

## Risk Assessment

<b>Procedure</b>	Safe handling of compressed gas cylinders
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<b>Name(s) of person performing the work</b>	Users (Lab manager & Lab Technician & Tenants & Licensee's)		
<b>Name &amp; position of assessor</b>	Khwaja Islam & Laboratory Manager	<b>Signature</b>	
<b>Date of assessment</b>	15/08/2018	<b>RA Number</b>	BioE 0002

### Scope:

Gas cylinders present a number of different hazards for example size, shape and weight, pressure and product hazards in work place. Gas cylinders are generally heavy and are relatively unstable due to the base diameter to height ratio. Large cylinders can weigh over 100 kg when full and being tall and thin they are easily toppled over. Cylinder handlers can be at risk of injury if attempting to stop a falling cylinder or coming into contact with a falling cylinder. Gas cylinders are awkward objects to move safely. Cylinders contain gases stored under pressure and will have significant stored energy. Any pressure above atmospheric released from a cylinder has the potential to cause injury to personnel, or damage to plant or property. All gas cylinders contain gases under pressure and may present a risk of explosion if not safely handled and stored. All gases have different properties and each has its associated hazards. CO<sub>2</sub> gas cylinders is heavier than air and therefore may accumulate in confined spaces, particular at or below ground level.

This document defines the principle of safe practice for handling compressed gas cylinders and only trained personnel can handle gas cylinders. Refer to safety data sheet by BOC. **Cross Ref. to University of Oxford Guidance Note: S5/03.**

### Potential hazards

Substance or item handled	Associated Hazard (s)	Existing Control Measures	Risk (L/M/H)	Further Action required	Risk (L/M/H)
Carbon Dioxide Gas Cylinder (vapour phase)	<p>Gas under pressure. Asphyxiation in high concentration.</p> <p>Heavy cylinders—up to 99 kilos and unstable objects and as such can present considerable damage for those handling them - strain injury.</p> <p>Manual handling injuries</p> <p>Impact from falling cylinders.</p> <p>Impact from parts of gas cylinders or valves that fail, or any falling debris.</p> <p>Impact from blast of a gas cylinder explosion or rapid release of compressed gas.</p> <p>Contains gas under pressure; may explode if heated (H280).</p>	<p>Only experienced and trained personal should handle gases under pressure.</p> <p>Wear appropriate PPE when handling gas cylinders.</p> <p>Eye Protection: safety glasses are worn when transporting or removing or connecting to the pigtail on the automatic manifold and to avoid exposure to liquid splashes. Guideline: EN166 personal eye protection.</p> <p>Hand protection: Suitable gloves are worn (hide gloves) when handling gas cylinders. Guideline: EN388 protective gloves.</p> <p>Safety footwear: suitable footwear is worn when handling gas cylinders (safety boots/shoes). Guideline: ISO 20345 PPE-safety footwear.</p> <p>PPE is inspected by the user on a regular basis. Manual handling and compressed gas safety training attended by personnel.</p>	M	No further action required if the existing control measures are adhered to.	M

		<p>Three/two wheeler trolleys are available for moving gas cylinders &gt;5m or churning method for short distance &lt;5m. Trolleys inspected to ensure good condition. Signage on the gas storage room (696.18.07).</p> <p>All personnel who are required to handle gas cylinders shall receive suitable information and instruction regarding the hazards associated with gas cylinders and the gases being stored within them, and provided with the necessary skills and knowledge to carry out their job safely. Always ensure gas cylinders are secured when not being moved.</p> <p>Do not attempt to catch a falling cylinder; get out of the way!</p> <p>Stored in a well-ventilated place outside in the car park. Fully (including part-used) and empty cylinders will be segregated within the gas storage room (i.e. one cage for full and one for empty cylinders). Empty cylinders will have red tag sign “empty cylinders” and full cylinders have green tag sign “full cylinders ready for use”.</p>			
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<p>Vehicle(s)</p> <p>Parking areas</p> <p>The gas storage room shall have adequate protection against vehicle impact.</p>	<p>Hazardous gas properties creating danger to people and equipment.</p> <p>Potential of vehicle to act as an ignition source.</p>	<p>A crash curb (i.e. low level concrete protection) is in front of the gas storage room which should protect all cylinders from potential impact from vehicles.</p> <p>The gas storage room is kept secure at all times and access is controlled and only authorised personal have access to the gas storage room.</p> <p>The gas storage room has plenty of ventilation as it is outside located in the car park.</p> <p>Appropriate signage displayed on the gas storage room for inert gasses at present.</p>	<p>M</p>	<p>Regular checks for structural damage to be carried out OUED FM.</p>	<p>M</p>
<p>Delivery and collection of gas cylinders</p>	<p>Impact during delivery</p>	<p>All delivery and collection of cylinders is supervised with appropriate management controls in place to ensure:</p> <p>Clear access to and within the gas storage room, All vehicles have their engines turned off, with the handbrake applied, when cylinders are being loaded or unloaded. The movement of cylinders is only carried out by trained persons using the churning method for short distance &lt; 5 m. Handling is only to be conducted following an appropriate assessment.</p>	<p>L</p>	<p>No further action required if the existing control measures are adhered to.</p>	<p>L</p>



		<p>Each cylinder product is identified and a Safety Data Sheet is available. Each cylinder is positioned and secured in its designated area. Vehicle movements onto a site shall be managed. The specific delivery and collection point is the distribution centre (i.e. Goods In). The person collecting the gas cylinder is aware of their duties with regard to the carriage, handling, storage and safe use of the cylinder and its contents.</p>			
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### Persons potentially at risk:

Only the user or others near by

### Action in event of an accident or emergency:

1. **Accidental release:** Evacuate area, call BOC, and wear self-contained breathing apparatus when entering area unless atmosphere approved to be safe. Ensure adequate air ventilation.
2. **Fire:** Dial **4444** for emergency services and call BOC (0800 111 333) and evacuate the area. On arrival, emergency service should be informed of the type of gas present in the area affected. Cylinders may burst, vent or explode when subjected to extreme temperature so avoid using fire extinguishers unless the fire is small and can be dealt with very quickly. If in any doubt, evacuate & leave it professionals. Do not approach any cylinder which has been affected by fire. The emergency services and BOC will deal with the matters when safe to do so and BOC will recover from the disposal.
3. **Falling Cylinder:** If a cylinder falls over, never attempt to catch it, it is much too heavy and will cause serious injury. It is also very robust and is unlikely to be damaged although it may make a loud noise. Competent help should be called to assist to sit it up.
4. **First Aid Measure:**

General: In high concentrations may cause asphyxiation. Symptoms 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 CPR if breathing stopped.

**Inhalation** - Remove victim to uncontaminated area wearing self-contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

**Eye contact** - Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Obtain medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.

**Skin contact:** contact with evaporating liquid may cause frostbite or freezing of skin.

**Ingestion:** ingestion is not considered a potential route of exposure.

### **Arrangements for monitoring effectiveness of control:**

Weekly inspection of autochange manifold to check that:

- a) The equipment looks to be in good order, is being used correctly and all necessary equipment is fitted.
- b) The manifold framework and chains are in good condition.
- c) The pigtailed are in good condition.
- d) Valves shut off and reopen correctly.
- e) The area is clean and is not used as a general store.
- f) Regular checks for leaks.

Annual service inspection of autochange gas manifold by external contractor.

**Review of the Risk Assessment:**

Date of review		Name of reviewer	
Date of next review		Signature	

Have the control measures been effective in controlling the risk?

Yes	No
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Have there been any changes in the procedure or in the information available which affect the estimated level of risk from the listed substances

Yes	No
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What changes to the control measures are required?

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**Receipt of Risk Assessment:**

This assessment has been issued to and read by:

Name	Date of receipt	Signature


