

Gas Cylinder Safety Training (Control Measure)

Line managers/ supervisors are responsible for ensuring that staff and students are competent to conduct their tasks safely and correctly. Line managers/ supervisors must ensure that only trained staff and students use compressed gases, and supervision is provided. Direct supervision of staff and students who are new to the University, and all inexperienced gas users is essential. This should be conducted by a competent person; *A person who has the right training, skills, experience, and knowledge to perform a task safely (HSE).*

A **Gas User*** is defined as all staff and students who manually handle, store and/or use compressed gas cylinders. Gas users will be trained to a given level outlined below in section 1. Training Requirements.

*Exceptions to this are undergraduate students who are under direct supervision, and those who store, handle, or use diving equipment or breathing apparatus only (alternative training must be sourced by the faculty).

A person using a gas generator would still be considered a gas user however other training would be required.

For roles and responsibilities see the Compressed Gas Policy Arrangements (HSA-10122).

1. Training Requirements

1.1 Level 1 Gas User

Level 1 Gas Users are required to follow the training request process and complete the following:

- **Online Training:** Complete the online course titled Using Gas Cylinders within Universities (ref: 458). Online training can be booked by contacting your Faculty Technical and Operations Team/ PSU Operations Team (Appendix 1). The HS&R Team will provide you with a training access code and information. You will need to complete the training within 3 months of issue of the access code. Failure to do so will require you to apply for the training again at a cost to your Faculty/ Department. Download your certificate for your training records and forward a copy to your Faculty Technical and Operations Teams/ PSU Operations Team:
 - Faculty of Science & Engineering - FSE-Compliance@swansea.ac.uk
 - Faculty of Medicine, Health & Life Science - fmhls-tscomp@swansea.ac.uk

If you fail the first attempt of the online training course, your Faculty/ PSU will be charged for every attempt thereafter.

Refresher training is required every 2 years.

- **Practical Training 1 Using Gas Cylinders:** Complete a gas safety practical training 1 Using Gas Cylinders. This can be booked by contacting your Faculty/ PSU Operations team on completion of the online element of the training. You will require your online training certificate to complete the practical training.

Refresher training is required every 2 years.

Where a faculty provides in-house practical training, they must follow the syllabus agreed by the HS&R Team. They must consider who will deliver the training, their competency, and their resource to do so. Trainers must have up to date knowledge of relevant current legislation, standards, and industry documents. To deliver this training, trainers must ensure their training is in date, evidenced by their training certificates.

- **Local training:** Line managers/ supervisors must ensure practical instruction on the safe use of specific apparatus in the area where the individual is expected to work. Individuals must also be instructed on what to do in the event of an emergency and/ or non-routine situation. A checklist is available in Appendix 2 as a prompt for training, to identify gaps in knowledge. The Faculty/ PSU must maintain records of training. This training should be refreshed periodically if something changes/ if a lack of understanding is demonstrated/ following an adverse event (if relevant).

Local induction training is also required for others who share a laboratory/ workshop to ensure they are aware of potential hazards and what to do in the event of an emergency and/ or non-routine situation.

- **Chemical risk assessment training:** All users are recommended to attend chemical risk assessment training to ensure they are able to complete a suitable and sufficient risk assessment for their activities.

1.2 Level 2 Gas User

Level 2 Gas Users are required to follow the training request process and complete the following:

- **Online Training:** Complete the online course titled Using Gas Cylinders within Universities (ref: 458). Online training can be booked by contacting your Faculty Technical and Operations Team/ PSU Operations Team (Appendix 1). The HS&R Team will provide you with a training access code and information. You will need to complete the training within 3 months of issue of the access code. Failure to do so will require you to apply for the training again at a cost to your Faculty/ Department. Download your certificate for your training records and forward a copy to your Faculty Technical and Operations Teams/ PSU Operations Team:

- Faculty of Science & Engineering - FSE-Compliance@swansea.ac.uk

- Faculty of Medicine, Health & Life Science - fmhls-tscomp@swansea.ac.uk

If you fail the first attempt of the online training course, your Faculty/ PSU will be charged for every attempt thereafter.

Refresher training is required every 2 years.

- **Practical Training 1 Using Gas Cylinders:** Complete gas safety practical training 1 Using Gas Cylinders. This can be booked by contacting your Faculty/ PSU Operations team on completion of the online element of the training. You will require your online training certificate to complete the practical training.

Refresher training is required every 2 years.

- **Practical Training 2 Manual Handling of Gas Cylinders:** Complete gas safety practical training 2 Manual Handling of Gas Cylinders. This can be booked by contacting your Faculty/ PSU Operations team on completion of the online element of the training. You will require your online training certificate to complete the practical workshop.

Refresher training is required every 2 years.

Where a faculty provides in-house practical training, they must follow the syllabus agreed by the HS&R Team. They must consider who will deliver the training, their competency, and their resource to do so. Trainers must have up to date knowledge of relevant current legislation, standards, and industry documents. To deliver this training, trainers must ensure their training is in date, evidenced by their training certificates.

- **Local training:** Line managers/ supervisors must ensure practical instruction on the safe use of specific apparatus in the area where the individual is expected to work. Individuals must also be instructed on what to do in the event of an emergency and/ or non-routine situation. A checklist is available in Appendix 2 as a prompt for training, to identify gaps in knowledge. The Faculty/ PSU must maintain records of training. This training should be refreshed periodically if something changes/ if a lack of understanding is demonstrated/ following an adverse event (if relevant).

Local induction training is also required for others who share a laboratory/ workshop to ensure they are aware of potential hazards and what to do in the event of an emergency and/ or non-routine situation.

- **Chemical risk assessment training:** All users are recommended to attend chemical risk assessment training to ensure they are able to complete a suitable and sufficient risk assessment for their activities.

1.3 Oxy-fuels Gas Users

If using oxy-fuels gases, the following training is required:

- **Online Training:** Complete the online Using Oxy-fuel Gases Safely course. Online training can be booked by contacting your Faculty/ PSU Operations team. Access to the training will be provided by the HS&R team. Refresher training is required every 2 years.
- **Practical Training:** Complete the Oxy-fuel Gases practical workshop, including manual handling of gas cylinders. Refresher training is required every 2 years. Practical workshops can be booked by contacting your Faculty/ PSU Operations team.
- **Local Training:** Line manager/ supervisor must ensure practical instruction on the safe use of specific apparatus in the area where the individual is expected to work. They must also be instructed on what to do in the event of an emergency and/ or non-routine situation. A checklist is available in Appendix 2 as a prompt for training and to identify gaps in knowledge. Records of training must be maintained. This training should be refreshed periodically if something changes/ if a lack of understanding is demonstrated/ following an adverse event (if relevant).
- **Chemical risk assessment training:** All users are recommended to attend chemical risk assessment training to ensure they are able to complete a suitable and sufficient risk assessment for their activities.

1.4 Inspector Training

Inspector training for single cylinder systems is required for any member of staff who:

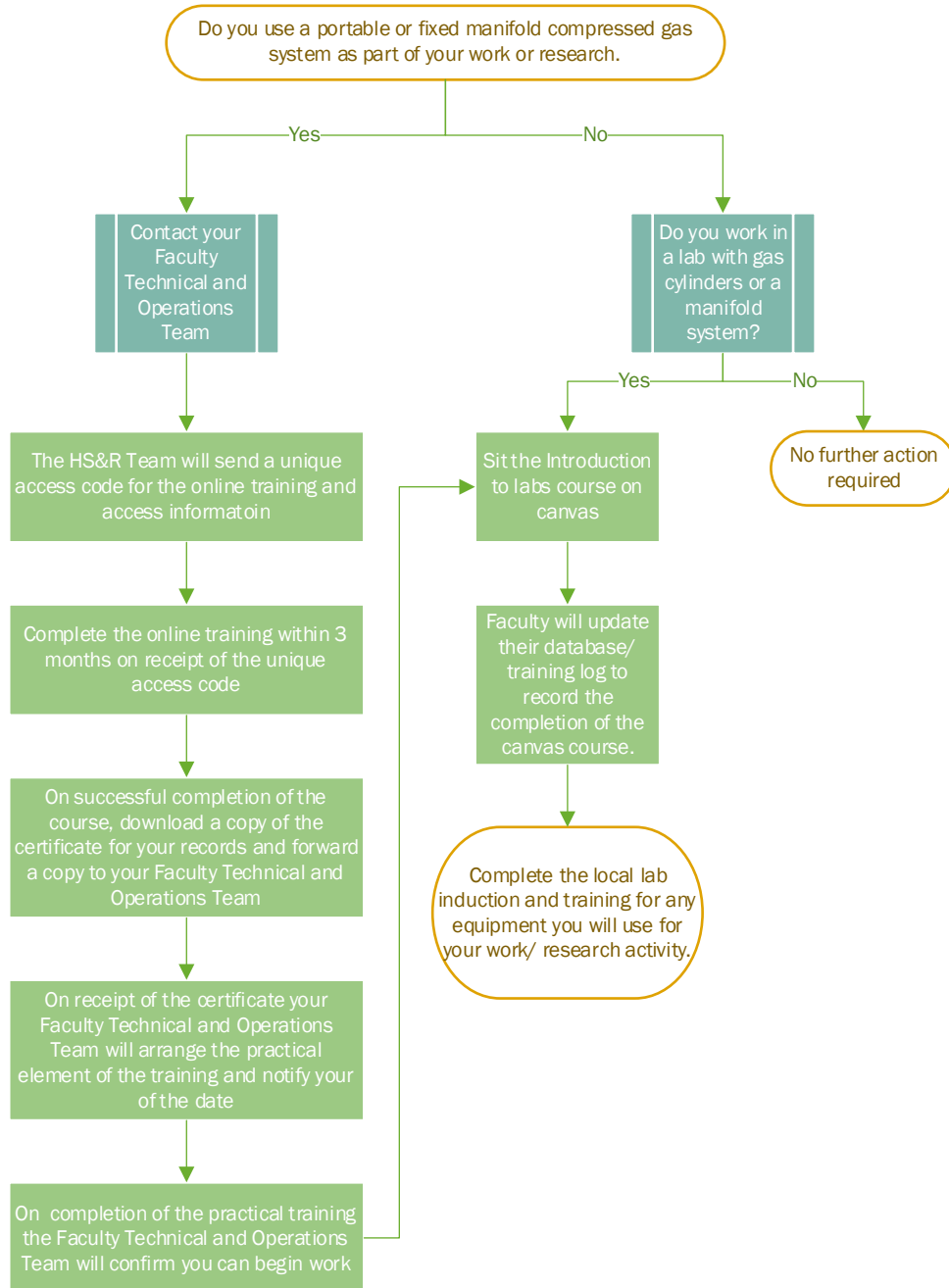
- Provides practical compressed gas training workshops.
- Manages and inspects gas stores.
- Conducts safety checks and inspections of single cylinder systems.

Contact the HS&R team for this training.

Inspectors must have also completed the same level of training as Level 2 Gas User.

Appendix 1

Gas Safety Training Request Process



Appendix 2

GAS CYLINDER TRAINING

Recommendations for Training (BCGA GN 23 – Revision 1 2018)

All gas users at the University must complete online gas safety training and practical training. **In addition to this local training is required.**

Local Training

Line managers/ supervisors must ensure practical instruction on the safe use of specific apparatus in the area where the individual is expected to work. Gas users must also be instructed on what to do in the event of an emergency and/ or non-routine situation. A checklist is available below as a prompt for local training, to identify gaps in knowledge.

Other people who work in the area, who are not gas users, will also need some awareness training. A checklist is available below as a prompt for training.

Records of training must be maintained. This training should be refreshed periodically if something changes/ if a lack of understanding is demonstrated/ following an adverse event (if relevant).

Note 1. Others. Anyone who may be present or near to gases (e.g. other lab/ workshop users)

Note 2. User. Anyone who handles, stores, or uses gas cylinders.

Key to colour code:

Topic selection required
Topic selection required – dependent on role and/or gases in use
Topic selection not required

Table A1-1: Compressed gas cylinders including LPG cylinders		Others Note 1	User Note 2
Industry Documents & Legislation	BCGA		
	UKLPG		
	'Best practice' documents.		
Swansea University	Gas Policy / Information Sheets		
	Local risk assessment / SOP		
	Local arrangements (E.g., access to gas stores, ordering gases / accessories).		
Composition of the air.			
Compliance with environmental legislation			
The hazard of pressure.			
Storage of gas cylinders:	External.		
	Secure.		
	Ventilation.		
	Control of ignition sources.		
	Layout.		
	Signage.		
	Fire extinguishers.		
	Receipt of cylinders.		
	Housekeeping and reporting.		
Recognition of leaks			
Gas detection (smell / visual / sound / monitor).			
Emergency Procedures.			
Actions in the event of a gas leak			
Actions in the event of a fire			
Evacuation procedures			
Involvement of emergency services.			
Hazards of oxygen deficiency (asphyxia).	Confined / enclosed areas.		
	Poor ventilation.		
	Inert / flammables.		
Hazards of oxygen enrichment:	Hazards posed by oils and greases.		
	Risk of increased likelihood of fire.		
Flammability hazards (including pyrophoric gas hazards).			
Toxics (including toxic hydrides).			

Table A1-1: Compressed gas cylinders including LPG cylinders		Others Note 1	User Note 2
Corrosives (including reactive fluorides and chlorides).			
Incompatibility between gases and materials, e.g., Acetylene and copper			
Gas cylinders:	Production design and filling.		
	Content identification.		
	Inherent instability, weight, size, shape.		
Cylinder manual handling techniques including churning and the hazards of incorrect handling techniques.			
Gas equipment: (As per cylinder/ type gas)	Regulators.		
	Hoses.		
	Safety devices, e.g., Flashback arrestors.		
	Pipework.		
Selection of correct gas control equipment.			
Before-use safety assessment of work area.			
Practical Training			
Pre-use checks.			
Correct connections.			
Leak check procedures.			
Removal and exchange of cylinders.			
Safe shut down procedures.			

Table A1-2: Transportation of gases		Others Note 1	User Note 2
Carriage of Dangerous Goods legislation			
Industry documentation			
Open and closed vehicles.			
Signage – options.			
Recognition of vehicles carrying gases.			
Recognition of an unsecured load.			
Ventilation.			
Driver responsibilities and training.			
Dangerous Goods Safety Advisor (DGSA), requirement and role.			
ADR load limits & documentation.	Cylinders only.		
	LPG only.		
	Mixed gases.		

Empty vehicles – signage – removing cylinders.		
Cylinder checking.		
Record keeping and documentation.		

If you need to transport gas cylinders, please contact your [H&S Lead](#).

Table A1-3: Oxy-fuel gas equipment <i>In addition to relevant compressed gas cylinder training topics</i>		Others Note 1	User Note 2
Work area risk and safety assessment:	Appropriate fire extinguishers present.		
	Permits to work / hot work permits, as required.		
	Safe location away from traffic routes/ forklift trucks/ overhead cranes/ other hazardous materials, etc.		
Workplace hazards:	Heat.		
	Fume.		
	Noise.		
Backfires and flashbacks:	How flashbacks occur.		
	Avoidance.		
Torches & Nozzles:	Torch design and selection.		
	Correct nozzle selection.		
Practical training elements:			
Work area safety checks:	Correct set-up of an oxy-fuel gas unit.		
	Pre-use visual checks on gas equipment.		
	Correct setting of working pressures.		
	Correct leak testing.		
Safe light up procedure:	Purging of hoses and torch before lighting up.		
	Flame setting.		
Basic cutting practice.			
Safe shut-down procedures.			
Actions in the event of:	Flashback.		
	Sustained backfire.		

Table A1-4: Oxy-fuel gas equipment Mobile systems, annual inspections <i>In addition to oxy-fuel gas equipment user training</i>		Others Note 1	User Note 2
Regulators:	Design and function of single and multistage regulators.		
	Visual checks and inspection.		
	Functional tests.		

	Life expectancy – Date check.		
Flame arrestors:	Design and function of flame arrestors.		
	Visual checks and inspection.		
	Reverse flow test.		
	Life expectancy – Date check.		
Hoses:	Visual checks and inspection.		
	Hose care.		
	Hose check valves: Function, purpose and test		
Torches and nozzles:	Visual checks and inspection.		

Table A1-5: Liquefied Petroleum Gas (LPG) <i>In addition to relevant compressed gas cylinder training topics</i>		Others Note 1	User Note 2
Health and first aid:	Cold burns		
	Burns.		
	Asphyxiation.		
	Carbon monoxide poisoning.		
Practical training elements:			
Connection to equipment / process / hand-tools.			
LPG hand operated equipment / tools:	System before use checking.		
	Leak testing.		
	Correct light up.		
	Correct shutdown.		
	Unattended lit tools/equipment.		
LPG forklift trucks	Safe cylinder removal.		
	Connection of new cylinder.		
	Leak checking procedures.		
	Personal protective equipment.		
	Manual handling.		

Table A1-6: Inert gases Including MIG / TIG <i>In addition to relevant compressed gas cylinder oxy-fuel training topics</i>		Others Note 1	User Note 3
Work activity hazards:	Radiation.		
	Electric currents.		
	Particulate and non-particulate fume.		
	Arc light – Wearing appropriate PPE.		
	Fixed pressure regulators.		

Differences in regulators:	Flow gauges.		
	Regulators registering litres per minute.		
Practical training elements			
Connecting equipment.			
Before use visual checks.			
BCGA CP 7 (8) test procedure and checks:	Fixed pressure regulator visual checks (flow bobbin).		
	Single stage regulator (flow gauge device) visual checks.		
	Hose visual checks.		