



Health and Safety

Transportable Gas Containers

Minimum Standard

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Author/s	Lee McGurty
Approver	ELT Operating Committee
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1 Aims and Principles

The aim of this Government of Jersey (GoJ) Minimum Standard is to provide guidance on the steps which should be taken to ensure that the risks posed by transportable gas containers are adequately controlled to prevent harm.

Departments responsible for managing these risks must develop their own procedures which detail the specific arrangements to be implemented. The procedures must include the standards set out in this document or be of an equivalent or higher standard.

2 Legislation and Guidance

a) Applicable Legislation and Approved Code of Practice

Health and Safety at Work (Jersey) Law, 1989

Safety of Pressure Systems and Transportable Gas Containers – Approved Code of Practice (ACoP 3)

b) Guidance

British Compressed Gas Association (BCGA) – All Publications

Cylinder identification - Colour coding and labelling requirements Technical Information Sheet (TIS) 6 (52) (BCGA)

The Guidance for the storage of gas cylinders in the workplace Guidance Note GN2 (BCGA)

Storage of Gas Cylinders – Code of Practice 44 (BCGA)

Cylinders in Fires (BCGA)

3 Definitions

Transportable Gas Container

A container, including any permanent fitting of such a container, which is used, or is intended to be used, to contain a relevant fluid and is-

- Designed to be transportable for the purpose of refilling and has an internal volume of at least 0.5 litres and not greater than 3000 litres

- A non-refillable container having an internal volume of at least 1.4 litres and not greater than 5 litres

Further definitions are available in the Jersey [Pressure Systems ACoP](#).

4 Who this Minimum Standard Applies to

- All Government of Jersey (GoJ) and States' employees
- Voluntary staff or those on honorary contracts where there is no implied contract of employment

5 Links to other GoJ Policies, Minimum Standards and Guidance

a) Policies

Government of Jersey - Health and Safety Policy

b) GoJ Minimum Standards

Risk Assessment
Manual Handling
Control of Contractors

6 Roles and Responsibilities

The department's arrangements must clearly set out the roles and responsibilities of those required to manage the risks to employees and others from transportable gas containers.

Reference should be made to the Government of Jersey Health and Safety Policy for general responsibilities.

7 Overview

The use of transportable gas containers in the workplace is covered by the Jersey [Approved Code of Practice \(ACoP 3\) - Safety of Pressure Systems and Transportable Gas Containers](#) (Pressure Systems ACoP)

This Minimum Standard provides a summary of the requirements of the Pressure

Systems ACoP and the measures which should be taken to ensure the safe use of transportable gas containers

The Pressure Systems ACoP contains further details of the expected standards and must be consulted in conjunction with this Minimum Standard.

Following the standards set out in the ACoP will help to ensure compliance with the Health and Safety at Work (Jersey) Law, 1989.

8 Exclusions

This Minimum Standard covers the storage, handling and transport of gas cylinders only. It does not cover the use or specific gas types or the safety requirements for operations involving gas cylinders.

The following are also not covered by this Minimum Standard:

- Storage and handling of liquefied petroleum gas (LPG) containers which are covered in a separate Minimum Standard
- Storage and handling of medical gas – specialist guidance should be consulted.

9 Risk Assessment

A risk assessment(s) covering the storage, handling and transport of gas cylinders covering the following should be prepared, although this list is not exhaustive:

- Types of gas cylinders and the particular hazards associated with them
- Storage requirements for the different gas types
- Means of transporting gas cylinders
- Manual handling risks
- Types of emergency e.g. leak or fire and the arrangements in place
- Training requirements

10 Identification of Gas Cylinders

Any gas cylinders being stored, used or transported by a GoJ department must be clearly marked to show their content.

A colour coding system is used to assist with this identification and Appendix A shows the colour scheme for some of the common gases used.

Further information is available in the British Compressed Gas Association's Technical Information Sheet (TIS) 6 (52), [Cylinder identification: Colour coding and labelling requirements](#)

New cylinders are also provided with a label, as shown in Appendix B, although this can become worn during use.

Where the contents of a gas cylinder is unknown, the cylinder should be quarantined and the gas supplier or the authority responsible for cylinder disposal be contacted.

11 Storage

Gas cylinders are considered to be in storage when they are not being used or transported.

The arrangements for any storage for gas cylinders will depend on the types of cylinders being stored and their potential impact on each other and the surroundings.

"Empty" and full cylinders should be stored separately but "empty" cylinders should be treated as if they are full as there is likely to be residual product in the cylinder.

Quantity in storage

Only the minimum number of gas cylinders required to ensure continuous operations should be stored at any one time. This ensures that cylinders are not left in storage for long periods of time during which deterioration can occur.

Depending on the type of gases being stored, this can also significantly reduce the level of risk posed by the storage e.g. flammable gases.

Separation distance between types of gas cylinders

Flammable gases such as oxygen, must be kept separate from other flammable gases or fuel cylinders, such as acetylene when in storage. This can be achieved through providing sufficient separation distance between the different cylinder types or ensuring a suitable fire wall is provided.

The minimum recommended separation distances between cylinders are shown in Appendix C.

Location and design of storage area

Gas cylinders should be stored outside in the open air which will provide good ventilation in the event of gas escape. Where this is not possible, gas cylinders can be stored inside a building or dedicated compartment of a building but reference should be made to the [BCGA Code of Practice, The Storage of Gas Cylinders](#) for further guidance to ensure the risks are properly addressed. Any new stores should not be sited inside buildings.

Guidance should also be sought from the department's H&S Advisor.

Storage areas should be sited away from the following:

- Combustible materials
- Sources of heat or ignition
- Emergency exits
- Drains (if any gases being stored are heavier than air)
- Vehicle routes (or be provided with suitable protection to prevent damage from collision)

The storage area should have a solid base, such as concrete, to prevent water from pooling which can cause corrosion the use of a roof should be avoided as this can reduce ventilation.

The BCGA Code of Practice, *The Storage of Gas Cylinders* sets out minimum separation distances between gas cylinders and the surrounding features as is available in Appendix D.

Security

The storage area should be secure to prevent unauthorised access to the cylinders e.g. a lockable cage.

Cylinders should be stored in an upright position where required, and a means of preventing them from falling over provided.

Signage

Signage should be used to show the following:

- Types of gases being stored
- Flammable and No Smoking signs where flammable gases are being stored
- Full and empty cylinder storage areas

Examples of signage which can be used in gas storage areas are included in Appendix E.

12 Handling/Transporting Gas Cylinders

Transporting using manual handling aids/mechanical aids

Gas cylinders should not be dropped, dragged or rolled when being moved.

They should be transported in an upright position, never horizontally and should be secured on any carrying equipment to prevent unexpected movement.

Transporting in vehicles

When transporting gas cylinders by vehicle, they should be stored in an upright position and must be secured to prevent them from being able to fall over.

They should preferably be transported on open-backed vehicles to reduce the risk of any potential gas build-up in the event of a leak occurring.

Flammable or asphyxiating gases should not be transported in closed vehicles.

Where gas cylinders are transported in closed vehicles, signage confirming the carriage of compressed gas cylinders should be clearly displayed so that it is visible from outside of the vehicle.

13 Fire Safety

A Fire Safety Risk Assessment should be carried out where flammable or oxidising gases, including oxygen are being stored and handled.

Ensuring that the storage area is designed and sited in an appropriate place as described Section 25 will significantly reduce the risks of fire occurring or the cylinders being affected in the event of a fire occurring in close proximity.

Details of the areas which contain gas cylinders should be readily available to the emergency services in the event of an incident fire occurring on site.

14 Emergency Procedures

If cylinders are handled and stored correctly, then an emergency situation is unlikely to arise.

However, the risk cannot be discounted and arrangements should be in place should such an event occur.

The types of emergency which could occur should be detailed in the risk assessment.

Items which should be considered as part of the emergency procedures are set out in Appendix F.

15 Training

Any persons involved with storage or handling of gas cylinders should receive suitable training which should be recorded.











The scope of the training required will be dependent on the role of the individual and should be tailored accordingly.

Typical training content for persons working with compressed gas cylinders is available in Appendix G.

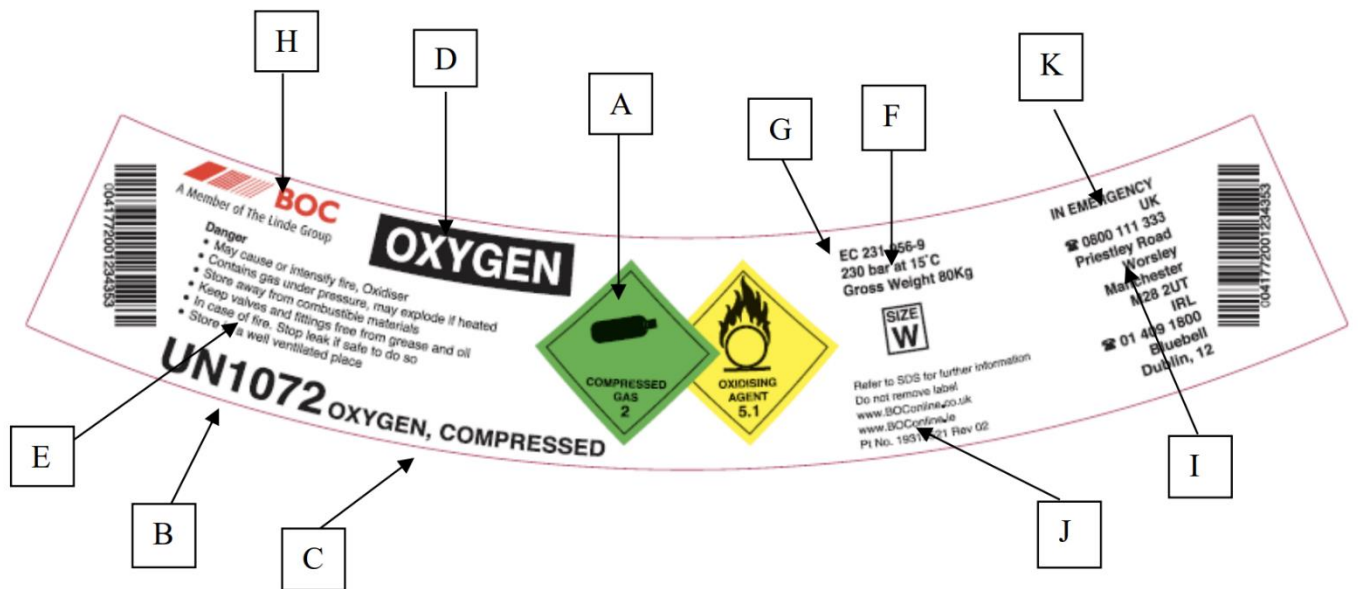
Cylinder Collar Colour - Common Gases



by specific gas:

Maroon			Acetylene
White			Oxygen
Dark green			Argon
Black			Nitrogen
Grey			Carbon dioxide
Brown			Helium

Example Gas Cylinder Label



The following information is required on a label:




- A.** A diamond hazard label, displaying the primary hazard with additional hazard labels displaying any subsidiary hazards. These labels will display the dangerous goods classification number.
NOTE: Diamond hazard labels can be overlapped when they are on a cylinder shoulder label and have been reduced in size.
- B.** The UN number, preceded by the letters UN.
- C.** The proper shipping name.
- D.** Product name (may be omitted if the proper shipping name is identical).
- E.** Signal word, hazard and precautionary statements.
- F.** Package size and pressure.
- G.** EC number, if applicable.
- H.** Company name.
- I.** Address of the gas company.
- J.** Additional company information.
- K.** Contact telephone number

Minimum recommended separation distances between different gas cylinder types






TYPICAL TYPE OF EXPOSURE (Note 1)		MINIMUM SEPARATION DISTANCE (Metres) (Note 2)				
		Inerts including CO ₂	Oxidants	Flammable(s) Compressed or dissolved gases only – e.g. H ₂ and Acetylene	LPG and other liquefied flammables (Note 3)	Toxics (Note 4)
Between gas cylinders and other gas storage						
Bulk storage of flammable gases and liquids (Note 6)		1	3	3	3	3
Bulk storage of cryogenic liquids – (Notes 6 and 7)	Oxidants <2000 litres capacity	1	1	5	5	1
	>2000 litres up to 200 Tonnes			8 (>70 m ³ flammable gas – 7 large cylinders)	7.5 (above 50 kg total capacity LPG)	
	Inerts <2000 litres	1	1	3	3	1
	Inerts >2000 litres	1	1	3	3	1
Transportable cryogenic containers	Oxidants	1	1	5	5	1
	Others	1	1	1	3	1

Note: See [Guidance for the storage of gas cylinders in the workplace Guidance Note GN2 \(BCGA\)](#) for further information







Minimum recommended separation distance from the gas store to specific hazards, processes and articles

Image	Descriptors	Hazard	Inert	Flammable	Oxidiser	Toxic / Corrosive
	Wooden structures, site huts, work sheds etc. NOTE 2.	Thermal radiation from fire.	1	3	3	3
	Combustible material, paper, cardboard boxes, etc. Excessive vegetation.	Thermal radiation from fire.	1	3	3	3
	Plant, ventilation and conditioning.	Intake – Suction of gas into machinery. Hazardous gas properties creating danger to personnel and equipment such as, oxygen depletion, explosion and / or fire risk.	3	3	3	3
	Intakes Exhausts NOTES 7, 8, 9.	Exhaust – Heat and properties / quality of the air (gas) being exhausted. Potential harmful effects on the condition of a cylinder.	1	3	3	3





Appendix D

	Fuel gas vent pipes. NOTE 8.	Ignition of leaking product. Thermal radiation from fire.	0	3	3	3				
	Overground services	Ignition of leaking product. Damage caused by electric arcing.	1	<table border="1"> <tr> <td>< 1 kV</td> <td>1.5</td> </tr> <tr> <td>≥1 kV</td> <td>10</td> </tr> </table>	< 1 kV	1.5	≥1 kV	10	1	1
< 1 kV	1.5									
≥1 kV	10									
Not to be located directly underneath electrical power cables, this includes telephone cables.										
	Process equipment & machinery which is not a part of the storage installation. NOTE 7.	Ignition of leaking product from the process equipment. Thermal radiation from heat generated by normal operation.	0	3	1	1				
	Unprotected electrical equipment NOTE 7.	Source of ignition.	1	3	1	1				
	Medium Voltage (MV) and High Voltage (HV) sub-stations. NOTE 7.	Ignition of leaking product. Thermal radiation from fire.	Undesirable to locate near. Requires a specific risk assessment and specialist advice.							

Appendix D

	Openings, windows and escape routes from buildings.	Hazardous gas properties creating danger to personnel and equipment such as, oxygen depletion, fire risk.	1	2	1	3
	Vulnerable populations.		8	8	8	8
	Places where people assemble or have public access.	Hazardous gas properties creating danger to people and equipment such as, oxygen depletion, fire risk.	1	3	1	3
	Where naked flames, smoking, welding etc. may be present.	Increased fire risk, danger to personnel.	1	NOTE 4 3	1	3
	Railway tracks (on railway property).	Hazardous gas properties creating danger to people and equipment such as, oxygen depletion, fire risk.	Undesirable to locate near. Requires a specific risk assessment and specialist advice. Do not locate flammable gas cylinder stores underneath a bridge supporting a railway.			
	Public roads.	Hazardous gas properties creating danger to people and equipment such as, oxygen depletion, fire risk.	Undesirable to locate near. Requires a specific risk assessment and specialist advice. Do not locate flammable gas cylinder stores underneath a bridge supporting a public road.			

Appendix D

	Site boundaries NOTE 3.	Hazardous gas properties creating danger to people and equipment such as, oxygen depletion, fire risk.	1	3	1	3
	Vehicle(s). Parking areas. The store shall have adequate protection against vehicle impact.	Hazardous gas properties creating danger to people and equipment. Potential of vehicle to act as an ignition source.	0	3	1	3
	Pits, ducts & surface water drains (untrapped). Openings of systems below ground level.	Liquefied and heavier-than-air gases are likely to accumulate below ground causing oxygen deficient or flammable atmospheres.	0	2	0	0
	Cryogenic storage tank NOTES 5, 6.	Embrittlement from extreme cold.	1	From inert cryogen = 1 From oxidant cryogen = <2000 L = 5 >2000 L = 8	1	1

Note: See [Storage of Gas Cylinders – Code of Practice 44 \(BCGA\)](#) for further information

Notes

1. All distances are in metres (m).
2. The separation distance is measured from:
 - For individual cylinders, the separation distance is to be measured from the external shell of the cylinder to the external boundary of the specific hazard; or
 - Where multiple cylinders are kept in a store with a fence, for all hazards external to the store the fence-line may be taken as the starting point to measure a separation distance.
3. Where the store boundary also acts as a site boundary – the values quoted are the distance between the cylinder and the site boundary.
4. LPG cylinders. <400 kg = 1 m; >400 kg = 3 m.
5. For all bulk dangerous substances a risk assessment shall be carried out to establish the safe separation distance.
6. The distances from bulk storage are to be taken from the skin of the tank or any potential release points, for example, filling lines, vents, vaporiser.
7. The risk assessment may identify a need for protected electrical equipment or may justify a change to the separation distance for un-protected electrical equipment.
8. The store shall not be directly below an air intake. Exhaust gases should be directed away from cylinders.
9. Consideration should be given to the density of the gases being stored, i.e. lighter or heavier than air. Take into account air intakes, doors, windows and other openings close to the storage area. This may require an increased separation distance.

Examples of signage for use in gas storage areas

General:



No source of ignition



No smoking



No unauthorised access



No mobile phones



Danger
Gas cylinder store

Potential asphyxiating atmosphere



Danger
Risk of asphyxiation

Gas cylinder store



Danger
Explosive atmosphere

Explosive Atmosphere



No oil or grease



Safety gloves must be worn



Safety boots must be worn



Eye protection must be worn



Industrial vehicles

Gases:



WARNING
Flammable gas

Flammable gas



ACETYLENE

Acetylene



WARNING
Oxidising gas

Oxidising gas



WARNING
Corrosive gas

Corrosive gas



WARNING
Toxic gas

Toxic gas

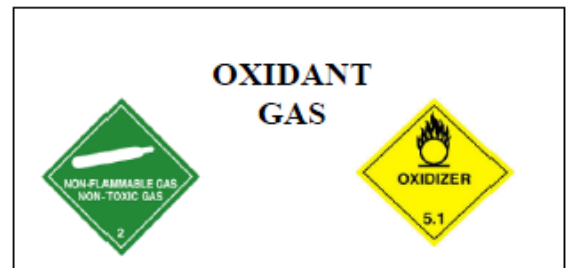
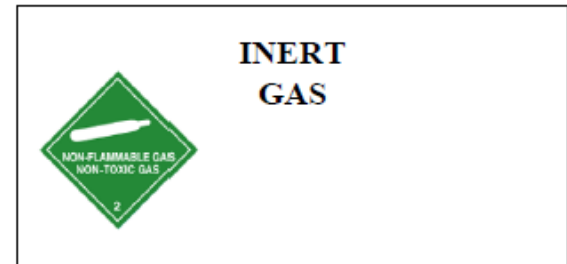
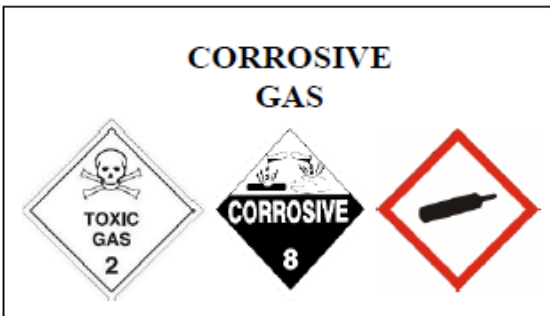
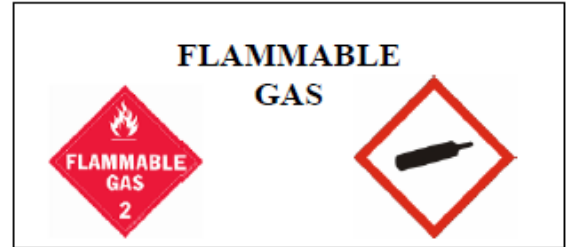
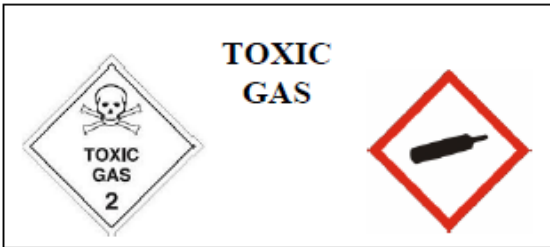
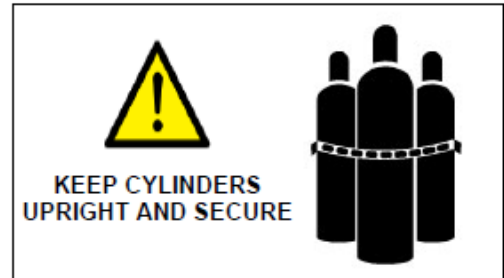
Appendix E

1. Inert gas



2. Flammable gas





Emergency Procedures

The following items should be considered in the preparation of documented emergency procedures.

Incident controller

The need for and appointment of a trained person with adequate local site knowledge to take charge of the emergency and assist the emergency services as necessary.

Action in the event of a serious leakage

- Identify the source of the leak.
- Identify the gas concerned.
- Undertake actions as based on the properties of the gas concerned.
- Consult gas supplier for advice.

Only people who have knowledge of gas properties and hazards and who have been trained to deal with gas emergencies should handle leaking cylinders.

NOTE: Never attempt to dismantle or repair cylinder valves.

Action in the event of a fire

KEEP AWAY, do not approach or attempt to move the cylinder or open the valve.

- Sound the alarm.
- Evacuate the danger area.
- Call the Fire and Rescue Service.

NOTE: The Fire and Rescue Services have operational procedures in place for dealing with gas cylinders in a fire. The Fire and Rescue Service will inform you when it is safe to handle a cylinder.

Further advice on fire-fighting equipment and fire precautions may be obtained from either the enforcing or fire authorities. Additional information is available in the product Safety Data Sheet, also refer to [BCGA L 6 \(36\) Cylinders in fires](#).

Information required by the emergency services

Inform the fire and rescue service immediately of the location and type of any gas cylinders involved in the fire as well as any others located on the site.

It is good practice where larger quantities of cylinder gases are stored to invite the Fire and Rescue Service to site so they are familiar with the location in the event of a fire.

Appendix G

Gas supplier

Contact the gas supplier for further information regarding the gases involved. The gas supplier should **ALWAYS** be notified of any cylinder involved in a fire. Further information, including contact numbers for gas cylinder suppliers is available in [BCGA L 6 \(36\) Cylinders in fires](#).



Training

The training should include, but is not limited to:

Identification of the cylinder contents

- Cylinder labels, tags, stencilling
- Colour coding

Properties of gases

- Meaning of flammable, toxic and non-flammable non-toxic gases classification
- Potential hazards
- Contents of each product safety data sheet
- Fire triangle
- The different properties and hazards of compressed and liquefied gases

Construction of cylinders

- Materials of construction
- Difference between welded and seamless cylinders
- Valve operation and valve types
- Cylinder information on data plate or stamped into cylinder shoulder
- Use of guards, caps on valves where fitted
- Checks on cylinder condition
- The importance and operation of relief devices

Handling of cylinders

- Cylinder weights full and empty
- Safe handling techniques for individual cylinders
- Safe movement of cylinders into or out of pallets
- Safe movement of palletised cylinders

Appendix G

- Use of trolleys or other handling devices
- Use of mechanical handling devices e.g. Fork Lift Truck
- Operation and maintenance of securing devices for cylinders
- Personal protective equipment

Stock management

- Examination of cylinder storage conditions
- Separation of different categories of cylinders e.g. full and empty cylinders
- Stock rotation of cylinders
- Reporting of cylinder defects to line management/supplier

Storage compound

Need for removal of debris and good housekeeping

Need for security

Identification by the appropriate signage

Emergency situations

- Action to be taken in cases of:
 - Leaking cylinder valve
 - Fire
 - Fire impact on cylinders in storage
- Emergency contact details for supplier
- Location of emergency equipment
- Links to emergency services