



**TUS**

**Technological University of the Shannon:  
Midlands Midwest**

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# **TUS Midlands Policy, Procedures and Guidance for the Handling, Use and Storage of Compressed Gas**

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# **TUS Midlands Policy, Procedure and guidance for the Handling, Use and Storage of Compressed Gas**

## **Policy**

TUS Midlands has developed this compressed gas policy & procedure to ensure good standards of Health and Safety are being implemented and maintained throughout the Midlands Campus.

## **Purpose**

This policy is intended to set out Midlands approved procedures for the care and use of compressed gases throughout the Midlands Campus is so far as:

- 1) There is an awareness of the hazards associated with compressed gas amongst users.
- 2) There are standardised work practices across the Midlands for use and care of compressed gas equipment.
- 3) That relevant staff are trained in the proper handling, storage & use of compressed gas.
- 4) That complying with these approved procedures will minimize the possibility of injury or harm to our staff and students.
- 5) That operating in accordance with this policy will ensure compressed gas practices in the Midlands Campus is complying with the Health and Safety legislative requirements.

## **Scope**

This policy covers all Faculties, Departments and Units including campus companies operating on the Midlands Campus, where they intend to handle, use or store compressed gas or equipment supplied or powered by compressed gas. It is applicable to daily users and those who only occasionally have cause to use the equipment.

## **Review**

The Midlands Campus will review and update this policy and procedure in accordance with the TUS Parent Safety Statement requirements. A review for update will be based on:

- A walk-through of the facility, and/or
- Views from managers and staff on the level of impact of the current procedures

## **Definitions**

### **TUS Unit**

A shorthand term used in this policy to denote and include any Midlands Campus Faculty, Department, Section, and Campus Company who provides assigned functions or services on behalf of the Institute. Most TUS Units are made up of management and staff with assigned responsibilities and duties who operate from an TUS campus building.

### **Compressed Gases**

Compressed gases stored in cylinders in TUS Midlands can be divided in three major types; liquefied, non-liquefied and dissolved gases as follows: -

#### **Liquefied Gases**

Liquefied gases are gases which can become liquids at normal temperatures when they are inside cylinders under pressure. They exist inside the cylinder in a liquid-vapour

balance or equilibrium. Initially the cylinder is almost full of liquid, and gas fills the space above the liquid. As gas is removed from the cylinder, enough liquid evaporates to replace it, keeping the pressure in the cylinder constant. Anhydrous ammonia, chlorine, propane, nitrous oxide and carbon dioxide are examples of liquefied gases. Cryogenic liquefied gases consist of gases that have been cooled below their boiling points.

### **Non-Liquefied Gases**

Non-liquefied gases are also known as compressed, pressurized or permanent gases. These gases do not become liquid when they are compressed at normal temperatures, even at very high pressures. Common examples of these are oxygen, nitrogen, helium and argon.

### **Dissolved Gases**

Acetylene is the only common dissolved gas. Acetylene is chemically very unstable. Even at atmospheric pressure, acetylene gas can explode. Nevertheless, acetylene is routinely stored and used safely in cylinders at high pressures.

This is possible because acetylene cylinders are fully packed with an inert, porous filler. The filler is saturated with acetone or other suitable solvent. When acetylene gas is added to the cylinder, the gas dissolves in the acetone. Acetylene in solution is stable.

The above compressed gases can be further categorised as follows: -

**Oxidant:** These gases do not burn, they enhance and support combustion. That is many things will burn that are not normally flammable, with an increased amount and the right type of oxidant. Examples would be compressed Oxygen or Air.

**Inert:** These gases do not generally react with other materials, they do not support combustion nor do they support life. Inert gases have the potential to asphyxiate because they will displace oxygen in the air should they leak. When the gas leaves the cylinder it can expand in volume 400+ times, which can create dangerous situations by displacing enough oxygen in the air in an enclosed space. This is why it is important to use cylinders in controlled ventilated conditions. Examples: Carbon Dioxide, Nitrogen, and Helium.

**Flammable:** These gases when mixed with oxidants or air and provided with the right ignition source will burn. An increase in the temperature of the fuel/oxidant mix may also cause ignition. Examples: Acetylene, Hydrogen or Propane.

**Toxic:** These gases have the potential to cause injury, harm or threaten life, even in low air concentrations. Examples: Carbon Monoxide, Chlorine and Ammonia.

**Corrosive:** These gases attack materials and burn skin tissue. As they react chemically they corrode causing deterioration and may even release hazardous gases. Examples: Chlorine, Fluorine and Sulphur Dioxide.

**Pyrophoric:** These gases will ignite spontaneously in contact with air. (Example Phosphine).

### **Health & safety management of compressed gases**

Health and safety management of compressed gases on the Midlands Campus includes the safe management of any storage, handling and use of compressed gas cylinders.

# Campus Level Risk Assessment

The Midlands Campus level risk assessment is a high-level risk assessment of the generic hazards associated with the handling, use and storage of compressed gases throughout the campus.

The purpose of the risk assessments is to allow TUS to provide the safety procedures and safe work practices for the handling using or storing of compressed gas cylinders.

Please note that while TUS Units and their reporting staff, handling, using and/or storing compressed gas cylinders are required to adhere to the best practice safety procedures and safe work practices, there is still a requirement for each Unit to risk assess their work practices associated with their acquired compressed gas cylinders and to ensure their local emergency protocols take account of the hazards.

The following three paragraphs present the Midlands Campus Level Risk Assessment for the hazards associated with compressed gases used on the Midlands Campus and the associated risk to safety. The assessment leads to establishing Campus 'Control Measures' (set out in the 3<sup>rd</sup> paragraph) needed to mitigate the risk to acceptable levels. In the sections that leads on from this risk assessment, each established control measure sets out the corresponding procedure and practice to be followed by both management and staff who use store and handle compressed gas on Campus.

## HAZARDS

Compressed gas cylinders are safe if treated properly, but if handled incorrectly or damaged, they can be extremely dangerous - large quantities of toxic or flammable gases may be released. Uncontrollable discharge may result in a cylinder becoming a projectile propelled by extremely high pressures.

Two distinct category of hazards can exist in relation to the use of compressed gases;

- i. Chemical - Those of the gas itself by virtue of its chemical or physical properties,
- ii. Physical/Mechanical - Those of a mechanical nature associated with the size, shape and weight of its container.

The hazards include that of fire, explosion, burns, asphyxiation, release of toxic or noxious material into the work area or surrounding atmosphere, eye injury from release of gas under pressure, injuries to feet, fingers and back, and damage to nearby equipment or to the building structure itself.

## RISK

Uncontrolled, the risks associated with the above identified hazards whether either handling, using or storing compressed gas are considered High Risk. The Following paragraph "Midlands Campus Control Measures", details the measures implemented by the Institute to reduce the level of risk to appropriate levels, i.e. 'Low'.

## Midlands Campus Control Measures

To ensure the safe handling, use and storage of compressed gas cylinders on campus, implementation of the identified control measures (see headings 1 to 5 below) are needed.

Each 'Control Measure' has an associated Institute procedure and all management and staff working with compressed gas cylinders must operate within the relevant control measure procedure which represents best practices in industry.

- 1. Roles & Responsibilities**
- 2. Training**
- 3. Receipt, Labelling Procedures**
- 4. Storage of Compressed Gas Cylinders**
- 5. Handling Procedures**

- 6. Usage Procedures**
- 7. Personal Protective Equipment**
- 8. Compressed Gas Cylinder Emergency Procedures**
- 9. Record Keeping**

The following section 'TUS Midlands Campus Procedures and Practices for Using, Storing & Handling Compressed Gas', sets out how the above control measures 1-9 are required to be implemented on campus by both management and staff who use store and handle compressed gas.

# TUS Midlands Campus Procedures and Practices for Using, Storing & Handling Compressed Gas

## 1. Roles and Responsibilities

Midlands Campus Unit managers and staff have the following responsibilities when handling, using and storing compressed gas on campus: -

### Campus Estates Department

Shall ensure that:-

- 1) Campus infrastructure provided to supply of compressed gas (delivered to the campus by BOC), including the infrastructural pipeline networks, are serviced and maintained fit for purpose, on behalf of TUS.  
*(Note: - the compressed gas infrastructure includes External Gas compound/stores, gas lines networks supplying the laboratories/workshops and gas detection and alarm systems linked to the campus fire detection & alarm systems and infrastructural manual/automated gas supply shutdown system).*
- 2) That on behalf of TUS, the Campus Estates Department engages competent external professional services to maintain and to service the infrastructural pipeline networks, their regulators, gas detection and alarm systems in accordance with statutory requirements.
- 3) That where necessary that the relevant unit management of compressed gas users within relevant laboratories or workshops are made aware of any necessary infrastructural Gas Emergency protocols and measures that are in place for their local operations/use of compressed gas.

### Heads of Faculty or Department/ Campus Company Managers/Research Directors/TUS Unit Managers

Are responsible for the health and safety management systems for work and academic activities that come under their management control and which include the use of compressed gas or compressed gas cylinders.

Health and safety management of compressed gases on the midlands campus includes the safe management of any storage, handling and use of compressed gas cylinders.

Where any TUS Unit has made arrangements to bring on campus, compressed gas cylinders, for the purpose of supplying or powering equipment for activities under their control, they shall ensure that this policy and procedure is implemented as follows: -

- That they have a designated a member/s of staff (e.g. technician staff) whose duty includes the storing, handling and use of departmental compressed gas in accordance with this procedure. And that the designated staff have received training in the storing, handling and use of compressed gas including manual handling training.
- That local departmental Risk Assessments have been undertaken for all compressed gas used by department and that both the safety data sheets and risk assessments results are available, read and implemented by the department.
- That equipment associated with the storage handling and use of compressed gas cylinders is available and properly inspected before being used.

- That staff in their department who conduct work associated with compressed gas and/or compressed air equipment have the appropriate training and understand all aspects of safety associated with this equipment.

### **Department Technician Staff/Lab or Workshop Managers**

Shall ensure the following:

- That they store, handle and use faculty or departmental compressed gas in accordance with this policy. Follow and maintain safe work practices as outlined by the procedures in this policy.
- That they have received training in the storing and handling of compressed gas and manual handling training.
- Within their assigned TUS Unit's labs or workshops, equipment which is either supplied with or powered by compressed gas, is serviced in accordance with manufacture requirements and maintained in good working order.
- That they adhere to and operate within the departmental completed risk assessments for the storing, handling and using compressed gas. That they ensure Safe Operating Procedures/Practices (SOPs) are adhered to for the equipment they are working with. That any needed SOPs are easily accessible and obtainable for that equipment.

### **Staff, Researchers & Students**

All Midlands Campus staff, researcher or students working with equipment supplied or powered by compressed gas shall:

- Only operate the equipment they have been trained to use and for which they have been approved by their line manager (e.g. Head of Department).
- Operate the equipment only in accordance with the laboratory or workshop standard operating procedures.
- Wear the appropriate personal protective equipment for the task/activity being performed.
- Be familiar with any laboratory or workshop hazard control & emergency measures procedures prior to operating any compressed gas equipment.
- Maintain awareness of hazards associated with the handling and use of compressed gas.
- In the event of any suspected compressed gas problem (e.g. leak) arising with the equipment or its supply line, shall follow the local gas emergency procedures (e.g. raise the alarm), and must immediately contact the competent department member of staff and communicate the issue to him/her.



## Contractors

Shall:

- Review, understand and follow all Campus Estates Department safety policies and procedures while on-site.
- Risk assess for safety the work they propose to undertake anywhere on campus and ensure that any required personal protective equipment is provided in accordance with the control measures.
- Ensure that any other hazard control measures appropriate for the work is implemented.
- Ensure all hazards are appropriately communicated to employees as well as sub-contractors working under their direction.

## 2. Training

Any Midlands Campus member of staff whose work activities involve the Handling, Using or Storing of compressed gas should receive safety training relevant to their activity.

This training should include:

- a) Compressed gas safety training for Storing, Handling and Using compressed gas cylinders, and,
- b) Safety training relevant to the equipment which they operated and which is supplied or powered by compressed gas.

### **a) Midlands Campus approved training for Safe Storing, Handling & Using compressed gas cylinders**

TUS will make available this training approximately every two year on campus or at the approved trainer's site.

It is the responsibility of each Midlands Campus department manager to ensure that staff under their control who handle, store or use a compressed gas are released from normal duties, attend and receive the training.

Under no circumstances will a member of TUS staff or a student be permitted to handle, store or use compressed gas cylinders until he/she has successfully completed the TUS compressed gas training program.

The Storage, handling and use of compressed gas cylinders training will include the following: -

- Compressed gases and equipment at the campus.
- Hazards of compressed gases and equipment at the campus.
- Personal protective equipment.
- Inspection procedures.
- Handling procedures.
- Storage procedures.
- Usage procedures.
- Gas-specific safety procedures.
- Compressed gas emergency procedures.

### **b) Safety training for equipment which is supplied or powered by compressed gas.**

Certain compressed gases and equipment use, such as the operating of Oxyacetylene cutting equipment requires users to have obtained specific training and qualification and it is the responsibility of the relevant TUS Unit to ensure that their designated users are appropriately trained and certified.

### **3. Receipt, Labelling**

All compressed gas cylinders received by any approved person on the Midlands Campus must be legibly and durably labelled at the valve end of the cylinder in accordance with the European CLP Regulations (Classification, Labelling and Packaging) and the European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR) regulations.

Primary identification is by means of the name of the product on the label and its corresponding UN and EC numbers. Risks and hazards associated with the product are also detailed on the label.

The label on a cylinder will identify the gas in the cylinder, the written word is the legally recognised means of identifying gas in a cylinder, the colours being only a secondary guide.

The receipt of gas cylinders onto TUS Campus property is the first point at which safety must be ensured by the correct identification of the gas involved, and an examination of the cylinders for damage.

### **4. Storage of Compressed Gas Cylinders**

Most compressed gas cylinders used on Campus by TUS Units are stored in external gas compounds or in external cages adjacent to the relevant campus buildings.

These compounds are provided by TUS and the Campus Estates Department who maintain the storage Infrastructure and gas lines.

TUS via the Estates Department assigns these external compounds (see below) to relevant Units such as faculties to store the gas cylinders they use to support their operational and academic functions.

The Campus compounds are assigned as follows: -

#### **Faculty of Science & Health**

Compressed gas cylinder uses to support the Faculty of Science operations and academic activities are stored in the external storage compound adjacent the International Arena. The Faculty of Science is responsible for all their acquired compressed gas cylinders stored within this compound and for ensuring the cylinder storage complies with this policy's storage procedure.

#### **Faculty of Engineering & Informatics**

Compressed gas cylinder uses to support the Faculty of Engineering (West Campus) operations and academic activities are stored in the external gas storage compound adjacent the West campus Auburn Buildings.

Compressed gas cylinders used to support the Department of Trades (East Campus) operations and academic activities are stored in the external gas storage compounds, located externally and adjacent the Trades Building on the East campus.

As set out in this policy under 'Responsibilities', the Faculty of Engineering & Informatics is responsible for ensuring that compressed gas cylinders kept in the above compounds are stored, handled & used in accordance with this policy and its procedures.

#### **Research Institutes operating from the Research Hub Building & MIRC Building**

Compressed gas cylinder uses to support any Research Institute's operations and academic activities are stored in the external gas storage compound adjacent the Research Hub.

Research Institutes share responsible for all compressed gas cylinders stored within these compounds to ensure that the storage complies with this Policy's storage procedure.

#### **External Caged Storage**

In addition to the above gas cylinder storage compounds, there are also a number of external cylinder storage cages. The responsibility for the cylinders in these cages is assigned to the faculty or Unit that brought the cylinders on site.

## **Storage Procedural Requirements**

Any TUS Unit intending to store compressed gas cylinders in external storage areas (i.e. campus gas compounds or cylinder storage cages) shall comply with the following compressed gas storage requirements: -

- i) Full cylinders are to be stored separately from nominally empty cylinders. Each will be clearly identifiable.
- ii) Faculties & departments and campus companies must not allow the presence of any other types of goods but the approved cylinder to be stored in the external gas storage compounds.
- iii) Oxygen and compressed air should never be stored in the same fire walled area as acetylene, LPG or a flammable gas or liquid.
- iv) Fuel gases should be segregated from oxygen by a firewall.
- v) Where piped gas supply systems are in use, there must be automatic shut down or alternative safety devices with alarms in place, to act where gas pressures go outside the normal operating range. *(Note: - The Campus Estates Department will perform this function).*
- vi) All piped flammable gases must be routed in ventilated service ducts that are free from electrical cables or other ignition sources. *(Note: - The Campus Estates Department will perform this function).*
- vii) Where toxic, flammable or other hazardous gases including oxygen depletion gases, are in use, there should be gas detection alarm systems in operation. These are designed to indicate raised concentrations or leaks in the buildings and automatically shut off the supply. *(Note: - The Campus Estates Department will perform this function).*
- viii) Gas cylinders should not be stored externally/in the open, they must be protected from extremes of weather, corrosion or overheating and provided with security to protect them against vandalism.
- ix) For caged storage areas adjacent buildings, crash barriers are to be constructed around cylinders to in areas where storage is at risk from vehicle impact. *(Note: - The Campus Estates Department will perform this function).*
- x) Designated Campus gas compounds should be maintained dry, well ventilated and away from all sources of heat and out of direct sunlight.

## **Storage (for use) of cylinders within Campus Buildings**

As a general rule the TUS prohibits the storage and use of cylinders within work areas without meeting the strict conditions, set down by this policy *(note: - It is always preferable that cylinders are stored outdoors in the specially constructed buildings or compounds, the gases being taken to the laboratory or workshop via a system of fixed metal pipes).*

Where a TUS Unit for operational and/or academic reasons considers that, there is an absolute need to install a compressed gas cylinder within their Unit's work area, they must follow the requirements set out below: -

1. The TUS Unit must first consider the feasibility of installing the compressed gas cylinder in an external storage compound and have the gas piped from that compound to the work area where it is required.
2. The TUS Unit must consider and where practicable, the installation of a gas generator (located in external storage compounds) to eliminate and avoid the need to store the gas cylinder within the room.

Where the above options '1 or 2' are not feasible or practicable and the compressed gas cylinder needs to be located in the work area then:

3. The TUS Unit must complete the Institute Risk Assessment for the compressed gas cylinder to be located in the workshop or laboratory as follows : -
  - i) The risk assessments must assess the hazards associated with the work activity that is supported by the compressed gas.
  - ii) The risk assessment must address the additional matters which are related to storing, using and handling a compressed gas cylinder in a work area such as ;

#### **Additional Gas Prevention & Emergency Measures**

- a) (Local gas monitoring & detection & alarm systems, automatic shut off systems, purging systems and room ventilation).
- b) Designating a competent member of staff with duties to include management of prevention systems (e.g. Maintenance, servicing).
- c) Local Gas Emergency Procedures

#### **Training**

Additional Training for staff that are Using, Handling or storing the compressed gas (E.g. Manual handling training)

#### **Signage**

A compressed gas cylinder located in an 'internal work area' must be accompanied by the placing of approved safety signage at the entrance door to the work area (laboratory or workshop). Only approved signage which is in accordance with the (General Application) Regulations, 2007 S.I. 299 will be permitted. Unit managers must liaise with the Campus Health and Safety Office before completing this action.

#### **Midlands Campus Approval**

The relevant Unit must obtain approval from the Campus Health and Safety Office and the Estates Department prior to locating any compressed gas bottle in any indoor work area (e.g. Laboratories and workshops). (Note: this is extremely to ensure that the Institute takes account of these hazards for maintaining up to date Emergency Plans)

## 5. Handling Procedures

Handling a compressed gas cylinder includes activities such as; a member of staff or a researcher performing activities such as filling, changing cylinders, servicing gas, moving cylinders, connecting cylinders and/or withdrawing content from a cylinder.

In circumstances where any of the above activities take place, a member of staff or a researcher must follow the safe handling procedures below: -

- i) Identify the compressed gas and its safety precautions before handling it. Look for this information on labels, SDS sheets provided by the supplier and cylinder markings. If you do not know what is in a cylinder, do not use – contact your line manager so that the Institute may have the cylinder removed (BOC Ireland Tel: - 1890 355 255).
- ii) All cylinders should be treated as if full. The pressure inside a cylinder is never less than the pressure outside which is 1 bar (atmospheric pressure). What is left in the 'empty' cylinder is gas at 1 bar pressure, so it is never empty!
- iii) PPE - The correct Personal Protective Equipment should be used by anyone handling cylinders. Use good grip protective gloves and dry clothing free of oil. If moving cylinders from the fixed secured position wear safety shoes. Safety Glasses are a must for any valve inspection work.
- iv) Examine cylinders as soon as you receive them. If you detect signs of damage or leakage, Contact BOC Emergency phone number **01 4091800** which is contactable 24/7 to deal with your emergency. Also contact the Campus Emergency response team on **087 111 4444**.  
If you are trained to do so and the gas SDS sheet permits, then with the assistance of the campus emergency response team move the cylinder to a safe, isolated area and return them to the supplier as soon as possible.
- v) Handle cylinders carefully, using the correct manual handling techniques. If moving cylinders from a fixed secured position, you must wear safety shoes. Cylinder trolleys should be used for transporting cylinders to the point of use. Cylinders must never be brought into unventilated laboratories or small rooms within laboratories without the approval of the relevant Unit manager, Estates Department and Health & safety Office.
- vi) Never leave a cylinder propped against a bench or "free-standing"; always secure it by a strap or chain (Note: A falling cylinder can easily crush the foot or other mishandling can cause pulled muscles or back strain).
- vii) Never drag a cylinder from place to place or move it with if attached to equipment. Also cylinders should not be dropped or allowed to strike each other violently.
- viii) If tilting a cylinder to withdraw liquid use a secure cradle; do not prop it up on a stool.
- ix) Non-sparking tools should be used where cylinders are in storage or in use. Cylinder keys must be kept with the cylinder and used to turn off cylinders after use.
- x) Cylinders should not be used as storage or work supports.

- xi) Oil or grease should not be allowed to contaminate a cylinder and its fittings as they can ignite violently in the presence of compressed air or oxygen.
- xii) Do not apply PTFE tape, or other jointing compounds or any sealing materials to the valve to achieve a good gas tight seal.
- xiii) Soapy water should be used to test for leaks - not a naked flame.
- xiv) Simple maintenance includes checking all connections regularly and following the supplier's instructions to prevent corrosion.

### **Motor vehicle transport of cylinders**

Shall only be done with vehicles equipped with racks or other means of securing the cylinders and the appropriate safety sign is installed in the approved external vehicle body location.

## **6. Usage Procedures**

Safe use of compressed gases include the following activities; A) Properly handling leaking containers, b) Preventing abuse, c) Identifying contents, d) Properly using cylinder, valve caps and plugs and d) Returning empty containers.

Before using a cylinder of compressed gas, Staff or Researchers must ensure the following:

- i) That the gas outlet on the cylinder is free from foreign matter e.g. dirt etc.,
- ii) Know and understand the properties, uses, and safety precautions before using any gas or gas mixture. Consult the Safety Data Sheet (SDS) and pictograms for safety information on the gases and equipment you will be using.
- iii) The cylinder valve should always be opened slowly to avoid a rapid flow of gas. The valve should be closed only sufficiently to shut off the gas. Excessive force shall not be used i.e. use only the standard key provided. Do not rely on the regulator alone to stop gas flow for more than brief periods - close the valve also. Adjustments to valves, locking nuts etc. should only be made with the proper tools - never use a hammer to open or close a sticking valve.
- iv) Ensure that the regulator to be used is the correct type. Never use a regulator marked for use with a dissimilar gas.
- v) Ensure that the gauge(s) fitted must be within the working pressure. After fitting the regulator, check for leaks using an appropriate method.
- vi) All oxy/acetylene cylinders in use must be fitted with flash back arresters which will comply with *BS 6158*.
- vii) Do not use oxygen and compressed air interchangeably. They are not the same.
- viii) Comply with correct standards when using or storing oxy fuel gas containers for welding and cutting and other similar activities.

## **7. Personal Protective Equipment (PPE)**

The relevant Campus Unit will need to risk assess the hazards associated with the storing, handing and use of the type of compressed gas cylinders and associated equipment that come

under their control, to determine the correct Personal Protective Equipment (e.g. this will be supported by reference to the Safety Data Sheet). Unit's should refer to the Campus PPE policy and procedure to establish the required PPE for relevant tasks and activities.

As a general guide, the following PPE should be worn as a minimum for handling, storing or using compressed gases unless the specific risk assessment or Safety Data Sheet requires otherwise.

#### **Hand protection**

Wear good grip protective gloves when transporting cylinders.

Wear chemically resistant gloves when using gases that are harmful to the skin.

Wear appropriate insulated thermal gloves to protect against extreme cold when handling cryogenic containers. Use long loose thermal gloves while handling or pouring cryogenic liquids.

#### **Foot protection**

If moving cylinders from the fixed secured position wear safety shoes.

#### **Torso Protection**

A lab coat, closed-toed shoes and long pants (NO SHORTS) should be worn when handling compressed gas cylinders.

Aprons or other protective clothing may be needed depending on the risk of skin contact.

#### **Eye and face protection**

Wear safety glasses and a face shield when working with regulators.

Wear face shield and chemical resistant safety goggles when dispensing refrigerated liquefied gases from a cylinder or liquid Dewar.

Safety Glasses with side shields are a must for any valve inspection work.

## **8. COMPRESSED GAS CYLINDER EMERGENCY PROCEDURES**

### **For Compressed Gas, damaged cylinders or Leakage: -**

- 1) Contact the Campus Emergency Response Team **087 111 4444**
- 2) Contact (TUS Midlands Campus Supplier)  
BOC Emergency phone number **01 4091800**

### **For Gas Fires, Gas explosion, or Gas Dangerous Occurrences with the potential for causing immediate harm: -**

- 1) Raise the Alarm by pressing the fire alarm call point & contact the Campus Emergency Response Team on 087 111 4444 (EVACUATE THE AREA)

## **9. Record keeping**

Any TUS Unit working with compressed gas cylinders (storing, handling or using compressed gas), is responsible for maintaining up to date completed risk assessments, the names of designated staff trained for handling, storage and use of compressed gases and equipment.

They shall also update the Campus Health and Safety Office in respect of any changes to the storage of compressed gas cylinders within buildings.  
These records should be kept in the relevant Unit's safety file and made available to the H&S office for audit purposes.

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Compressed Gas Policy & Procedure (Nov 2023 Rev 6)  
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