



**BCGA GUIDANCE NOTE GN 23**

**Identifying Gas Safety Training**

**Requirements in the Workplace**

**2012**

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**British Compressed Gases Association**

## **BCGA GUIDANCE NOTE GN 23**

### **Identifying gas safety training requirements in the workplace**

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## PREFACE

The British Compressed Gases Association (BCGA) was established in 1971, formed out of the British Acetylene Association, which existed since 1901. BCGA members include gas producers, suppliers of gas handling equipment and users operating in the compressed gas field.

The main objectives of the Association are to further technology, to enhance safe practice, and to prioritise environmental protection in the supply and use of industrial gases, and we produce a host of publications to this end. BCGA also provides advice and makes representations on behalf of its Members to regulatory bodies, including the UK Government.

Policy is determined by a Council elected from Member Companies, with detailed technical studies being undertaken by a Technical Committee and its specialist Sub-Committees appointed for this purpose.

BCGA makes strenuous efforts to ensure the accuracy and current relevance of its publications, which are intended for use by technically competent persons. However this does not remove the need for technical and managerial judgement in practical situations. Nor do they confer any immunity or exemption from relevant legal requirements, including by-laws.

For the assistance of users, references are given, either in the text or Appendices, to publications such as British, European and International Standards and Codes of Practice, and current legislation that may be applicable but no representation or warranty can be given that these references are complete or current.

BCGA publications are reviewed, and revised if necessary, at five-yearly intervals, or sooner where the need is recognised. Readers are advised to check the Association's website to ensure that the copy in their possession is the current version.

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# **BCGA GUIDANCE NOTE GN 23**

## **Identifying gas safety training requirements in the workplace**

### **1. INTRODUCTION**

This Guidance Note has been prepared by producers, processors distributors and training providers of compressed and cryogenic gases.

It is aimed primarily at management and supervisors of personnel who either handle, store, use or transport compressed gas cylinders and cryogenic gases in the workplace.

The aim of this Guidance Note is to provide information on the topics which should be covered when considering compressed gases safety training.

A risk assessment for users of compressed gases is required at all times under The Management of Health and Safety at Work Regulations (1), The Health and Safety at Work Act (2) and may also be required under The Dangerous Substances and Explosive Atmospheres Regulations (DSEAR) (3). Guidance on the preparation of Risk Assessments under DSEAR is contained in BCGA Guidance Note 13 (4). Model Risk Assessments are available from the BCGA, for example, for the storage and use of oxyacetylene cylinders (5) and for manual handling activities in the industrial gas industry (6). DSEAR is a set of regulations concerned with protection against risks from fire, explosion and similar events arising from dangerous substances used or present in the workplace. Other relevant references may be found in the Further Reading section at the end of this publication.

### **2. SCOPE**

This document is an audit tool to allow managers / supervisors to:

- make a concise assessment of compressed and cryogenic gas usage on-site;
- identify all staff who may be involved in the handling, storage, transportation or use of these products;
- determine training requirements.

### 3. ASSESSMENT OF COMPRESSED & CRYOGENIC GAS USAGE

When answering the following please include all personnel:

- who are responsible for
- who use
- or come into contact with

compressed or cryogenic gases.

		Yes	Location	Staff
		No		
Are single cylinders of compressed gases used?	Through flexible hose to process equipment?			
	Through fixed installation pipe work?			
Are multiple cylinders of compressed gases used?  MCP or Manifolds (Multiple Cylinder Pallets)	Through flexible hose to process equipment?			
	Through fixed installation pipe work?			
Are cryogenic gases used on-site?	In mobile pressurised dewars?			
	In mobile unpressurised dewars?			
	In small receptacles <20 litre capacity?			

		Yes	Location	Staff
		No		
Are bulk storage vessels located on-site?	Cryogenic vessels / tanks?			
	LPG tanks?			
Is there a cylinder gases store?				
Is there a fixed supply manifold and gas distribution system?				
Is company transportation used to move gases from the store to the points of use - within the site boundary only?				
Is company transportation used to move gases on public roads in vehicles?	Collecting or returning gases from a supplier?			
	To undertake work at off-site locations?			
	The movement of gases between company sites?			
Is welding, cutting, brazing or any other oxy-fuel gas process undertaken which uses gas from a mobile supply (e.g. cylinders)?				
Are gases for welding, cutting, or brazing used from an installed supply (e.g. gases piped from cylinders, pallets or liquid vessels)?				

Are gases used for any of the following:			
	<b>Yes</b>	<b>Location</b>	<b>Staff</b>
	<b>No</b>		
Medical purposes?			
Laboratory work?			
Inerting, purging, blanketing?			
Plasma or other process?			
Refrigeration?			
Food freezing or packaging?			
Electronics / Semiconductor Manufacture?			
Glass manufacture?			
Propulsion e.g. fork lift trucks using LPG fuel?			
Have the risks associated with welding fumes been assessed?			
Oxygen, flammables, dissolved acetylene			Yes      No
Has a Manual Handling Risk Assessment been carried out covering the movement of gas cylinders?			Yes      No

May staff engage in the following:			
	Yes No	Location	Staff
<p>Entering into a confined space of any kind where gases have been or may be present?</p> <p>(The term 'confined' includes lifts, tanks, pits, trenches, basements, silos, and ships holds, etc.)</p>			
Transferring cryogenic liquids from vessels into dewars or flasks?			
Transferring compressed gases cylinder to cylinder (decanting)?			
Connecting gas cylinders to control equipment or pipework?			
Entering areas where cylinders are in storage or use?			
Are contractors entering your site to which any of the above may apply?			
Are contractors trained in the hazards, properties and risks associated with the safe use of gases?			

#### 4. GAS SAFETY TRAINING

<b>Duties</b>	The Health and Safety at Work Act (2), imposes a general duty on every employer to provide as much information, instruction, training and supervision as is necessary to ensure, so far as is reasonably practicable, the health and safety at work of the employees.			
	If employees are injured at work, or are engaged in a potentially dangerous activity for which they have been ill-prepared or advised by their employer, criminal prosecution may ensue.			
			<b>Yes</b>	<b>No</b>
	To comply with the Act (2) does your company:			
	Introduce comprehensive safety rules and procedures and induction training programmes for all new recruits?			
	Provide repeat training (either on the job or in a classroom or equivalent environment) at regular intervals?			
	Ensure that no employees transferred or promoted from one job or activity to another are permitted to start work in their new job until and unless they have received training and instruction sufficient to enable them to perform the job without risk to their health and safety?			
	Ensure that safety representatives are adequately trained?			
	Provide adequate safety training for managers at all levels?			
	Pay attention to the safety needs of existing employees?			
	Document details of safety training given and received?			
Set out training provision in the Safety Policy Statement?				
<b>Training Records</b>	Are there training logs and schedules available for each employee? Based on current job descriptions or equivalent			
	Are these reviewed annually with the employee to ascertain:	There are no knowledge gaps?		
		The employee is confident regarding their proficiency in all aspects of their work?		
<b>New Employees</b>	With new employees, immediately after induction and job-specific training are training logs completed and a review undertaken with the employee?			
	Are both management and employee satisfied that proficiency and competency in the job role has been established?			
<b>Transferred Employees</b>	Immediately after induction and job-specific training, are training logs completed and a review undertaken with the transferred employee?			
	Are both management and employee satisfied that proficiency and competency in the job has been established?			

		Yes	No	
<b>Sub-contracted or Temporary Employees</b>	With sub-contracted or temporary employees, immediately after induction and job-specific training are training logs completed and a review undertaken with the employee?			
	Are both management and employee satisfied that competency in the job role has been established?			
<b>Workplaces Changes</b>	Have employees been identified who are affected by the following:	Changes in workplace procedures?		
		Changes in workplace methods?		
		Changes in workplace processes?		
		Changes in workplace plant or equipment?		
	Has appropriate training taken place because of the changes above and has this been noted in the training logs?			
<b>Proficiency Assessment</b>	Has a responsible person been appointed with the duty of signing off the proficiency of an employee after any training and before they are allowed to commence work?			
<b>Proficiency of Responsible Person</b>	Is there a method available to validate the training and proficiency of the responsible person who undertakes the training and proficiency assessment of employees under training?			
<b>Control of Contractors</b>	Where contractors are employed to use gases on-site are procedures in place to ascertain:	They have undergone site induction and this is recorded?		
		Their proficiency has been checked?		
		They have undergone gas safety training related to their role?		
<b>Contractors Using Gases</b>	Have contractors been trained in the hazards and properties of gases?			
	Do they complete before use checks on gas equipment?			
	Do they use the correct equipment light-up and shut-down procedures? (where applicable)			
	Are their gas regulators and flashback arrestors still within the stipulated service life? (normally under five years old or within manufacturer's recommended life)			
	Do they avoid wrapping hoses around cylinders when in use?			
	Are they aware of the hazards of using oil and greases in the presence of oxygen?			
	Is their equipment free from evidence of use of PTFE tape on fittings and joints?			
	Has their gas equipment been subjected to any inspection procedures and do they have records of this?			

## 5. TRAINING TOPICS

Having ascertained the use of gases and personnel involved, training contents should include:

<b>Gas Usage</b>	<b>Learning topic</b>
<b>Compressed cylinder gases</b>	<p>Composition of the air.</p> <p>Gas properties and potential hazards (use of Safety Data Sheets (SDS) and exposure scenarios).</p> <p>Inert gases and oxygen deficiency (asphyxia).</p> <p>Hazards of oxygen enrichment:</p> <ul style="list-style-type: none"> <li>• Hazards posed by oils and greases.</li> </ul> <p>Flammability hazards (including pyrophoric gas hazards).</p> <p>Toxics (including toxic hydrides).</p> <p>Corrosives (including reactive fluorides and chlorides).</p> <p>Hydrogen embrittlement.</p> <p>Acetylene and copper.</p> <p>Personal protective equipment requirement.</p> <p>Gas cylinders:</p> <ul style="list-style-type: none"> <li>• Production design and filling.</li> <li>• Content identification.</li> <li>• Safe operation.</li> <li>• Storage.</li> <li>• Handling.</li> </ul> <p>Gas equipment:</p> <ul style="list-style-type: none"> <li>• Regulators.</li> <li>• Hoses.</li> <li>• Flashback arrestors.</li> <li>• Pipework.</li> <li>• Selection of correct gas control equipment.</li> </ul> <p>Manual handling techniques and the hazards of incorrect techniques.</p> <p>Before-use safety assessment of work area.</p> <p>Emergency procedures.</p> <p>Legislation and Codes of Practice.</p> <p>General risk assessment and safe systems of work procedures.</p>
<b>Compressed cylinder gases practical instruction</b>	<p>Manual handling techniques (e.g. milk churning).</p> <p>Regulator fitting:</p> <ul style="list-style-type: none"> <li>• Pre -use checks.</li> <li>• Correct connection.</li> <li>• Leak check procedures.</li> </ul> <p>Safe shut down procedures.</p> <p>Removal and exchange of cylinders.</p>

<p><b>Mobile Oxy-fuel equipment – Users</b></p> <p><b>In addition to compressed cylinder gases training topics</b></p>	<p>Design and function of single and multi-stage regulators.</p> <p>Backfires and flashbacks:</p> <ul style="list-style-type: none"> <li>• How flashbacks occur.</li> <li>• Avoidance.</li> <li>• Design and function of flashback arrestors.</li> </ul> <p>Hoses:</p> <ul style="list-style-type: none"> <li>• Correct hose selection.</li> <li>• Using hoses safely.</li> </ul> <p>Torches:</p> <ul style="list-style-type: none"> <li>• Torch design and selection.</li> <li>• Correct nozzle selection.</li> </ul> <p>Correct set-up of an oxy-fuel gas workstation.</p> <p>Safe working practices.</p> <p>Pre-use visual checks on gas equipment.</p> <p>Correct set-up of an oxy-fuel gas unit.</p> <p>Correct leak testing.</p> <p>Safe shut-down procedures.</p> <p>Transportation and handling of oxy-fuel units.</p>
<p><b>Mobile Oxy-fuel Units (at least) Annual Inspection</b></p> <p><b>In addition to Oxy-fuel gas user training</b></p>	<p>Regulators:</p> <ul style="list-style-type: none"> <li>• Visual checks and inspection.</li> <li>• Functional tests.</li> <li>• Date coding.</li> </ul> <p>Flashback arrestors:</p> <ul style="list-style-type: none"> <li>• Visual checks and inspection.</li> <li>• Reverse flow test.</li> <li>• Date coding.</li> </ul> <p>Hose check valves:</p> <ul style="list-style-type: none"> <li>• Reverse flow test.</li> </ul> <p>Hoses:</p> <ul style="list-style-type: none"> <li>• Visual checks and inspection.</li> <li>• Components.</li> <li>• Hose care.</li> </ul> <p>Torches and Nozzles:</p> <ul style="list-style-type: none"> <li>• Visual checks and inspection.</li> </ul> <p>Record keeping and documentation.</p>

<p><b>Cryogenic Gases</b></p>	<p>User behaviour and perceptions.  Gas and air properties.  Hazards posed by cryogenics:</p> <ul style="list-style-type: none"> <li>• Cryogenic burns.</li> <li>• Expansion rates and oxygen deficiency.</li> <li>• Oxygen enrichment.</li> <li>• Embrittlement.</li> </ul> <p>Hazards posed by pressure.  Cryogenic Vessels:</p> <ul style="list-style-type: none"> <li>• Design, function and operation.</li> <li>• Key safety features.</li> <li>• Valve identification.</li> <li>• Safe handling.</li> <li>• Safe storage.</li> <li>• Safe movement.</li> <li>• Ice plugs.</li> </ul> <p>Decanting procedures:</p> <ul style="list-style-type: none"> <li>• Pre-fill checks.</li> <li>• Potential oxygen enrichment hazards during decanting.</li> <li>• Personal protective equipment.</li> <li>• Safe procedures and vessel pressures.</li> </ul> <p>Oxygen monitoring and ventilation systems.  Cryogenic spillage:</p> <ul style="list-style-type: none"> <li>• Emergency procedures.</li> <li>• First aid.</li> </ul> <p>Before-use safety assessment of work area.  General Risk Assessment and Safe Systems of Work procedures.</p>
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## 6. REFERENCES

Document Number	Title
(1) SI 1999 No. 3242	The Management of Health and Safety at Work Regulations, 1999
(2) Available from HSE	The Health and Safety at Work etc Act 1974
(3) SI 2002 No. 2776	Dangerous Substances and Explosive Atmospheres Regulations, 2002 - (DSEAR)
(4) BCGA Guidance Note 13	DSEAR Risk Assessment.
(5) BCGA Technical Information Sheet 15:	Model Risk Assessment for the storage and use of oxyacetylene gas cylinders.
(6) BCGA Technical Information Sheet 17:	Model Risk Assessment for manual handling activities in the industrial gas industry.

## 7. FURTHER READING

SI 2009 No. 1348	The Carriage of Dangerous Goods and use of Transportable Pressure Equipment Regulations 2009, and subsequent amendments.
SI 1997 No. 1713	The Confined Spaces Regulations 1997
HSE INDG 370	Fire & Explosion – How safe is your workplace?
BCGA Code of Practice 7	The safe use of oxy-fuel gas equipment (individual portable or mobile cylinder supply).
BCGA Code of Practice 27	Transportable vacuum insulated containers of not more than 1000 litres volume.
BCGA Code of Practice 36	Cryogenic liquid storage at users premises.
BCGA Guidance Note 11	Reduced oxygen atmospheres. The management of risk associated with reduced oxygen atmospheres resulting from the use of gases in the workplace.
BCGA Guidance Note 20	Guidance for BCGA training providers.
BCGA Technical Information Sheet 6	Cylinder identification colour coding and labelling requirements.
BCGA Technical Information Sheet 12	Handle gas cylinders safely. Information for customers handling gas cylinders.
BCGA Technical Information Sheet 24	Welding Fumes – Safety Alert.
UKLPG Code of Practice 7	Storage of full and empty LPG cylinders and cartridges
UKLPG Code of Practice 24 – Part 5	Use of LPG cylinders. The storage and use of LPG on construction Sites

### Further information can be obtained from:

Health & Safety Executive	<a href="http://www.hse.gov.uk">www.hse.gov.uk</a>
HSE Books	<a href="http://www.hsebooks.co.uk">www.hsebooks.co.uk</a>
HMSO	<a href="http://www.hmsso.gov.uk">www.hmsso.gov.uk</a>
EIGA	<a href="http://www.eiga.eu">www.eiga.eu</a>

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