

Risk Assessment: Transportation, Operation and Storage of Compressed Gas Cylinders

Hazards	Who Might be Harmed and How?	Existing Control Measures	Further Actions Required	Responsible Person	Date
Musculoskeletal, crush and impact injuries	<i>Research staff, students, temporary or visiting researchers transporting gas cylinders.</i> Improper manual handling of gas cylinders could result in musculoskeletal injuries e.g. muscle strain and back pain. If a gas cylinder were to fall and strike a user, this could lead to broken bones or blunt-force trauma. If a regulator were to fall and damage the main cylinder valve, the sudden release of gas at high pressure could result in injury if users were struck by a projectile. If a gas regulator / manifold connection is not attached to the cylinder correctly, the regulator / high-pressure hose could be ejected at high speed, causing serious impact injuries.	Gas regulators are removed before transport to reduce the risk of damage to the main cylinder valve in the event a cylinder falls. Cylinder trolleys are used when transporting gas cylinders. Cylinders are kept in an upright position and secured to the trolley with a chain. The individual moving the cylinder is deemed physically capable of doing so and has received training on the safe transportation of compressed gas cylinders. Where possible, cylinders should be transported in pairs and the route taken should be clear of obstacles. In the laboratory, cylinders are stored in an upright position and securely fastened to a wall / bench. Regulators should be installed correctly ensuring a tight connection. If a user is unsure whether a connection is effective, the cylinder valve should not be opened until it has been inspected by the mechanical workshop engineer or suitably experienced laboratory user.	Provide departmental gas-cylinder training to complement local laboratory training in the transportation, operation and storage of compressed gas cylinders	Kevin Jones	To complete by August 2026

Hazards	Who Might be Harmed and How?	Existing Control Measures	Further Actions Required	Responsible Person	Date
Fire & Explosion	<i>Staff, students or visitors in the vicinity of a compressed gas cylinder.</i> If flammable gas were to be released from a damaged cylinder / regulator this could produce a flammable / explosive atmosphere. Introduction of an ignition source could result in a fire or explosion. Exposing oil / lubricant to oxygen gas could lead to rapid oxidation resulting in fire. Gas cylinders subjected to an external heat source may become over-pressurised resulting in a rapid release of the cylinder contents and possible rupture of the cylinder. Acetylene gas can undergo spontaneous internal heating if subject to an external heat source or mechanical shock.	Only correct regulators for the selected gas cylinder are used and the regulator is inspected for signs of damage before use to limit the likelihood of an accidental release. After installing a regulator, a leak test is performed to ensure flammable gas is not escaping. Oil / lubricant (or PTFE tape) is not used to secure a regulator to an oxygen cylinder. When working with a flammable gas, ignition sources are removed from the immediate vicinity. Smoking in the vicinity of gas cylinders is prohibited. Fire extinguishers are available to help laboratory users attempt to extinguish fires developing in the vicinity of compressed gas cylinders. Acetylene gas cylinders that have experienced mechanical shock are allowed to settle for 24 hours before use.	Provide departmental gas-cylinder training to complement local laboratory training in the transportation, operation and storage of compressed gas cylinders	Kevin Jones	To complete by August 2026

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Poisoning	<i>Research staff, students, temporary researchers working in the laboratory.</i> If a cylinder / regulator were to fail and release a toxic gas, this could lead to poisoning and, in extreme cases, could be fatal.	Only correct regulators for the selected gas cylinder are used and the regulator is inspected for signs of damage before use to limit the likelihood of an accidental release. After installing a regulator, a leak test is performed to ensure toxic gas is not escaping. Fixed gas-detection systems (e.g. carbon monoxide) are installed in laboratories to provide an early warning of toxic gases in the atmosphere. Where possible, small gas cylinders ("lecture bottles") are stored in a fume cupboard or glove box as an additional safety measure. Personal gas monitors can be worn for additional protection.	No further actions currently required, but risk assessment subject to regular review.	N.A.	N.A.

Hazards	Who Might be Harmed and How?	Existing Control Measures	Further Actions Required	Responsible Person	Date
Asphyxiation	Research staff, students, temporary or visiting researchers using / transporting gas cylinders in a confined space. If a gas cylinder or regulator were to fail in a confined space, oxygen could be displaced, resulting in oxygen depletion and a risk of asphyxiation.	A physical barrier has been installed to prevent access to the lift when a gas cylinder is being transported. Fixed gas-detection systems (e.g. oxygen depletion) are installed in areas that have the potential for large volumes of gas to be released to provide an early warning of an oxygen depleted atmosphere. Signage is displayed informing building users not to travel with a gas cylinder under any circumstances. The risk of asphyxiation is highlighted as part of the health & safety induction process.	No further actions currently required, but risk assessment subject to regular review.	N.A.	N.A.

Hazards	Who Might be Harmed and How?	Existing Control Measures	Further Actions Required	Responsible Person	Date
Burns	<i>Research staff, students, temporary or visiting researchers working in the laboratory.</i> If a gas cylinder or regulator were to fail, the release of corrosive gas could cause burns.	Only correct regulators for the selected gas cylinder are used and the regulator is inspected for signs of damage before use to limit the likelihood of an accidental release. After installing a regulator, a leak test is performed to ensure corrosive gas is not escaping. Pipework / regulators used with corrosive gas is regularly inspected for signs of corrosion.	No further actions currently required, but risk assessment subject to regular review.	N.A.	N.A.

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Use of incompatible materials	<i>Research staff, students, temporary or visiting researchers working in the laboratory.</i> Acetylene gas can react with copper and copper alloys to form explosive compounds.	Avoid contact between acetylene gas and valves that contain copper, including brass valves and some types of steel valves.	No further actions currently required, but risk assessment subject to regular review.	N.A.	N.A.

Training Requirements:

Individuals transporting and using compressed gas cylinders must receive training. Currently this training is delivered at individual group level, however, the School of Chemistry aims to deliver a general course for all that can be complemented by lab-specific training.

Specialised Emergency Response (if required):

Cylinder Falls: If a cylinder falls, alert those in the surrounding area and, if safe to do so, return the gas cylinder to an upright position. If the cylinder has been damaged or has ruptured, leave the area and inform your H&S coordinator.

Fire: If a fire breaks out near a gas cylinder, attempt to extinguish the fire with an extinguisher. If you are unable to extinguish the fire, trigger the fire alarm, evacuate the building and phone 999. Please pass any information to a fire warden who can make the emergency services aware.

Gas Leaks: In the event of a minor leak of a toxic, flammable or asphyxiant gas, evacuate the local area and inform your H&S coordinator. In the event of a major leak that could impact on the wider department, trigger the fire alarm and evacuate the building

Version Control:

Version Number	Purpose or Changes	Document Status	Author of Changes, Role and School/ Unit	Date
1.0	Original Document	Published	Kevin Jones, Chemistry	14/11/2025
2.0	Updated contents to include further description of hazards associated with incorrect connection of regulators	Published	Kevin Jones, Chemistry	05/06/2026