

Chemistry Risk Assessment

Room No: B12

Building MSRH

Persons in charge of area

S.J. Elliott

What is the hazard(s) or hazardous activity?	Working with cryogenic magnets or in an area containing cryogenic magnets.
Who may be affected?	<input checked="" type="checkbox"/> Students and staff in lab <input checked="" type="checkbox"/> Cleaners <input checked="" type="checkbox"/> Maintenance staff <input checked="" type="checkbox"/> Engineers Other – Any visitor to the area
How will injury occur?	<ol style="list-style-type: none"> 1) Interaction with stray magnetic field surrounding magnets 2) Hazards associated with use of liquid nitrogen and liquid helium, both in normal magnet/cryoprobe refill operations and in the event of a magnet quench. A quench will occur if liquid helium level becomes too low OR if some external event causes a sufficient flux change within the magnet – e.g. impact of a ferrous object on the magnet casing. 3) Hazards associated with using steps in operations on magnets.
What is the likely outcome?	<ol style="list-style-type: none"> 1) THERE IS A SPECIFIC HAZARD TO ANY PERSON FITTED WITH A CARDIAC PACEMAKER OR SIMILAR MEDICAL IMPLANT. Such persons should seek medical advice before entering a magnet room and must certainly keep well outside the 5 gauss area. No ferrous object may be taken within the 5 gauss area to avoid the risk of substantial equipment damage and possible injury to the persons involved. 2) Magnet refilling/cryoprobe operations involve delivering cryogens via appropriate piping to the magnet cryostat or cryoprobe Dewar, respectively. Corresponding volumes of very cold gas are displaced from the cryostat tanks by the process and contact with this must be avoided. Appropriate PPE must be used in handling the very cold pieces of equipment used in these operations. In the (rare) event of a quench very large volumes of helium gas will be released in a very few minutes and may significantly depress the oxygen concentration in the room, creating an asphyxia hazard. 3) Step ladders accidents could cause personal injury and equipment damage.
What control measures are in place?	<ol style="list-style-type: none"> 1) Floor markings indicate approximate 5 gauss lines: warnings against crossing these under any circumstances are displayed on doors. 2) Appropriate PPE is used when handling cryogens. Cryogen storage vessels are appropriately maintained. The rooms have a forced ventilation system supplied from plant room and a back-up manually controlled extract fan. Oxygen depletion sensors are fitted at high and low level locations in the room and will trigger audible and visual alarms if an asphyxia hazard occurs. Portable oxygen sensor held in G07 as a back-up.

WHAT MIGHT HAPPEN?	WHAT EMERGENCY PROCEDURES ARE REQUIRED?
Cryogen spillage or major gas release from equipment.	Be prepared to evacuate room immediately if oxygen depletion sensor triggered – keep personnel away from liquid as much as possible
Skin/eye contact: (liquid or gas at cryogenic temperatures)	<input checked="" type="checkbox"/> Wash with copious amounts of running water for 20 mins <input checked="" type="checkbox"/> Other - please describe tepid only NOT hot water
Oxygen depletion alarm operates (flashing beacon and sounder in room and corridor outside)	Do NOT enter room if outside. If in room, evacuate immediately. Notify specialist NMR staff if they are immediately available. If anyone may be left in room, summon persons with Breathing Apparatus – quickest response may be from Fire and Rescue service. (Phone 4444)
Failure of oxygen depletion sensor	Verify oxygen level using portable oxygen concentration meter held in reserve in G07
Failure of other engineering control measure:	<ol style="list-style-type: none"> 1) Failure of ventilation -- Do NOT enter room if outside. If in room, evacuate immediately. Notify specialist NMR staff if they are immediately available. If anyone may be left in room, summon

	persons with Breathing Apparatus – quickest response may be from Fire and Rescue service. (Phone 4444)
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Prepared by S.J. Elliott