harm	L Likelihood	R Risk	Further control measures, if necessary?	Step 4: Who will take these actions forward and completed by when? Action by whom	When	Done
Lifting Operations (Craning)	Cryogenics Team members, Instrument Scientists, Lifting Operations Team	Crush and impact injuries; cold burns or asphyxiation if dewar falls & bursts	**Eliminate/Substitute**: Use goods lifts where available instead of craning onto different floors. **Engineering Controls**: Only inspected and coded lifting equipment used on site. Lifting cabinets access controlled (locks). Pressure relief devices on dewars per PSSR, and labs/halls fitted with oxygen depletion systems if indicated by depletion assessment. **Administrative Controls**: 6 monthly inspections of lifting	High	Unlikely	Med				

			equipment. Visual check before lifting equipment used. Only trained personnel allowed to use cranes. Larger or more complex lifting operations performed by the heavy gang with cryogenics team assistance. Banksman to assist during craning operations not requiring the Heavy Gang. Check surroundings thoroughly during lifting operations. Keep well clear of lifting path. Never stand underneath load. Monitor lift area for other/untrained individuals looking to pass through, and halt lift if necessary until safe to continue. **PPE**: Safety shoes worn during lifting operations. Protective gloves when interacting with lifting hooks.							
Transport of dewars – manually moving	Cryogenics Team members	Crush and impact injuries, cryogenic burns, oxygen deficiency & loud noise in event of dewar falling	**Eliminate/Substitute**: N/A **Engineering Controls**: Multiple pressure relief devices on all dewars per PSSR. **Administrative Controls**: Only approved and inspected dewars used (passed annual PSSR inspection). Visual check before dewar moved, in particular check wheel stability and integrity, including connection to dewar body. If in any doubt about a vessel, leave dewar in place out of fire lane & contact helium recovery team about dewar. Check surroundings thoroughly	High	Unlikely	Med	None			

			before & during transport. Inspect path prior to movement. Transport slowly and follow smoothest & most level path to avoid dewar tipping. On beamlines & in halls, be mindful of surrounding equipment & changes in elevation (e.g. stairs, instrument pits, etc.). **PPE**: Safety shoes							
Transport of dewars – manual handling	Cryogenics Team members	Musculoskeletal injury	**Eliminate/Substitute**: N/A **Engineering Controls**: Regularly grease castors (1x per year) to reduce effort needed to steer/move dewars **Administrative Controls**: Personnel to have manual handling training before handling any dewars. On areas with prominent/extended gradient or for larger/heavier vessels, work in pairs to move dewars. Do not try to catch a falling dewar! If any issues with how a dewar moves, raise with helium recovery team. **PPE**: Safety shoes	Moderate	Unlikely	Med				
Transport of dewars – by van	Cryogenics Team members	Cold burns, crush & impact injuries, oxygen deficiency & loud noise in event of dewar falling	**Eliminate/Substitute**: N/A **Engineering Controls**: Cryogens held in appropriately insulated vessels with pressure relief valves – ensure travelling valves open for transit. Front of van (where people sit) is completely isolated from back of van, eliminating oxygen deficiency	Moderate	Unlikely	Med				

			hazard in transit. **Administrative Controls**: Interaction with cryogenic equipment by trained and competent persons, as per SC03 and training therein. Check retaining bars are secure before driving with dewars in back of van. Before unloading dewars, ensure lift gate is level with back of van & wheel flaps are up. Load/unload van on most level surface possible. On inclines, have a colleague assist getting dewars onto or off of tail lift. Ensure back of tail lift rests on the ground before removing dewars, to prevent them from falling on you. If a dewar tips over in back of van & starts exhausting, treat as any other oxygen depletion risk in an enclosed space (use O2 personal monitor) & contact supervisor. Any dropped/fallen/hit vessels must be removed from service & pass a reinspection before returning to service. **PPE**: Safety shoes							
Untrained/Other people present in area.	Beamline users, visiting scientists, visiting students, contractors, staff from other ISIS teams, members of public on guided tours.	They are likely to be un-trained and may not appreciate the full range of hazards present.	**Eliminate/Substitute**: N/A **Engineering Controls:** Access control prevents untrained people entering R55 or R80. Cryogenic laboratories have additional access control. Beamlines are under an interlock system.	Moderate	Very Unlikely	Low	None			

			Administrative Controls: Members of the public are always accompanied by a competent person. Users, scientists, and students complete training before access granted and are assessed as competent by their local host before interacting with any beamline equipment. Other ISIS team members undergo mandatory training before access to Main Halls is granted. Security and cleaners have their own risk assessment which states no equipment to be touched. **PPE:** N/A							
Vacuum Systems	Cryogenics Team, Instrument Scientists	Hearing damage, and strikes by projectiles in case of vacuum failure	**Eliminate/Substitute**: N/A **Engineering Controls**: Pressure relief valves (incl. bursting discs) in place in alignment with PSSR regs protect in event of sudden loss of vacuum causing cryogens to see room temperature & boil rapidly. **Administrative Controls**: Vacuum systems designed by competent suppliers to eliminate design hazards. No non-authorised repair or modification to vacuum systems. Failures to be reported and vessels removed from service until repaired. All repairs to the pressure vessel portion of dewars will be contracted to a suitable individual or company, and shall	Moderate	Very Unlikely	Low	None			

			be reinspected & recertified prior to returning a repaired dewar to circulation. Repairs to non- PSSR components (e.g. wheels) to be approved in design by a PSSR competent individual, then reinspected before dewar is returned to circulation. **PPE**: N/A							

SC03 - Appendix 4

Emergency procedures

Before entering an incident area ensure that it is safe to do so since it is possible for an oxygen deficient environment in the vicinity of a major cryogenic accident to be present. Cold gas will displace ambient air including oxygen.

Remove victims to a known safe zone before administering first aid. Report the incident immediately by calling 3333 at DL and 2222 at RAL and Swindon and 222 at UK ATC to initiate the First Aider response. Severe cryogenic "burns" are similar to burns from fire.

Beware that liquid helium can liquefy oxygen in the air so all sources of ignition should be removed from the area.

Cryogens Accident Checklist

During Cryogenic Accident:

- Do not rush into the area where somebody has physical collapsed through probable asphyxiation, since you are also likely to become a casualty.
- Evacuate the area, and deploy warning signs if necessary.
- Thoroughly ventilate the area, opening doors and windows or using active forced ventilation systems.
- In case of Dewar rupture, evacuate area immediately.
- Close open valves if possible.
- Do not re-enter the area without self-contained breathing apparatus unless it is proved safe to do so. The presence of oxygen deficiency monitors will indicate the oxygen levels in the vicinity.
- If liquid helium is present, remove direct sources of ignition because of the potential for oxygen enrichment.
- Prevent liquid cryogens from entering drains, basements, pits or any confined space where accumulation may be dangerous.

Immediate Treatment:

- **Do not** pull clothing away from burned or frozen skin.
  Warm the contact area by immersion in warm water (approximately 38°C), with body heat, or warm air.
- **Do not** use an open flame or other significant heat source to warm burned or frozen skin.

NOTE: This procedure is the opposite of the procedure for a burn injury which is to rapidly cool the contact area.

- **Do not** rub or massage the affected area.
- **Do not** permit smoking or alcohol consumption.
- **Do not** give analgesics (e.g. paracetamol, aspirin).
- Prevent infection by cleansing with mild soap and water.

After Cryogenic Accident:
Remove injured personnel: Do not use intense heat on frozen skin; warm very slowly with warm water; resuscitate if necessary; get immediate medical help.
Ventilate the area.
[End of SC03 Appendix 4]

Note that there are personal O2 monitors at CryoLab, MagLab, and R108 that can be used to prove an area safe to reoccupy following a cryogenic spill/accident.

Distribution List:	Signed:	Date:
IEOD Cryogenics Team		
Has the assessment been entered into the Evotix Assure database?	Yes ☑ No ☐ Evotix Assure ref no:	
Step 5 Review Date: 23/05/2026	▪ Review your assessment to make sure you are always improving the identification of hazards and control measures. ▪ If there is a significant change in your workplace, remember to check your risk assessment and where necessary, amend it.	

What is the level of risk? For each hazard, choose the 'Harm' and 'Likelihood'. Choose 'the most likely reasonably foreseeable injury' and **not** just the worst case outcome. For example, it is very unlikely that someone would be killed from falling from a footstool, the most common injury is likely to be a minor injury which may or may not require attention from a First-Aider.

E.g. if Harm was 'Moderate' and Likelihood 'Unlikely' the Risk would be 'Medium'.

		If control measures are not adhered to potential harm is likely to be:				
HARM	**Major**	Fatality	High	High	V High	V High
	High	Fatality or life changing injuries or serious health effects	Med	Med	High	V High
	Moderate	Time off work, e.g. broken bones, stress or musculoskeletal injury	Low	Med	Med	Med
	Slight	Minor injury which may or may not require First-aid treatment	Low	Low	Low	Low
			Very Unlikely	**Unlikely**	**Likely**	**Very Likely**
			Conceivable but difficult to realise. Would require a combination of several failures	Can be envisaged but is unlikely. Never previously happened in STFC	Can be anticipated to happen. Has previously been known to happen in STFC	Can be anticipated to happen. Has previously been known to happen on site
			LIKELIHOOD			

[Please note this matrix is reversed on SHE Assure, this is due to the software design and currently is unable to be altered. However, the meaning of the risk categories are the same.]

Where:

Low Risk	No additional controls are necessary unless they can be implemented at very low cost (in terms of time, money and effort) or there is a mandatory requirement within legislation. Actions to further reduce these risks can be assigned low priority.
Medium Risk	Consideration should be given as to whether the risks can be lowered, where applicable, to a low risk level, but the costs of additional risk reduction measures should be take into account. The risk reduction measures should be implemented within a defined time period.
High Risk	The controls put in place are critical and it is imperative that they are monitored by a line manager (or equivalent) on a regular basis to ensure they are in place. Risk reduction measures should be contemplated as per the hierarchy and favour engineering controls over administrative controls and PPE. Additional controls may require extra resources and these would be justifiable.
Very High Risk	Additional control measures **must** be implemented to reduce the risk, regardless of cost, or a decision taken to terminate the activity until the risk level can be reduced.

What are you already doing? The 'Control Hierarchy' provides a simple prompt to consider the various types of control measure that are or could be established for any given hazard. The examples below are provided for illustration but are not an exhaustive list.

Eliminate/Substitute	Redesign job or substitute a substance so hazards are removed or eliminated. For example, avoid working at height or substitute a carcinogenic substance with a less hazardous substance.
Engineering Controls	For example: Local Exhaust Ventilation (LEV) to control risks from dusts or fumes; Interlocks/guarding of machinery; Access control; Emergency stop within reach. Also, the complete enclosure of the operator or the hazardous machinery/equipment. Give priority to measures which protect collectively over individual measures.
Administrative Controls	For example: training; reducing the time workers are exposed to hazards (e.g. by job rotation); prohibiting lone working; prohibiting use of mobile phones in hazardous areas; safety signage. Also, performing risk assessments, safe systems of work or a laser standing order.
Personal Protective Equipment (PPE)	Only used as a control measure after all the previous measures have been considered and determined to be ineffective in controlling the risks to a reasonably practicable level. For example: safety shoes, gloves, safety spectacles, hard hat, fall arrest harnesses. It is not sufficient to say 'PPE used', the type of PPE required must be specified.

Note: if one section such as PPE is not applicable, do not delete it but instead insert "PPE: N/A". This shows that it has been considered and deemed not relevant for this activity.