



**Ministry  
of Defence**

**JSP 319  
Joint Service Safety Regulations for the Storage  
and Handling of Gases**

**Part 1: Directive**

# Foreword to - JSP 319 v4.2

The Secretary of State for Defence (SofS) requires that all Defence activities are properly governed and organised and are conducted in as safe, effective and efficient manner as reasonably possible.

As the Defence Authority for Logistics (DAfL), I am responsible for providing the MOD's rules and regulations for the safe conduct of all logistic operations; the regulations set out in this JSP cover those that apply to the good governance, organisation, safe storage, handling, distribution and disposal of Gases. The application of these rules is mandatory and full compliance is required. It is the responsibility of commanders and line managers at all levels to ensure that personnel, including contractors, involved in the management, supervision and conduct of Defence activities using the products referred to in this publication are fully aware of their responsibilities.

The Fuel and Gases Safety Regulator (FGSR) is empowered by the SofS, through the Director General Defence Safety Authority, to enforce these regulations and will do so through a regular, programmed regime of compliance audits.

Units should destroy previous editions of this publication.

*A. Fay*

Major General A. Fay

Defence Logistics

# Acknowledgements

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# Amendment Sheet

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# Part 1 Direction

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# Preface

Chapter Sponsor - DSFA Tech Gas Manger

## How to use this JSP

1. JSP 319 lays down the standards of practice to be observed within the MOD for the storage and handling of all Industrial Gases including Liquefied Petroleum Gas. It is designed to be used by staff responsible for the storage and handling of Industrial Gases stored in cylinders, LPG stored in bulk storage vessels and Cryogenic liquids stored bulk cryogenic storage tanks.
2. The JSP is structured in two parts:
  - a. Part 1 - [Directive](#), which provides the direction that must be followed in accordance with Statute, or Policy mandated by Defence or on Defence by Central Government.
  - b. Part 2 - [Guidance](#), which provides the guidance and best practice that will assist the user to comply with the Directive(s) detailed in Part 1.

Related JSPs	Title
<a href="#">JSP 319 Pt 2</a>	Joint Service Safety Regulations for the Storage and Handling of Gases Part 2 Guidance.
<a href="#">DSA 01.1</a>	Defence Policy, Health, Safety and Environmental Protection
<a href="#">DSA 02 &amp; 03</a>	Fuels & Gas Safety & Environmental Regulations & DCOP's
<a href="#">JSP 418</a>	MOD Corporate Environmental Protection Manual
<a href="#">JSP 375</a>	MOD Health and Safety Handbook
<a href="#">JSP 426</a>	Defence Fire Safety and Fire Risk Management

## Coherence with other Defence Authority Policy and Guidance

3. Where applicable, this document contains links to other relevant JSPs, some of which may be published by different Defence Authorities. Where particular dependencies exist, these other Defence Authorities have been consulted in the formulation of the policy and guidance detailed in this publication.

## Further Advice and Feedback- Contacts

4. The owner of this JSP is Defence Logistics, DSFA. For further information on any aspect of this guide, or questions not answered within the subsequent sections, or to provide feedback on the content, contact in the Subject Matter Expert / Chapter Sponsors promulgated at the front of each Chapter, or:

Job Title	Email	Phone
DSFA - Gases Technical Mgr	<a href="mailto:Joseph.Lam102@mod.gov.uk">Joseph.Lam102@mod.gov.uk</a>	030 679 89678
DSFA - JSP Editor	<a href="mailto:Paul.Franks898@mod.gov.uk">Paul.Franks898@mod.gov.uk</a>	030 679 83799



## Glossary

5. **Scope.** This section provides the standard definitions and abbreviations for specialist terminology used in connection with the storage, handling and use of the range of gases used within the MOD.

6. **Source.** Definitions used in this publication are mainly derived directly from legislation, Codes of Practice and Guidance Notes. In addition, NATO terminology has been introduced where appropriate. The relevant source is quoted wherever possible.

7. **Primacy.** In deriving the definitions used in this publication, several meanings have been found to exist for the same expression. Accordingly, the following table of accession has been adopted:

- a. UK legislation.
- b. International Standards Organisation (ISO).
- c. Economic Commission for Europe (ADR).
- d. European Standards (CEN).
- e. British Standards Institute (BSI).
- f. Trade Associations, including BCGA, UKLPG and EIGA.
- g. NATO Terminology (APP-1).
- h. MOD (e.g. APs, JAPs, JSPs, SRPs, etc).

8. **Availability.** JSP 319 is available electronically from the [Defence Intranet](#). A controlled version is available on the [World Wide Web \(Internet\)](#).

9. Units that require JSP 319 in CD-ROM format are expected to 'burn' off copies as required at a local level. Units that either have no access to the Intranet or the facility to 'burn' CD-ROM's should staff their requirement through the chain of command. Exceptionally CD-ROM copies of JSP 319 can be obtained from the JSP 319 Technical Author.

10. Abbreviations and terms defined in this publication are contained in Annexes A and B. In this publication the following terms have the definitions assigned to them irrespective of any other meanings that may be given elsewhere. The source publication has been identified where applicable. To minimise confusion, wherever practical the terminology used by civilian industry or incorporated into legislation and standards are used.

## Introduction to JSP 319

11. **Scope.** This manual lays down the standards of practice to be observed within the MOD for the storage and handling of Industrial Gases including Liquefied Petroleum Gas and cryogenic liquids.

12. **Sources.** The regulations contained within JSP 319 are derived from international and national legislation; international, NATO and national standards; industry Codes of Practice and Guidance Notes.

13. **Authority.** JSP 319 is produced and maintained by the Defence Strategic Fuels Authority under the parameters of the DSA FGSR Stakeholder Committee as defined in [DSA 01.1](#) and [DSA 02 & 03](#).

14. **Maintenance.** JSP 319 will be maintained on the Defence intranet and will be revised on an as-required basis. All hard copies of JSP 319 are uncontrolled. To check the latest amendment status reference should be made to the [Defence Intranet](#) or to [ACDSLOGOPS-DSFA-PolicyWO1@mod.gov.uk](mailto:ACDSLOGOPS-DSFA-PolicyWO1@mod.gov.uk).

15. **Equality and Diversity Impact Assessing Statement.** This policy has been Equality and Diversity impact assessed in accordance with the department's equality and diversity impact assessment tool against: "Part 1 Assessment only - no diversity impact found."

## Applicability

16. The Secretary of State for Defence issues a policy statement on Safety, Health, Environmental Protection and Sustainable Development in the MOD which sets out the strategic principles, duties and governance to be applied throughout the MOD. This policy statement is published in [DSA01.1-SHEP](#). The MOD policy for fuel and gases is promulgated by the Defence Fuels and Gases Stakeholder Committee (DF&G SC) in the form of a domain specific publication - [DSA 02 & 03 Fuels Gases & Environmental Regulations & DCOP's](#). The specific MOD policy and regulations relating to the **End to End**<sup>1</sup> storage, and handling of gases are detailed in JSP 319, Part 1. JSP 319 regulations shall be applied to the storage & handling of gas and LPG products by the three Services, Defence Equipment and Support (DE&S), Central TLB, and Defence Agencies. The regulations shall also apply to contractors, and their personnel, operating on the MOD estate and to non-public activities/encroachments (such as flying clubs).

17. **Transportation.** All gases and pressure receptacles, including gas cylinders, aerosols, tanks and MEGC's are classified as dangerous goods. JSP 800 – Defence Movement and Transport Regulations are always to be consulted when transporting dangerous goods detailed within this publication ([refer to Part 2, Chap 8](#)).

18. **Exceptions.** These regulations do not cover the internal use of Gas Products aboard ships or vessels, or in aircraft operated by the Services or specialist contractors or agencies, or the repair of MOD vehicles or aircraft for which special regulations apply. Such special regulations shall be based on this publication. Similarly, where the Services

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<sup>1</sup>End to End Includes:

- Transportable gas cylinders when in a MOD station / MOD central establishment store.
- Bulk cryogenic gases and associated pipelines (up to 1st stage regulator)
- Bulk LPG and associated pipelines (up to 1st stage regulator).

End to End **does not** include:

- Transportable gas cylinders that are in-use. (Operating Authority / Equipment, Platform Sponsor / MMO / Trade Sponsor Responsibility as applicable)
- Natural gas storage and pipeline transportation (DIO responsibility)
- Distribution of gases within an equipment, platform or building (Operator / DIO)
- Cylinders that are in-carriage (Transport carriage of Dangerous Goods iaw JSP 800)

need to operate at locations which require specific standards higher than those contained in this manual, then the higher standard shall be applied. Where applicable these specialist regulations/publications are referenced within JSP 319.

19. **Outside UK.** In countries outside of the UK, the standards specified in this manual shall be applied unless the host nation requires a higher standard in which case that standard must be applied. In Germany, where the Status of Forces Agreement (SOFA) has precedence, all facilities must be constructed to German Standards with disregard to the regulations specified in this manual.

20. **Specific Procedures.** The main sections of the JSP 319 will detail the generic procedures to be used within the services and associated users. However, where storage handling procedures are not common across the services at this stage, they will be detailed in annexes or references covering the Land, Marine and Aviation environments. Where single-Service issues require the production of clarifying or complementary statements, policies or orders, these shall be based on the detail of this publication, but should not repeat its contents. The JSP 319 shall have primacy over any such clarifying or complementary statements, policies or orders.

21. **User Responsibilities.** The responsibility for the **safe use of gases** lies with the “user” and their respective Trade Group Sponsor or equipment / platform Project Team (PT) as appropriate. “User” process should include safe operating procedures, (how gases interface with user equipment / processes), training, and auditing programmes (including Ready Use).

**Note:** Examples of users: - welding bays, medical centres, diving stores, LOx charging bays.

22. **Operational Conditions.** Some relaxation of the procedures detailed in the JSP 319 may be necessary under operational circumstances. However, as many of the regulations and procedures contained within the JSP are derived directly from legislation, exemption from the regulations would require the approval of the Secretary of State for Defence.

23. **Parts.** The JSP 319 consists of three main parts.

## **Format**

24. The format of this JSP is in accordance with JSP 101.

## **Editorial**

25. JSP 319 is published under the management control of Defence Logistics, DSFA as the MOD Regulations for storage, handling and use of gases. The chairman of the JSP 319 Working Group is responsible for the editorial content of this publication.

26. **Editorial Working Group.** An editorial Working Group is responsible for reviewing the content of JSP 319: Refer to Table 1.

Department	Members
Defence Logistics - DSFA	DSFA COS - SO1 Chairman JSP 319 WG DSFA Policy WO1 - Secretariat of JSP 319 WG DSFA Gas Technical Manager
DSA Fuels & Gas Safety Regulator (FGSR)	FGSR - Gas Auditor
DSA	(DMR Spt Diving) (DSEA DLSR Mov Tpt)
Navy Comd HQ	SO2 Navy Log Infra
Army Comd HQ	SO2 Fuels, D Support, Army HQ 64 Wks Gp RE, 516 STRE OC DFRMO – SD FS
Air Comd HQ (38 Gp)	SO2 38 Gp Fuels RO
Joint Force Command (JFC)	CESO EPSD A
Defence Equipment & Support (DE&S)	SCM SC Mgr
Defence Fuel & Food Services (DES LCS OILS, LUBRICANTS, AND GASES TEAM)	SCM Inv Mgr 2 Technical Team Manager
Defence Equipment & Support (DE&S)	AS-AC GSE1d TECH - AG DStan-SPM5 DES Ships MCS - UEW Tech Spt DES QinetiQ DSCOM, DMTPD, DGHSG Med & Gen PT Technical Manager
Defence Infrastructure Organisation (DIO)	DIO ODC - Eng Mech AH Sp DIO ODC - Utilities En Del2a DIO ODC - Utilities En Del1a
Defence Support Group Stafford (DSG)	CGMS QA Manager
	Additional Chapter Sponsors (SMEs) as required

**Table 1** - Composition of JSP 319 Editorial Working Group.

27. **Amendments.** Amendments will be issued whenever required to reflect changes in legislation or other source documents. Proposed amendments to JSP 319 should be submitted through existing staff channels to the Editor of JSP 319.

## Reporting Amendments in JSP 319

28. **Purpose.** The purpose of this information is to provide users at all levels with a means of reporting unsatisfactory features in the JSP 319 and proposing an amendment. Reports are to be submitted using The [MOD Form 765](#)

29. **Originator of report.** Originators of reports are to raise one copy of the report. Once satisfied that the report contains all relevant detail, it is to be forwarded to the JSP 319 [Editor](#). There is no requirement to provide a covering letter or additional correspondence with the report; unless the originator believes amplification of the report is necessary to assist the JSP 319 WG.

30. **Action by JSP 319 WG.** On receipt of the report, the JSP 319 WG is to investigate the content of the report and, if necessary, initiate amendment action through the Chapter Sponsors and the Editor of JSP 319. On completion the Editor is to advise the originator the decision of the JSP 319 WG and the revision made if applicable.

# Annex A - Definitions

Term	Definition	Source
Access Apron	An area between the tank and a tanker where the process operating controls on both tank and tanker are accessible to the operator during filling/discharging. This area will normally have provision for containing or diverting a liquid spillage.	BCGA CP 36
Accident (Incident)	Any event which causes, or has the potential to cause injury, loss or damage to people, plant or premises.	JSP 375
ADR	European Agreement Concerning the International Carriage of Dangerous Goods by Road	ADR
Aerosol or Aerosol dispenser	Any non-refillable receptacle made of metal, glass or plastics and containing a gas, compressed, liquefied or dissolved, with or without a liquid, paste or powder, and fitted with a relief device allowing the contents to be ejected as solid or liquid particles in suspension in a gas, as a foam, paste or powder or in a liquid state or a gaseous state.	ADR
Air Separation Unit (ASU)	Air separation units produce nitrogen, oxygen and argon using air and electrical power as raw materials. While there are variations in the process details, reflecting desired product mix and other factors, all air separation units belong to one of two general process categories: <ul style="list-style-type: none"> <li>• Cryogenic plants – Produce gas and liquid products using very low temperature distillation to separate air components and achieve the desired product purities.</li> <li>• Non-cryogenic plants – Produce gaseous products with near-ambient temperature separation processes that utilize differences in properties such as molecular structure, size or mass to generate oxygen or nitrogen.</li> </ul>	
Air compressor	A machine that draws in air at atmospheric pressure compresses it and delivers it at a higher pressure.	
Anesthetic gas	Gas with narcotic characteristics, for medical use. EXAMPLE: Cyclopropane.	ISO 10286
Analgesic gas	Gas with pain-relieving characteristics, for medical use. EXAMPLE: Nitrous oxide.	ISO 10286
Asphyxiant gas	Gas which can cause suffocation when inhaled by man or animals. <b>Note:</b> Although most gases, with the exception of air, oxygen and a few others, are asphyxiant, the term is mainly used for gases not connected with other hazards, flammability, toxicity, etc.	ISO 10286
Authorised Person – Petroleum	A person employed by, or commissioned by the Works Services Manager or MOD, and appointed for the purpose of implementing the MOD Safety Rules and Procedures by the Commanding Officer/Head of Establishment/Officer in Charge.	JSP 375 Vol 3
Authorising Engineer – Petroleum	A suitably experienced chartered mechanical engineer experienced in petroleum handling systems, employed or commissioned by the Works Services Manager or MOD, and appointed by the Commanding Officer, Head of Establishment or Officer in Charge to ensure safety of petroleum work for the base.	JSP 375 Vol 3
Batch	A quantity of cylinders that are filled from the same charge from the same source.	
Breathing Apparatus	Apparatus designed to enable the wearer to work and breathe without harmful effects in a non-life supporting atmosphere by supplying breathable quality air via an airline or pressurised cylinder.	DB 1754
Breathing gas	Gas used in breathing apparatus to aid breathing. EXAMPLES: Air, nitrogen/oxygen mixtures	

Term	Definition	Source
Bundle (of cylinders)	An assembly of cylinders that are fastened together and which are interconnected by a manifold and carried as a unit. The total water capacity shall not exceed 3000 litres except that bundles intended for the carriage of toxic gases of Class 2 shall be limited to 1000 litres.	ADR
Burst pressure	Highest pressure reached in a cylinder during a burst test	ISO 10286
Cartridge	LPG: A non-refillable container of less than 1.4 litre water capacity. Often fitted with a pierceable diaphragm or a self-sealing valve.  Gas: See Gas Cartridge.	
CE Mark(ing)	A EC Declaration of Conformity, by means of adding a CE Mark to a PPE product	EC Legislation
Combustible Gas Indicator (Explosimeter)	An instrument used to measure the concentration of flammable gas.	
Compressed air	Compressed air produced by an air compressor. Normally produced to a low specification (suitable for tool use) and is not suitable for breathing purposes.	Def Stan 68-284
Competent Person	A person with sufficient technical knowledge or experience to prevent danger or, where appropriate, injury, during his or her work.	SRP-CER
	A competent individual person (other than an employee) or a competent body of persons incorporated or unincorporated. Responsible for preparing or certifying the suitability of a written scheme of examination and for carrying out an examination in accordance with the written scheme of examination.	PSSR
Compressed gas	Gas, which, when packaged under pressure for transport, is entirely gaseous at all temperatures above –50°C. <b>Note:</b> This category includes all gases with a critical temperature less than -50°C	ISO 10286 (BS) EN 1920
Container	A cylinder or cartridge.	HSE CS 4
	A storage tank, replenishment trolley or flask used for the storage and transportation of liquid oxygen or liquid nitrogen.	
	A portable container, including small cans and bottles, drums, portable tanks and tank containers of any size not connected to a process.	HS(G)51
Corrosive Gas	A corrosive gas is one which, on direct contact, may harm human tissue. Many corrosive gases may also react with certain materials of construction causing material damage and possible failure. Corrosive gases only react with a material in the presence of water or moisture from the atmosphere or other sources.	
	UN Definition – Gases which: (a). Are known to be so toxic or corrosive to humans as to pose a hazard to health; or (b). Are presumed to be toxic or corrosive to humans because they have a LC 50 value for acute toxicity equal to or less than 5 000 mL/m <sup>3</sup> (ppm). Gases or gas mixtures meeting the criteria for toxicity completely owing to their corrosivity are to be classified as toxic with a subsidiary corrosivity risk. Class 2, Division 2.3.	ADR
Critical pressure	The minimum pressure required to liquefy a gas at its critical temperature.	
Critical temperature	The temperature above which the substance cannot exist in the liquid state. <b>Note:</b> For gas mixtures the corresponding term is pseudo-critical temperature.	ISO 10286 ADR



Term	Definition	Source
Cryogenic liquid	Gas which liquefies at 1.013 bar at a temperature below –30°C. Note: Cryogenic fluids can be stored or transported only in thermally insulated containers. These gases are also known as liquefied gases or liquefied refrigerant gases, as appropriate.	
Cylinder	A transportable pressure receptacle of a water capacity not exceeding 150 litres.	ADR
Dangerous Area	An area in which there exists, or may exist, a dangerous atmosphere which in turn is defined as an atmosphere containing: a. Any flammable gases or vapour in a concentration capable of ignition. b. A concentration of toxic gas above prescribed limits. c. An atmosphere containing insufficient oxygen for normal respiration.	BR 1754
Dangerous Occurrence	A specific, unplanned, uncontrolled event which has the potential to cause injury or damage and is listed in Schedule 2 of the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995.	JSP 375
Decant	The filling or trans-filling from one gas cylinder to another	
Decant cylinder	Cylinder, normally for refrigeration gases, cleaned to a high standard, suitable for the temporary storage of a gas from a system.	
Decomposition	Chemical reaction whereby a substance breaks down into its constituent elements. In the case of acetylene this means carbon and hydrogen. This reaction gives out a great deal of heat.	BCGA GN15
Design pressure	Pressure used in the formula for the calculation of the minimum wall thickness of a cylinder. <b>Note:</b> In most cylinder design regulations it is the test pressure	ISO 10286
Developed pressure at $T_{max}$	Pressure developed by the gas contents in a cylinder at a uniform temperature of $T_{max}$ <b>Note:</b> $T_{max}$ is the expected maximum uniform temperature in normal service as specified in international or national cylinder filling regulations.	ISO 10286
Dewar flask	A thermally insulated container. It consists of two flasks, one placed inside the other, with a vacuum between. The vacuum prevents the conduction of heat from one flask to the other. For greater efficiency the flasks are silvered to reflect heat. The substance to be kept hot or cold, e.g. a cryogenic liquid, is contained in the inner flask.	
Dew point	The temperature at which dew, or condensation, forms on cooling a gas. It is a measurement taken at normal atmospheric pressure (1.013 bar). <b>Note:</b> For temperatures below 0°C the term 'Frost point' should strictly be used, but the term Dew point is often used to include Frost points.	Def Stan 68-284
Dissolved Acetylene	Acetylene dissolved in acetone or dimethylformamide.	(BS) EN 1800
Dissolved gas	Gas which when packaged under pressure for transport is dissolved in a liquid phase solvent	ISO 10286
Downstream User	Someone who uses substances in the course of his industrial or professional activities. Note 1: A Downstream User is, by definition, not a Manufacturer, or an Importer (into the EU) of chemicals. Note 2: Some of the duties of a Downstream User may apply to Distributors, Retailers and Storage.	REACH Regulations
Dunnage	Loose wood, matting or similar material used to keep cargo in position, typically in a ships hold.	
Earthing Boss	A brass bolt or lug brazed to a vessel to which the earthing system is attached.	
Entonox™	A trade name used by BOC Gases to identify a medical gas mixture of 50 % Nitrous Oxide and 50 % Oxygen.	
Expendable Container	An LPG container that cannot be refilled (see also Cartridge).	



Term	Definition	Source
Explosives area	An area used for the storage, handling and processing of explosives that are usually enclosed by a security fence.	JSP 482
F Gas	A Fluorinated Greenhouse gas controlled under the Kyoto Protocol.	
Filler	Person or persons responsible for inspection prior to, during and immediately after filling and who has received an appropriate level of training for the work involved, and has access to all necessary data for the cylinder, valve and all other fittings used.	(BS) EN 1919 (BS) EN 1920
Filling pressure	Pressure to which a cylinder is filled at the time of filling. <b>Note:</b> It varies according to the gas temperature in the cylinder, which is dependent on the charging parameters and the ambient conditions.	ISO 10286 (BS) EN 1920
Filling ratio	Ratio of the mass of gas to the mass of water at 15°C that is filled in a gas cylinder ready for use. <b>Note:</b> Synonyms are filling factor and filling degree, often expressed in kg/l or similar.	ISO 10286 ADR (BS) EN 1919
Fire wall	A wall, screen or partition erected in the open air to help protect containers of flammable liquid (LPG) from heat radiating from a nearby fire, and/or to ensure adequate dispersion distance from buildings, boundaries, sources of ignition etc for flammable liquid or vapour leaking from any container. A fire wall in this context does not include a wall intended only to protect buildings and other features in the vicinity from a fire at a container storage area.	HS(G) 51
Flameproof	Apparatus that will withstand an internal explosion of the flammable gas or vapour which may enter it, without suffering damage and will prevent the transmission of flame to the external flammable gas or vapour for which it is designed, through any joints or structural openings in the enclosure.	
Flame Arrestor	A device which arrests a flame front (caused by flashback or decomposition) and which is suitable for the most severe type of flame which may occur.	
Flammable gas	Gases which burn readily in the presence of oxygen or air and in certain admixtures are explosive.	
Flashback	Occurs when flame from a torch burns back into the tip, the torch or the hose. It is often accompanied by a hissing or squealing sound with a smoky or sharp-pointed flame.	BCGA GN15
Frost point	See 'Dew point'.	Def Stan 68-284
F & L	Fuels & Lubricants	
Full gas cylinder	A gas cylinder charged to its working pressure or, in the case of a liquefiable gas, a cylinder filled to its tare weight.	
Gas	Any substance that is completely gaseous at 1.013 bar and 20 °C or has a vapour pressure exceeding 3 bar at 50°C. <b>Note:</b> The word substance encompasses pure substances as well as mixtures.	ISO 10286
Gas cartridge	Any non-refillable receptacle containing, under pressure, a gas or a mixture of gases. It may be fitted with a valve.	ISO 10286 ADR
Gas free	A vessel or similar confined space is considered to be gas free if the concentration of combustible vapours present is below one per cent of the lower explosive limit as measured by an accurate and recently calibrated indicator, combustible gas. <b>Note:</b> Gas free does not mean non-toxic.	
Hazardous Area	An area in which explosive gas – air mixtures are, or may be expected to be, present in quantities as to require special precautions to be instituted to prevent their ignition. Such areas are to be Designated and appropriately signed.	JSP 375 Vol 3
Hazard Division (HD)	A division of the United Nations Dangerous Goods Class definition indicating the main type of hazard to be expected in the event of an accident.	

Term	Definition	Source
Heliox	A gas comprising a specified mixture of oxygen and helium, capable of supporting human life under appropriate diving or hyperbaric conditions.	BS 8478
High-pressure liquefied gas	Liquefied gas, which has a critical temperature between -50°C and +65°C	ISO 10286
Incident (Accident)	See definition for Accident	JSP 375
Industrial gas	Gas which is used in a technical process in industrial production or similar activity	ISO 10286
Inert gas	Gas which does not readily react chemically with other substances	ISO 10286
Inhabited Building	A building or structure occupied in whole or in part by people.	
Inside Quantity Distance	See definition of 'Quantity Distance'.	JSP 482
Intrinsically Safe	<p>An intrinsically safe circuit is one in which any electrical sparking that may occur in the normal working, under the conditions specified by the certifying authority and with the prescribed components, is incapable of causing an ignition of the prescribed flammable gas or vapour.</p> <p>An intrinsically safe apparatus is that which is so constructed that, when installed and operated in the conditions specified by the certifying authority, any electrical sparking that may occur in the normal working, either in the apparatus or in the circuit associated therewith, is incapable of causing an ignition of the prescribed flammable gas or vapour.</p> <p><b>Notes:</b></p> <p>1. The use of the term intrinsically safe in normal working is intended to cover sparking that may in normal use be produced by breaking line current or a short circuit across the lines in the circuit that is required to be intrinsically safe. It is also intended to cover sparking that may be produced under any conditions of fault, which in the opinion of the certifying authority might arise in practice.</p> <p>2. The certifying authority referred to in the above is the Department of Trade and Industry.</p>	<a href="#">Department of Trade &amp; Industry</a>
Liquid Transfer Area	An area adjacent to the tank, which surrounds the tanker, when the latter is in the filling/discharge position, and which includes the access apron.	BCGA CP 36
Liquefied Gases	Gas, which, when packaged for transport, is partially liquid (or solid) at some temperature above -50°C	ISO 10286
LPG	<p>LPG is the abbreviation used to describe 'Liquefied Petroleum Gas'. The name describes a group of hydrocarbon gases which exist as vapour under ambient conditions of temperature and pressure, but which can be liquefied by the application of moderate pressure and/or refrigeration.</p> <p><b>Note:</b> LPG is normally marketed as commercial butane (C<sub>4</sub>H<sub>10</sub>) or commercial propane (C<sub>3</sub>H<sub>8</sub>).</p>	
LPG Authority	An authority, normally the DIO or appointed person by them, having specialist knowledge concerning the storage and handling of LPG.	
Lower Explosive Limit (LEL)	This is synonymous with 'lower flammable limit'. It is the minimum concentration of vapour in air or oxygen below which propagation of flame does not occur with a source of ignition.	
Low-pressure liquefied gas	Liquefied gas, which has a critical temperature equal to or above +65 °C	ISO 10286
Maximum Liquid Level Device	A bleed valve connected to a dip tube terminating at the maximum permitted filling level in a vessel to indicate its maximum permitted level when being filled.	
Maximum permissible filling weight	Product of the water capacity of the cylinder and the filling ratio of the gas.	(BS) EN 1919

Term	Definition	Source
Maximum permissible operating pressure	Highest pressure permitted to be developed during service.	ISO 10286
Medical gas	Gas intended to be administered to patients for therapeutic, diagnostic or prophylactic purposes, or to be used for surgical tool applications.	ISO 10286
Minimum Pressure	The pressure below which a cylinder is not to be discharged in normal use.	
Multiple Element Gas Container	Multi-Element Gas Container (MEGC) is a unit containing elements which are linked to each other by a manifold and mounted on a frame. The following elements are considered to be elements of a MEGC: cylinders, tubes, pressure drums and bundles of cylinders as well as tanks for the carriage of Class 2 having a capacity of more than 450 litres. MEGC also known as Manifold Cyl Pack (MCP).	ADR
Naked Lights	The term naked lights is to include all exposed flames, incandescent materials, lamps (e.g. torches, electric lights, hurricane lamps) of an unapproved pattern, gas and electric welding and portable hand or power operated equipment of an unapproved pattern.	
Nitrox	A gas comprising a specified mixture of oxygen and nitrogen, capable of supporting human life under appropriate diving or hyperbaric conditions. <b>Note:</b> This includes manufactured gas mixtures made up from combinations of pure oxygen and pure nitrogen, with or without compressed air.	BS 8478
Nominally empty container	A container from which most if not all liquid has been discharged but which will still contain LPG vapour.	HSE CS 4
Nominal pressure	In accordance with common international understanding, the working pressure.	ISO 10286
Numerical coding	A system of identifying by a 4-digit numerical code the properties of a gas/gas mixture with respect to fire potential, toxicity, physical state and corrosiveness.	
Operating pressure	Varying pressure which is developed in a cylinder during service	ISO 10286
Outside Quantity Distance	See definition of 'Quantity Distance'.	JSP 482
Oxidising gases	Gases which in the presence of combustible materials can be ignited and which promote or are essential for maintenance of combustion.	
Pallet	Device for handling several cylinders at the same time.	(BS) EN 1920
Partition	A fire-proof dividing wall, minimum 300 mm, carried from floor to roof without a gap.	
Permanent gases	Gases which cannot be liquefied by the application of pressure at temperatures above 10 °C.	
Personal Protective Equipment (PPE)	Personal Protective Equipment refers to all equipment and products designed to be worn or held by a person at work to protect them against one or more risks to their health and safety.	
Pi Mark	A special Logo used on Transportable Pressure Equipment. A mandatory European compliance mark, signifying compliance with the, EC, Pressure Equipment Directive and ADR.	
Pigtail	A connecting pipe, usually flexible, between the cylinder valve and the fixed gas piping or installation.	
Portable Container	A gas or LPG cylinder not exceeding 150 litre water capacity.	
Preparation	A mixture or a solution of two or more substances.	CHIP Regulation, REACH Regulation
Pressure	Pressures used in this document are gauge pressures, except where otherwise stated.	

Term	Definition	Source
Pressure receptacle	A collective term that includes gas cylinders, tubes, pressure drums, closed cryogenic receptacles and bundles of cylinders.	ADR
Pressure Regulator	A pressure regulator is fitted to the outlet of the gas cylinder valve and reduces the pressure of the gas from the cylinder pressure to the lower pressure required for the operation of the process equipment.	
Pressure relief device	A device which is fitted to the cylinder or its valve and designed to open to prevent a rise of pressure in excess of a specified value because of excess temperature and/or pressure.	(BS) EN 1919
Pressure Relief Valve	A valve of specified performance designed to relieve pressure within a pressure container above the design pressure.	
Pressure Stage	An area of the installation defined by the upstream and downstream equipment. <b>High:</b> That part between the outlet valve of the cylinder/vessel and the inlet of the 1 <sup>st</sup> stage regulator. <b>Intermediate:</b> That part between the outlet of the 1 <sup>st</sup> and 2 <sup>nd</sup> stage regulators. <b>Low:</b> That part between the outlet of the 1 <sup>st</sup> stage (or 2 <sup>nd</sup> stage if an intermediate stage is used) and the inlet of the appliance.	
Pressure System	A system comprising one or more pressure vessels of rigid construction, including any associated pipework and protective devices, which contains, or is intended to contain, a relevant fluid.	JSP 375
Pressure Vessel	A closed vessel consisting of one or more independent chambers, any of which may be subject to an internal pressure greater than 0.5 bar and is used, or is intended to be used, to contain a relevant fluid.	JSP 375
Propellant gas	Gas under pressure used in a machine or apparatus to create a mechanical force.	ISO 10286
Purge	Definition 1: Vent momentarily, a process which allows the contained gas to blow away any contamination/debris from the gas outlet. Definition 2: Vent, a process using a gas source to clean and flush out contaminants from inside a container.	BCGA
Quantity Distance	There are two types, Inside and Outside: <b>Inside Quantity Distance:</b> <ul style="list-style-type: none"> <li><b>Inter-Magazine Distance.</b> The distance between a building or stack containing explosives to other such buildings or stacks which will prevent the direct propagation of explosives or fire from one to the other by missile, flame or blast.</li> <li><b>Process Building Distance.</b> The distance from a building or stack containing explosives to a Process Building, or from a Process Building to another Process Building, which will provide a reasonable degree of immunity for the operatives within the Process Building(s), and a high degree of protection against immediate or subsequent propagation of explosions.</li> </ul> <b>Outside Quantity Distance:</b> <ul style="list-style-type: none"> <li><b>Inhabited Building Distance.</b> The minimum permissible distance between a Potential Explosion Site and inhabited buildings, caravan sites, places of assembly, etc, which is such that the ignition or explosion of explosives at a Potential Explosion Site will not cause severe structural damage to those buildings or unduly hazard their occupants, be they Service or civilian.</li> <li><b>Public Traffic Route Distance.</b> The minimum permissible distance between a Potential Explosion Site and public traffic routes which is such that the ignition or explosion of explosives at the Potential Explosion Site will not cause intolerable danger to the occupants of vehicles at an Exposed Site.</li> </ul>	JSP 482

Term	Definition	Source
Rare gas	Gas which “never” reacts chemically with other substances. EXAMPLES: Argon, helium, neon, krypton.	ISO 10286
Recovery cylinder	Cylinder provided to recover ‘contaminated’ product for return, normally disposal.	
Refrigerant gas	See definition of Cryogenic Liquid	ISO 10286
Refrigerated liquefied gas	Gas which when packaged for transport is partially liquid because of its low temperature	ISO 10286
Relative Humidity (RH)	The ratio of the actual vapour pressure to the saturation vapour pressure over a plane liquid water surface at the same temperature, expressed as a percentage.	
Restricted Area	A temporarily defined area, which may or may not be in an existing hazardous area, in which there is increased risk of fire, explosion, asphyxiation, poisoning from fumes or gas, due to spillage, defects in installation, or type of maintenance operation to be carried out.	SRP 03
Respiratory Protective Device (RPD)	This refers to Personal Protective Equipment designed to protect the wearer’s respiratory tracts against the inhalation of atmospheres that would normally cause adverse health effects.	BS EN 132
Safe Area	Any area, no part of which lies within a specified dangerous, restricted or hazardous area.	
Safety Area	The area which is covered by the safety distance.	
Safety Distance	The distance to be observed with regards to gas and LPG stocks to ensure the minimum practical risk to life and property should an explosion occur.	
Safety distance external	The minimum distance between any gas cylinder storage area or bulk cryogenic liquid installation to the nearest main road, private building etc. so as to provide reasonable assurance of safety to life and property.	
Safety distance internal	The minimum distance required between storage sub-divisions of flammable, oxidising and inert gas cylinder stacks.	HSE CS 4
Scientific gas	A gas which is used for analysis, calibration and other similar purposes in scientific laboratories	ISO 10286
Separation distance	The horizontal distance between the nearest container in the storage area and the reference feature.	HSE CS 4
Settled pressure	Pressure of the contents of a gas cylinder in chemical, thermal and diffusive equilibrium	ISO 10286 ADR
Source of Ignition	All naked lights or a spark or flame produced by any other means.	
Stack	One or more cylinders located together, all containing the same type of gas.	HSE CS 4
Stampmarking	Permanent markings, applied to the cylinders by hard metal stamping, engraving, casting or other similar methods. In the case of composite cylinders, some permanent markings may be achieved by the use of a printed label, placed in the resin.	BS EN ISO 13769:2006
Stencilling	Marking of the item using inks and/or paints.	BS EN ISO 13769:2006
Storage Area (or store)	An area set-aside for the storage of Industrial Gases and LPG containers where there is no intention of using the products.	HSE CS 4
Storage sub-division.	One or more adjacent stacks of cylinders; each stack being composed only of cylinders containing gases of the same principal hazard classification, i.e. flammable, oxidising or inert.	
Substance	A chemical element and its compounds in the natural state or obtained by any production process, including any additive necessary to preserve the stability of the product and any impurity deriving from the process used, but excluding any solvent which may be separated without affecting the stability of the substance or changing its composition.	CHIP Regulation, REACH Regulation



Term	Definition	Source
Tare weight	The tare weight is the sum of the empty weight plus the mass of any coating (e.g. paint) used in service, the mass of the valve including dip tube where fitted, any fixed valve guard and the mass of all other parts that are permanently attached (e.g. by clamping or bolted fixing) to the cylinder.	BS EN ISO 13769:2006
Temperate climate	A climate in which the maximum shade temperature does not exceed 35 °C; and thus the contents of a container stored in the shade is not likely to exceed 35 °C.	
Test life expired	A cylinder which has not been pressure tested within the periods laid down.	
Test pressure	Required pressure applied during a pressure test for qualification or re-qualification.	ISO 10286
Total weight	Tare weight of the cylinder plus the maximum permissible filling weight.	(BS) EN 1919
Toxic gases	Gases which have a toxic effect when breathed; this includes corrosive gases. Gases classified as UN Class 2, Hazard Division 2.3	ADR
Transit devices	This term embraces all protective items e.g. rubber grommets, coir covers, cradles required by transport authorities as a condition of acceptance of compressed gas cylinders for transportation.	
Trimix	A gas comprising a specified mixture of oxygen, helium and nitrogen, capable of supporting human life under appropriate diving or hyperbaric conditions. <b>Note:</b> This includes manufactured gas mixtures made up from combinations of pure oxygen, pure helium and pure nitrogen, with or without compressed air.	BS 8478
Tropical climate	A climate in which the maximum shade temperature exceeds 35 °C; and thus the contents of a container stored in the shade is likely to exceed 35 °C.	
Water capacity	A 'value' declared by the manufacturer and permanently stamped on the cylinder shoulder. It is the capacity, in units of volume (litre), of the container when it is completely filled with water. It depends upon the dimensions of the container and not the liquid used to fill the container.	
Wet gas	A gas in which the water content of the gas is in excess of the gas specification.	
Wetting Test	Method used initially to establish if an acetylene cylinder is hot from an internal decomposition caused by a flashback or by exposure to fire. The wetting test may also be subsequently used to indicate if an on-going decomposition is slowing down inside the cylinder and that the external shell has cooled indicating that a spontaneous explosion is unlikely, given on-going cooling.	BCGA GN15
Working pressure	The Settled pressure of a compressed gas at a uniform reference temperature of 15 °C in a full gas cylinder	ISO 10286 (BS) EN 1920
Valve guard	A device protecting the valve during handling, transportation, storage. It need not be removed to provide access to the valve.	ISO 11117
Valve protection cap	A device securely fixed over the valve during handling, transportation, storage. It is removed for access to the valve.	ISO 11117
Vulnerable Population	People who cannot be evacuated easily and quickly from buildings because of age or infirmity. For example those in a nursery school, old people's home hospital or correction centre. It also includes buildings where people sleep.	HSE CS 4
Yield pressure	Pressure at which the actual yield strength of a cylinder is reached. <b>Note:</b> Exceeding the yield pressure will cause a permanent increase in the cylinder volume.	ISO 10286

# Annex B - Abbreviations

Description	Abbreviation	Source
<b>A</b>		
(European) Agreement Concerning the International Carriage of Dangerous Goods by Road	ADR	ADR
Air Commodities Project Team	AC PT	
Air Conditioning and Refrigeration Industry Board	ACRIB	
Air Separation Unit	ASU	
Air and Space Interoperability Council	ASIC	
Air Port of Embarkation	APOE	
Air Publication	AP	MOD
Airfield and Bulk Fuels Group	ABFG	
Allied Command Europe	ACE	
Allied Publication	AP	NATO
Allied Quality Assurance Publication	AQAP	NATO
American, British, Canadian, Australian	ABCA	
Amendment List	AL	MOD
As Low As Reasonably Practicable	ALARP	
Authorising Engineer	AE	
Authorised Person Petroleum	AP (Petroleum)	
Aviator's Breathing Oxygen	ABO	USA terminology
<b>B</b>		
Base Level Budget	BLB	
Boiling Liquid Expanding, Vapour Explosion	BLEVE	
Book of Reference	BR	RN
British Compressed Gases Association	BCGA	
British Oxygen Company	BOC	
British Standard	BS	
British Standards Institute	BSI	
<b>C</b>		
CE Mark(ing)	CE Mark	
Central Branch Commercial – Energy Procurement for Defence	CBC – EPD	
Central Health and Safety Project	CHASP	MOD
Chief Environmental Safety Officer	CESO	MOD
Chief of Defence Logistics	CDL	MOD
Chief of Fleet Support	CFS	
Clinical & Professional Support Division	CPSD	
European Committee for Standardization	CEN	
Compliance Monitoring Group Focal Point	CMP	
Compressed Natural Breathing Air	CNBA	Def Stan 68-284
Construction Industry Training Board	CITB	
Control of Major Accident Hazards	COMAH	HSE
Control of Substances Hazardous to Health	COSHH	HSE
Construction (Design & Management) Regulations	CDM	
Crown Fire Standards	CFS	
Customer Supplier Agreement	CSA	

Description	Abbreviation	Source
Cryogenics and Gas Section	CGS	
<b>D</b>		
Dangerous Substances and Explosive Atmospheres Regulations	DSEAR	
Defence Dangerous Goods and Hazardous Stores Group	DDGHSG	
Defence Equipment and Support	DE&S	
Defence Fire Risk Management Organisation	DFRMO	JSP 426
Defence Fuels and Gases Environment and Safety Board	DF&GESB	
Defence Fuels Operation Centre	DFOC	
Defence Infrastructure Organisation	DIO	
Defence Standard	Def Stan	
Defence Supply Chain Operations and Movements	DSCOM	
Defence Support Group	DSG	
Defence Training Estate	DTE	
Defence Works Advisor	DWA	
Department for Transport (UK)	DfT	
Department of Transportation (USA)	DoT	
Deployable Support & Test Equipment PT	DS&TE PT	
Director Defence Health & Safety	D Def H&S	
Director Joint Support Chain	D JSC	
Director Supply Chain Operations	Dir SC Ops	
<b>E</b>		
Environment Agency	EA	
Environment, Safety & Training Sub-committee	ES&TSC	DES LCS OLG TEAM
Equipment Sub Committee	ESC	DES LCS OLG TEAM
Equipment Support	ES	
Establishment Works Consultant	EWC	
Euro Atlantic Partnership Council	EAPC	MOD
European Agreement Concerning the International Carriage of Dangerous Goods by Road	ADR	ADR
European Chemical Agency	ECHA	
European Committee for Standardization	CEN	
European Community	EC	
European Standard (Norm)	EN	
European Union	EU	
Expeditionary Airfield Facilities	EAF	
Expeditionary Logistics Wing	ELW	
<b>F</b>		
First Aid Fire Appliances	FAFA	
Fleet Air Arm	FAA	
Fluorinated Gas	F Gas	
Fuels & Gas Safety Regulator	FGSR	
Focal Point	FP	MOD
Fuels & Lubricants	F&L	
Fuels Safety Assurance Assessment	FSAA	
Fuels Safety Working Group	FSWG	



Description	Abbreviation	Source
<b>G</b>		
Good Manufacturing Practice	GMP	
Government Pipeline and Storage System	GPSS	
Ground Support Equipment	GSE	
<b>H</b>		
Hazard Division	HD	ADR
Head of DFRMO	Hd DFRMO	JSP 426
Health & Safety at Work Act	H&SWA	
Health & Safety Executive	HSE	
Health & Safety Guidance Note	HS(G)	HSE
Higher Explosive Limit	HEL	
Higher Level Budget	HLB	
HQ Air Command	HQ Air	
HQ Land Forces	HQ LF	
HQ Land Forces Directorate of Infrastructure	HQ LF D Infra Sp	
HQ UK Support Command (Germany)	HQ UKSC(G)	
Hydrochlorofluorocarbon(s)	HCFC	
<b>I</b>		
Inside Quantity Distance	IQD	JSP 482
Institute of Petroleum (Now known as the Energy Institute (EI))	IP	
International Air Transport Association	IATA	
International Civil Aviation Authority	ICAO	
International Maritime Dangerous Goods Code	IMDG Code	
International Maritime Organisation	IMO	
International Standards Organization	ISO	
<b>J</b>		
Joint Air Publication	JAP	MOD
Joint Force Command	JFC	
Joint Force Logistic Component	JF Log C	
Joint Helicopter Command	JHC	
Joint Service Publication	JSP	MOD
Joint Support Chain Services	JSCS	
<b>K</b>		
<b>L</b>		
Land Systems Fuels & Lubricants Sub-Committee	LSF&LSC	
Liquid Oxygen	LOx	
Liquid Nitrogen	LiN	
Liquefied Petroleum Gas	LPG	
Logistic Support Inspections	LSI	
Logistic Support Services	Log Sp Svcs	
Logistic Support Technical Inspections	LSTI	
Logistic Support	Log Sp	
Long Term Costing	LTC	
Lower Explosive Limit	LEL	
<b>M</b>		
Major Accident Control Regulations	MACR	MOD
Manifolded Cylinder Pack	MCP	

Description	Abbreviation	Source
Maximum Explosive Limit	MEL	
Medicines and Healthcare products Regulatory Agency	MHRA	
Medical & General Supplies Team	M&GS Team	
Military Works Force	MWF	
Ministry of Defence	MOD or MOD	
MoD Defence Works Functional Standards Safety Rules & Procedures	SRP	MOD
MoD Demand Priority Code - (Stores Priority Code)	SPC	
Montreal Protocol	MP	
Montreal Protocol Substances Bank	MPSB	
Montreal Protocol Task Force	MPTF	
Motor Transport Fuelling Installation	MTFI	
Multiple-Element Gas Container	MEGC	
<b>N</b>		
NATO Military Standards and Terminology	NMSt	MOD
NATO Standardisation Agreement	STANAG	NATO
NATO Stock Number	NSN	
Nitrogen Concentration Trolley	NCT	
Nuclear, Chemical and Biological	NBC	
New European Valve Outlet Connector	NEVOC	
North Atlantic Treaty Organisation	NATO	
Northern Ireland	NI	
<b>O</b>		
Oil Fuel Depots	OFD	
Oil Industry Emergency Committee	OIEC	
Operating Authority	OA	
Out of Area Operations	OOA Operations	
Outside Quantity Distance	OQD	JSP 482
Ozone Depleting Substances	ODS	JSP 418
<b>P</b>		
Permanent Joint Headquarters	PJHQ	
Personal Protective Equipment	PPE	
Personal Role Radio	PRR	
Petrol, Oils & Lubricants (Obsolete – Use ‘F&L’)	POL	JSP 317
Pressure Relief Valve	PRV	
Pressure Systems Safety Regulations	PSSR	HSE
Products Sub Committee	PSC	DES LCS OLG TEAM
Project Team	PT	
Property Manager	PROM	
<b>Q</b>		
Quality Assurance	QA	
Quality Control	QC	
Quality Surveillance	QS	
<b>R</b>		
Rail Tank Cars	RTC	
Reichs-Ausschuss für Lieferbedingungen Number	RAL No.	
Registration, Evaluation, Authorisation and Restriction of Chemicals	REACH	

Description	Abbreviation	Source
Regulations concerning the International Carriage of Dangerous Goods by Road	RID	
Reporting of Injuries, Diseases and Dangerous Occurrences Regulations	RIDDOR	HSE
Respiratory Protective Device	RPD	
Role Office	RO	
Royal Air Force	RAF	
Royal Engineers	RE	
Royal Fleet Auxiliary	RFA	
Royal Logistic Corps	RLC	
Royal Navy	RN	
Royal School of Mechanical Engineering	RSME	
<b>S</b>		
Safety, Health, Environment & Fire Management Board	SHEFB	MOD
Safety Data Sheet	SDS	
Sea Port of Embarkation	SPOE	
Secretary of State	S of S	
Service Focal Points	SFP	
Siting Board	SB	
Specialist Petroleum Inspections	SPI	
Spillage Report	SPILLREP	
Standard Operating Procedure	SOP	
Standardisation Agreement (ABCA)	QSTAG	
Statement of Requirement	SOR	
Statement of User Requirement	SUR	
Status of Forces Agreement	SOFA	
Statutory Instrument	SI	
<b>T</b>		
Top Level Budget (Command)	TLB	
Training Group Development Agency	TGDA	
Transition to War	TTW	
<b>U</b>		
Unit Identity Number	UIN	
United Kingdom	UK	
United Kingdom Accreditation Service	UKAS	
United Kingdom Liquefied Petroleum Gas Association	UKLPG	
United Nations	UN	
<b>V</b>		
Vice Chief Defence Staff	VCDS	
<b>W</b>		
Wet Stock Management	WSM	
Working Party	WP	
Works Service Manager	WSM	

# 1 - Legislation

## Chapter Sponsor - DSFA Tech Gases Manager

### Introduction

1. The Secretary of State for Defence requires that all employees, as far as reasonably practicable, comply with Legislation and Accepted Code of Practice concerning the health, safety and welfare of themselves and others, regardless of any exemption which may apply to the Ministry of Defence<sup>2</sup>.
2. This Publication is based on the following applicable sources:
  - a. Statutory Legislation (and international convention where applicable).
  - b. Regulatory Approved Codes of Practice and Guidance Notes.
  - c. International and British Standards (ISO and BS-EN).
  - d. Industry Approved Codes of Practice (European Industry Gas Association- EIGA, British Compressed Gas Association-BCGA, UK Liquefied Petroleum Gas Association UK LPG).
  - e. Defence Standards (Def Stan).
  - f. MOD Publications (JSPs, MRPs, JAPs, BRs, AESPs, APs).
3. The above standards provide the minimum requirements for the storage, handling and working with Industrial Gases, and cryogenic liquids on the MOD estate. Regardless of the authority of the publications listed in paragraph 2 (above); all processes / references stated **within this** publication, both in the Annexes to this chapter, and the chapter specific bibliographies shall be deemed as **mandatory** unless otherwise stated.

### Legislation

4. Of particular relevance to this publication are Regulations enforced under the primary legislation (Acts) for health, safety, and the environment when storing, handling and working with Industrial Gases and cryogenic liquids. Further information can be obtained from the legislation below and the HSE / EA / DfT websites, which are summarised at Annex A:
  - a. [HSE GOV UK - Stat Instruments](#)
  - b. [Government Department Transport](#)
  - c. [Government Environment Agency](#)

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<sup>2</sup> JSP 375 Pt1 V1.0 dated Jan 2016, Paragraphs 11,12

## Regulatory Guidance Approved Codes of Practice, Guidance Notes (ACOPs, GNs)

5. Other Government departments and executive non-departmental public bodies such as Department for Transport (DfT), Environment Agency (EA, SEPA), and Health and Safety Executive (HSE) publish applicable Codes of Practice and Guidance Notes.
6. **Approved Codes of Practice-ACOPs.** These ACOPS are approved by the respective Secretary of State and provide practical advice on how to comply with the law. If you follow the advice you will be doing enough to comply with the law in respect of those specific matters on which the Code gives advice. However, the Code has a special legal status. If you are prosecuted for breach of health and safety law, and it is proved that you did not follow the relevant provisions of the Code, you will need to show that you have complied with the law in some other way or a Court will find you at fault.
7. **Guidance.** Guidance Notes, Pollution Prevention Guidance (GNs, PPGs) are approved by the respective Secretary of State and provide practical advice. If you do follow the guidance you will normally be doing enough to comply with the law. Regulators and inspectors seek to secure compliance with the law and may refer to the GNs / PPGs. Relevant publication titles are at Annex B. Publications from HSE, DfT, and EA can be sourced from the following websites:
  - a. [HSE Gov Publications](#)
  - b. [Pollution-Prevention-Guidance- \(PPG\)](#)
  - c. <https://www.gov.uk/driving-dangerous-goods-and-special-loads>

## International and National Standards for Gas Products and Cylinder Design and Manufacture (ISO, CEN, BS-EN)

8. ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies of which CEN (Comité Européen de Normalisation), and BSI (British Standards Institute) participate in. These bodies through respective national and international technical committees, (competent authorities) approve / validate gas specifications, and the design, material specifications, maintenance, and testing of gas cylinders (pressure receptacles).
9. Standards become a mandatory requirement when specified in a Regulation. Appropriate cylinder construction, design, manufacture, and testing is of particular importance as they demonstrate that cylinders are safe to be transported under the Carriage Regulations for the transport and use of transportable pressure equipment. Relevant standard titles are at Annex C. For applicable cylinder standards refer to: [HSE.Gov.uk](#) Refer to the BSI website for applicable gas specifications. [BSI Group](#).

## Industry Bodies and Industry COPs

10. The Gas Industry provides industry best practice by publishing standardised publications that enhance safe practice and prioritise environmental protection. Examples of such organisations are the British Compressed Gas Association (BCGA), and the UKLPG Association. Both the BCGA and the UKLPG produce Codes of Practice, Guidance Notes, and Technical Sheets, pertaining to specific gases and gas handling

processes. These Industry COPs are produced with full consultation with executive non - departmental public bodies (HSE, DfT, etc).

11. As such, industry COPs have the same relevance as Regulatory ACOPs as stated in paragraph 5 above. Relevant publication titles are at Annex D. For specific gas processes COPs Refer to the [BCGA website](#) and [UKLPG website](#).

## **Defence Standards – (Def Stans)**

12. A Defence Standard is established by broad consensus, achieved by stakeholders from MOD, Industry and Academia that deliver against a specified and continuing MOD requirement in support of the MOD acquisition process. Defence Standards specify material, procedures or process guidance and use normative references from other open standards bodies as appropriate. Defence Standards are the main instruments used to define the procurement standard for Industrial Gases and cryogenic liquids used in MOD. For specific gas defence Standards refer to the [Defence Standards](#) publications.

## **MOD Publications**

13. The storage and handling of Industrial Gases and cryogenic liquids is a multi-disciplinary process on the MOD estate. As such, to carry out the process safely and environmental compliant manner requires the observance of other MOD publications (e.g. generic Health and Safety- JSP 375, environment –JSP 418). Domain specific MOD publications are also available for specific gas applications (e.g. Air Publications, APs, Naval Books of Reference BRs, and Army Equipment Support Publications – AESPs). For MOD publications, refer to the [Defence Intranet](#).

## Bibliography

1. ISO 10286:2015 Gas Cylinder - Terminology.
2. BS EN ISO 13769:2009 - Gas Cylinders - Stamp marking.
3. HSE Guidance Note CS 4 - The Keeping of LPG in Cylinders and Similar Containers, HSE, June 1986.
4. [Pressure Systems Safety Regulations 2000](#)
5. ISO 11117:2008 - Gas cylinders - Valve Protection Caps and Valve Guards for Industrial and Medical Gas Cylinders - Design, Construction and Tests.
6. European Agreement Concerning the International Carriage of Dangerous Goods by Road, [ADR 2017](#).
7. BS EN ISO 3807:2013 - Transportable Gas Cylinders. Acetylene Cylinders. Basic requirements and Definitions.
8. BS EN 1919: 2000 - Transportable Gas Cylinders – Cylinders for Liquefied Gases (excluding acetylene and LPG) - Inspection at Time of Filling,
9. BS EN 1920: 2000 - Transportable Gas Cylinders – Cylinders for Compressed Gases (excluding acetylene) - Inspection at Time of Filling.
10. BS EN 60079-11: 2012 - Electrical Apparatus for Potentially Explosive Atmospheres. Intrinsic Safety 'i'.
11. BS EN 12021:2014 - Respiratory Protective Devices – Breathing Gases for Diving and Hyperbaric Applications.
12. [HSE HS\(G\) 51](#) - The Storage of Flammable Liquids in Containers.
13. [BCGA Guidance Note GN2](#) - Guidance for the Storage of Gas Cylinders in the Workplace, revision 5, 2012.
14. [BCGA Guidance Leaflet 6](#) - Managing Gas Cylinders Involved in a Fire.
15. [BCGA Code of Practice CP36, Revision 2 - 2013](#) - Bulk Cryogenic Liquid Storage at User's Premises.
16. [JSP 375 - Part 2 Volume 3 'High Risk Activity on Defence Infrastructure' Common Requirements](#).
17. [JSP 375 Volume 3, High Risk Activity on Defence Infrastructure, Chapter 5 - Petroleum Installations](#).
18. [MoD JSP 375 - Health & Safety Handbook](#).
19. [DSA01.1](#) Defence Policy for Health and Safety and Environmental Protection.
20. [BR 1754](#) - Safety Regulations for Storing and Handling Petroleum Oils, Lubricants and Certain Other Hazardous Stores in HM Ships.
21. [Defence Standard 68-284](#) - Compressed Breathing Gases for Aircraft, Diving and Marine Life-Support Applications.
22. [DSA DLSR 02&03](#) - Defence Fuels Gas & Environmental Regulations & DCOPs.

# Annex A - Legislation supporting JSP 319

The list below outlines the main pieces of Statutory Legislation that support the safe storage and handling of Industrial Gases and cryogenic liquids.

1. [Health & Safety at Work Act 1974](#) Places duties (e.g. duty of care) on defined individuals to ensure minimum health and safety standards at work; and general duties on all staff to take reasonable care of their own health and safety, not to intentionally or recklessly interfere with safety equipment and to cooperate with their employer to enable the employer to comply with his duties of care.
2. **Environmental Protection Act 1990**. Produced in 6 parts, The Act implements the European Union Waste Framework Directive in England, Wales and Scotland. The Act was intended to provide the fundamental structure and authority for waste management and control of emissions into the environment
3. [HS@W Act 1974 - Application to Environmentally Hazardous Substances Regulations 2009 \(SI 2009 No 318\)](#). Provides a legislative link between health, safety and environmental issues concerning hazardous substances.
4. [Classification, Labelling & Packaging \(European Regulations \(EC\) No 1272/2008](#). Known as CLP and aims to ensure that purchasers, handlers and users of hazardous chemicals are provided with sufficient hazard information to protect their health and safety.
5. [Confined Space Regulation 1997](#) , (SI 1997 No 1713). Defines confined spaces and imposes controls on access.
6. [Construction \(Design & Management\) Regulations 2015 \(SI 2015 No 51\)](#). Known as CDM, it imposes health and safety controls on construction projects that fall within the scope of the Regulations.
7. [Control of Major Accident Hazards Regulations 2015](#), (SI 2015 No 483- As amended. The Control of Major Accident Hazard (COMAH) Regulations (“the Regulations”) are intended to prevent on-shore industrial major accidents and to limit their consequences to people and the environment. The Regulations lay down rules for the prevention of major accidents which might result from certain industrial activities sites involving the production, use or storage of dangerous substances at or above certain thresholds, and the limitations of their consequences. Although legally exempt from these Regulations, the MOD complies through its Major Accident Control Regulations [JSP 498 - MACR](#).
8. [Control of Substances Hazardous to Health 2002](#), (SI 2002 No 2667; and the Health and Safety - Control of Substances Hazardous to Health (Amendment Regulation 2004, (SI 2004 No 3386) collectively, known as “COSHH” and covers exposure to most hazardous substances.
9. [Dangerous Substance \(Notification and Marking of Sites\) Regulations 1990](#), (SI 1990 No 304). These Regulations apply to sites holding certain quantities of listed substances. Its main aim is to ensure site access for fire fighting services.



10. [Dangerous Substances and Explosive Atmosphere Regulations 2002](#), (SI 2002 No. 2776). Known as DSEAR, it imposes requirements of eliminating or reducing risk from fire, explosion or other events arising at work from the hazardous properties of a dangerous substance. It supersedes previous regulations specifically concerned with highly flammable liquids and LPG.
11. [The Ozone-Depleting Substances Regulations 2015](#), (SI 2015 No 168). The regulations relate to the production, import, export and placing on the market of ozone-depleting substances and to minimum qualifications for those working on the recovery, recycling, reclamation or destruction of ozone-depleting substances
12. [Environmental Protection \(Controls on Substances that Deplete the Ozone Layer\) Regulations 1996](#), (SI 1996 No 506) as amended. Produced in accordance with the international agreement known as the Montreal Protocol.
13. [Environmental Permitting Regulations](#), 2016 (SI 2016 No 1154). The regulations set out an environmental permitting and compliance regime that applies to various activities and industries.
14. [Gas Safety \(Installation & Use\) Regulation 1998](#), (SI 1998 No 2451) (corrections October 1998 and February 1999). These Regulations cover the installation, maintenance and use of gas systems.
15. [Pressure Systems Safety Regulations 2000](#), (SI 2000 No 128). Fixed installations require a suitable written scheme of examination. In addition, those responsible for the management and use of all installations need to be able to demonstrate that they know the operating pressures of the installations and that they are safe to operate at those pressures
16. [The Management of Health & Safety at Work Regulations 1999](#), (SI 1999 No 3242 & Amdt SI 2002 No 2979 SI 2006 No 438). The regulations introduce and supplement measures to encourage improvements in the safety and health of workers at work.
17. [Manual Handling Operations Regulations 1992](#), (SI 1992 No 2793). The regulations provide the minimum health and safety requirements for manual handling of loads where there is a risk particularly of back injury to workers.
18. **Notification of Installations Handling Hazardous Substances Regulations 1982, (SI 1982 No 1357)**. as amended 2002 No 2979. Under these Regulations the HSE must be notified of premises wherever substances listed in the Regulations may be present in the quantities stated. [NOIHHS Revoked Policy](#), Refer to [JSP498 - MACR](#).
19. [Personal Protective Equipment at Work Regulations 1992](#), (as amended) (SI 1992 No 2966). These Regulations impose health and safety requirements with respect to the provision for, and use by, persons at work of personal protective equipment.
20. [Provision and Use of Work Equipment Regulations 1998](#), (SI 1998 No 2306). These Regulations impose health and safety requirements with respect to the provision and use of work equipment.
21. [The REACH Enforcement Regulations 2008](#) (SI 2008 No 2852). These Regulations create an enforcement regime for the European Regulation concerning the Registration,

Evaluation, Authorisation and restriction of Chemicals (REACH). REACH came into force on 1st June 2007, and will be implemented in stages up to 1 June 2018. It will make those who place chemicals in any form on the market responsible for providing information on them so that any hazards are understood and the risks associated with their use are properly managed. It therefore applies to manufacturers, importers, professional users and distributors of chemicals. Amdt SI [2013/2919](#) & [2014/2882](#).

23. [Reporting of Injuries, Disease and Dangerous Occurrences Regulations 2013](#), (**SI 2013 No 1471**). Known as RIDDOR, it provides a mechanism by which certain categories of work related injuries, diseases, and dangerous occurrences are reported to the Health and Safety Executive.

24. [The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations](#) (**SI 2009 No 1348, as amended SI 2011 No 1885**). The regulations adopt the United Nations Economic Commission for Europe's European Agreement Concerning the International Carriage of Dangerous Goods by Road (known as ADR), and its equivalents for Rail (RID) and Inland Waterways (ADN).

25. [Regulation \(EU\) No 517/2014](#) of the European Parliament and of the Council of **16 April 2014 on Fluorinated Greenhouse Gases and repealing Regulation (EC) No 842/2006**. These Regulations give effect to Regulation (EU) No 517/2014 of the European Parliament and of the Council on fluorinated greenhouse gases. They are designed to reduce emissions of fluorinated greenhouse gases (F Gases), used predominantly in the refrigeration and air conditioning sectors and which make a significant contribution to climate change.

# Annex B - Regulatory ACOPs & GNs

## Supporting JSP 319

The list below outlines the main ACOPs and Guidance Notes that support the safe storage and handling of Industrial Gases and cryogenic liquids

Publication Code	Title
HSE – L5	<a href="#">Control of Substances Hazardous to Health (Sixth edition - 2013)</a> The Control of Substances Hazardous to Health Regulations 2002 Approved Code of Practice and guidance
HSE – L21	<a href="#">Management of Health at Safety at Work</a> Approved Code of Practice
HSE - L22	<a href="#">Safe Use of Work Equipment. Provision and Use of Work Equipment Regulations 1998. (2008)</a> Approved Code of Practice and guidance
HSE – L23	<a href="#">Manual Handling 2004</a> <b>Manual Handling Operations Regulations 1992 (as amended)</b>
HSE – L25	<a href="#">Personal; Protective Equipment at Work (Second edition) (2005)</a>
HSE – L56 (4th Ed)	<a href="#">Safety in the installation and use of gas systems and appliances (2013)</a> Gas Safety (Installation and Use) Regulations 1998 Approved Code of Practice and guidance
HSE – L80	<a href="#">A guide to the Gas Safety (Management) Regulations 1996</a> Guidance on Regulations
HSE – L81	<a href="#">The Design, Construction and Installation of Gas Service Pipes (1996)</a>
HSE – L101	<a href="#">Safe Work in Confined Space</a> Safe Work in Confined Spaces, Confined Spaces Regulations 1997, Approved Code of Practice, Regulations and Guidance.
HSE – L122	<a href="#">Safe Work on Pressure Systems (2000)</a> Safety of Pressure Systems, Pressure System Safety Regulations 2000, Approved Code of Practice and Guidance on Regulations
HSE – L131	<a href="#">Approved Classification and Labelling Guide (Sixth Edition)</a> Chemicals at work – a new labelling system – guidance to help employers and workers to manage the transition to the new classification, labelling and packaging system
HSE –L138	<a href="#">Dangerous Substances and Explosive Atmosphere</a> Dangerous Substances and Explosive Atmospheres Regulations 2002. Approved Code of Practice and guidance (2013)
HSG-39	<a href="#">HSG-39</a> <b>Compressed air safety (1998)</b>
HSG-53	<a href="#">Respiratory Protective Equipment</a> <b>Respiratory protective equipment at work</b> A practical guide (2013)
HSG-71	<a href="#">Chemical Warehousing (2009)</a> The storage of packaged dangerous substances.
HSG-97	<a href="#">A step by step Guide to COSHH assessment: (2004)</a>
HSG-113	<a href="#">Lift Trucks in potentially Flammable atmospheres</a> : (1996)
HSG-139	<a href="#">HSG-139</a> - The safe use of compressed gases in welding, flame cutting and allied processes: (1997)
HSG-159	<a href="#">HSG-159 Managing Contractors</a> : (2011) A guide for employers
HSG-173	<a href="#">HSG-173</a> - <b>Monitoring strategies for toxic substances: (2006)</b>
HSG-250	<a href="#">HSG-250</a> - <b>Guidance on permit-to-work systems: (2005)</b> A guide for the petroleum, chemical and allied industries
HSG-253	<a href="#">HSG-253</a> - <b>The safe isolation of plant and equipment: (2006)</b>
HSE INDG-248	<a href="#">INDG-428</a> - <b>Inspecting and maintaining or replacing buried metallic pipework carrying LPG vapour: (2009)</b> Advice for commercial and industrial users of LPG

Publication Code	Title
HSE - <a href="#">INDG-143</a>	<b>Manual handling at work (2012)</b> A brief guide
HSE <a href="#">INDG-459</a>	<b>Oxygen use in the workplace: (2013)</b> Fire and explosion hazards
HSE <a href="#">INDG-174</a> Rev2	<b>Personal protective equipment (PPE) at work: (2013)</b> A brief guide
HSE <a href="#">INDG-261</a> Rev2	<b>Pressure systems: (2012)</b> <b>A brief guide to safety</b>
HSE <a href="#">INDG-178</a> Rev2	<b>Written schemes of examination: (2012)</b> Pressure Systems Safety Regulations 2000
HSE <a href="#">INDG-368</a> Rev1	<b>Using contractors: (2013)</b> A brief guide
<a href="#">DEFRA</a>	<b>Defra Guidance website:</b> F gas: Guidance for users, producers and traders, DEFRA, Greenhouse gas emissions and chemicals, December 2014  “DEFRA collection, part of Greenhouse gas emissions and chemicals”
<a href="#">DEFRA PB13944</a>	<b>Environmental Reporting Guidelines:</b> Including mandatory greenhouse gas emissions reporting guidance June 2013.

# Annex C - International & National Standards Supporting JSP 319

The list below outlines the main ISOs and BS-EN that support the safe storage and handling of Industrial Gases and cryogenic liquids.

Standard No	Standard Title
<b>For standard relating to cylinder shell material, cylinder design and construction, periodic inspection and test of cylinders and valves refer to HSE Website:</b> <a href="http://www.hse.gov.uk/cdg/stdcurr.htm">http://www.hse.gov.uk/cdg/stdcurr.htm</a>	
<b>Other Cylinder material specifications (refer to BSI website for current editions)</b>	
BS 8562:2011	Gas cylinders. In situ, non-destructive examination and testing of refillable seamless steel tubes of water capacity between 150 L and 3000 L, used for compressed gases Specification
<a href="#">BS EN 1089-3:2011</a>	Transportable gas cylinders. Gas cylinder identification (excluding LPG). Colour coding
BS EN 13096:2003	Transportable gas cylinders. Conditions for filling gases into receptacles. Single component gases
BS EN 13099:2003	Transportable gas cylinders. Conditions for filling gas mixtures into receptacles
BS EN 13365:2002	Transportable gas cylinders. Cylinder bundles for permanent and liquefied gases (excluding acetylene). Inspection at time of filling
BS EN 14876:2007	Transportable gas cylinders. Periodic inspection and testing of welded steel pressure drums
BS EN 15888:2014	Transportable gas cylinders. Cylinder bundles. Periodic inspection and testing
BS EN 1802:2002	Transportable gas cylinders. Periodic inspection and testing of seamless aluminium alloy gas cylinders
BS EN 1803:2002	Transportable gas cylinders. Periodic inspection and testing of welded carbon steel gas cylinders
BS EN 1919:2000	Transportable gas cylinders. Cylinders for liquefied gases (excluding acetylene and LPG). Inspection at time of filling
BS EN 1920:2000	Transportable gas cylinders. Cylinders for compressed gases (excluding acetylene). Inspection at time of filling
BS EN 1968:2002	Transportable gas cylinders. Periodic inspection and testing of seamless steel gas cylinders
BS EN ISO 10462:2013	Gas cylinders. Acetylene cylinders. Periodic inspection and maintenance
BS EN ISO 10961:2012	Gas cylinders. Cylinder bundles. Design, manufacture, testing and inspection
BS EN ISO 11372:2011	Gas cylinders. Acetylene cylinders. Filling conditions and filling inspection
BS EN ISO 11621:2005	Gas cylinders. Procedures for change of gas service
<a href="#">BS EN ISO 11623:2015</a>	Transportable gas cylinders. Periodic inspection and testing of composite gas cylinders
<a href="#">BS EN 12755:2000</a>	Gas cylinders. Acetylene Cylinder bundles. Filling conditions and filling inspection
BS EN ISO 13769:2009	Gas cylinders. Stamp marking
<a href="#">BS EN ISO 16148:2016</a>	Gas cylinders. Refillable seamless gas cylinders. Acoustic emission testing (AT) for periodic inspection
BS EN ISO 21007-1:2005	Gas cylinders. Identification and marking using radio frequency identification technology. Reference architecture and terminology
<a href="#">BS EN ISO 21007-2:2015</a>	Gas cylinders. Identification and marking using radio frequency identification technology. Numbering schemes for radio frequency identification
BS EN ISO 7225:2007+A1:2012	Gas cylinders. Precautionary labels
BS ISO 11625:2007	Gas cylinders. Safe handling

Standard No	Standard Title
BS ISO 19078:2013	Gas cylinders. Inspection of the cylinder installation, and requalification of high pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles
<a href="#">BS EN ISO 24431:2016</a>	Gas cylinders. Cylinders for compressed and liquefied gases (excluding acetylene). Inspection at the time of filling
<a href="#">BS EN ISO 25760:2015</a>	Gas cylinders. Operational procedures for the safe removal of valves from gas cylinders
PD CEN/TR 14473:2014	Transportable gas cylinders. Porous materials for acetylene cylinders
PD ISO/TR 22694:2008	Gas cylinders. Methods for establishing acceptance/ rejection criteria for flaws in seamless steel and aluminium alloy cylinders at time of periodic inspection and testing
<a href="#">BS EN 1442:2006+A1:2008</a>	Refillable Welded Steel LPG Cylinders; Design and Construction
<a href="#">BS EN 13110:2012+A1:2017</a>	Refillable Welded Aluminium LPG Cylinders; Design and Construction
BS341	Cylinder valves: <a href="#">BS 341-1:1991</a> . Transportable gas container valves. Specification for industrial valves for working pressures up to and including 300 bar <a href="#">BS 341-2:1963</a> . Transportable gas container valves. Valves with taper stems for use with breathing apparatus <a href="#">BS 341-3:2002</a> . Transportable gas container valves. Valve outlet connections <a href="#">BS 341-4:2004</a> . Transportable gas container valves. Pressure relief devices.
<b>Gas Standards</b>	
<a href="#">BS 4364:1993</a>	Industrial Oxygen
<a href="#">BS EN ISO 14175:2008</a>	Pureshield Argon
<a href="#">BS ISO 8573-1:2010</a>	COMPRESSED AIR
<a href="#">BS 4105:1990</a>	Carbon Dioxide - Liquid withdrawal
<a href="#">BS 4366:1993</a>	Nitrogen (Oxy Free)
<a href="#">BS EN ISO 6144:2006</a>	0.66% Propane / Air
<a href="#">BS 4250:2014</a>	Specification for Commercial Butane and Propane
<a href="#">BS EN 60376:2005</a>	1% Sulphur Hexafluoride / Nitrogen
<a href="#">BS EN 27201-1:1994</a>	HALON 1211
<a href="#">BS EN 12021:2014</a>	60% Oxygen / Nitrogen
<a href="#">BS EN ISO 6141:2015</a>	16% Oxygen / 84% Helium - Diving Calibration Gas
European Pharmacopoeia Specifications 2000	Medical Oxygen <a href="#">European Pharmacopoeia Monograph 0417 Medical Oxygen</a>
European Pharmacopoeia Specifications 2000	Medical Nitrous Oxide <a href="#">European Pharmacopoeia Monograph 0416 Nitrous Oxide</a>
European Pharmacopoeia Specifications 2000	Air Medical <a href="#">European Pharmacopoeia Monograph 1238 Medicinal Air</a>
European Pharmacopoeia Specifications 2000	Medical Carbon Dioxide <a href="#">European Pharmacopoeia Monograph 0375 Carbon Dioxide</a>
European Pharmacopoeia Specifications 2000	Medical Entonox - 50% Nitrous Oxide / Oxygen <a href="#">European Pharmacopoeia Monograph 2455 Oxygen 93%</a>
European Pharmacopoeia Specifications 2000	95% Oxygen / Carbon Dioxide medical <a href="#">European Pharmacopoeia Monograph 2455 Oxygen 93%</a>
European Pharmacopoeia Specifications 2000	Synthetic Medical Air <a href="#">European Pharmacopoeia Monograph 1684 Synthetic Medicinal Air</a>



# Annex D - Industry ACOPS & GNs

## Supporting JSP 319

The list below outlines the main industry ACOPS and GNs that support the safe storage and handling of Industrial Gases and cryogenic liquids.

Publication Code	Title
<b>British Compressed Gas Association Publications</b> (Refer to BCGA website for current editions - <a href="#">BCGA Publications</a> )	
<b>BCGA Codes of Practice -CP</b>	
<a href="#">CP 18</a>	The safe storage, handling and use of special gases.
<a href="#">CP 20</a>	Bulk liquid oxygen storage at production sites.
<a href="#">CP 22</a>	Bulk liquid argon or nitrogen storage at production sites
<a href="#">CP 26</a>	Bulk liquid carbon dioxide storage at users' premises
<a href="#">CP 27</a>	Transportable vacuum insulated containers of not more than 1000 litres volume
<a href="#">CP 31</a>	Safe storage and use of cylinders in mobile workshops and service vehicles
<a href="#">CP 33</a>	The bulk storage of gaseous hydrogen at users' premises
<a href="#">CP 34</a>	The application of the Pressure Equipment Regulations to customer sites
<a href="#">CP 36</a>	Cryogenic liquid storage at users' premises
<a href="#">CP 38</a>	Revalidation of cryogenic tankers and containers
<a href="#">CP 39</a>	In-service requirements of pressure equipment installed at user premises
<a href="#">CP 39 PDF</a>	Module One - In-service requirements of cryogenic storage systems at users' premises
<a href="#">CP 41</a>	The design, construction, maintenance and operation of filling stations dispensing gaseous fuels
<a href="#">CP 43</a>	The safe filling of gas cylinders
<a href="#">CP 44</a>	Gas Cylinder Compound
<b>BCGA Guidance Notes -GN</b>	
<a href="#">GN3</a>	Safe cylinder handling and the application of the manual handling operations regulations to gas cylinders
<a href="#">GN11</a>	Reduced oxygen atmospheres. The management of risk associated with reduced oxygen atmospheres resulting from the use of gases in the workplace
<a href="#">GN13</a>	DSEAR Risk Assessment
<a href="#">GN17</a>	BCGA policy and guidance for the safe filling of third-party owned and/or maintained tanks
<a href="#">GN27</a>	Guidance for the carriage of gas cylinders on vehicles
<b>BCGA Technical Information Sheets -TIS</b>	
<a href="#">TIS6</a>	Cylinder identification. Colour coding and labelling requirements
<a href="#">TIS8</a>	Information for customers collecting gas cylinders
<a href="#">TIS12</a>	Handle gas cylinders safely. Information for customers handling gas cylinders
<a href="#">TIS15</a>	Model risk assessment for the storage and use of gas cylinders for oxy-fuel applications
<a href="#">TIS16</a>	The storage of gas cylinders containing corrosive gas at users' premises
<a href="#">TIS17</a>	Model risk assessment for manual handling activities in the industrial gas industry

Publication Code	Title
<a href="#">TIS20</a>	Medical gas cylinders. BCGA policy statement on colour coding
<a href="#">TIS22</a>	BCGA policy on connecting gas cylinders
<a href="#">TIS23</a>	BCGA Policy regarding internal examination and proof pressure testing of static cryogenic liquid storage tanks
<a href="#">TIS26</a>	Model risk assessment for the transport of gas cylinders
<a href="#">TIS30</a>	Technical Information - Working in reduced oxygen atmospheres
<a href="#">TIS31</a>	Gas classification changes under ISO 10156
<a href="#">TIS32</a>	Acetylene or propane (for welding, cutting and allied processes).
<b>BCGA Leaflets - L</b>	
<a href="#">L6</a>	Cylinders in fires
<a href="#">L7</a>	The dangers of industrial gas abuse
<a href="#">L11</a>	Safety checks for vacuum insulated cryogenic tanks
<a href="#">L12</a>	Liquid gas storage tanks – your responsibilities.
<b>UK LPG Association Publications</b> (Refer to UKLPG website for current editions) <a href="#">UKLPG Publications</a>	
<b>UKLPG Codes of Practice - CP</b>	
<a href="#">CP 1: Part 1</a>	Bulk LPG Storage at Fixed Installations : Design, Installation and Operation of Vessels Located Above Ground
<a href="#">CP 1: Part 2</a>	Bulk LPG Storage at Fixed Installations for Domestic Purposes
<a href="#">CP 1: Part 3</a>	Bulk LPG Storage at Fixed Installations: Examination and Inspection
<a href="#">CP 1: Part 4</a>	Bulk LPG Storage at Fixed Installations: Buried/Mounded LPG Storage Vessels
<a href="#">CP 2</a>	Safe Handling and Transport of LPG in Road Tankers and Tank Containers by Road
<a href="#">CP 3</a>	Prevention or Control of Fire Involving LPG
<a href="#">CP 7</a>	Storage of Full and Empty LPG Cylinders and Cartridges
<a href="#">CP 10</a>	Containers attached to Mobile Gas-Fired Equipment
<a href="#">CP 12</a>	Recommendations for Safe practice in the Design and Operation of LPG Cylinder Filling Plants
<a href="#">CP 20</a>	Automotive LPG Refuelling Facilities
<a href="#">CP 24: Part 26</a>	Use of LPG Cylinders: The use of Propane in Cylinders at Commercial and Industrial Premises
<a href="#">CP 25</a>	LPG Central Storage and Distribution Systems for Multiple Consumers
<a href="#">CP 27</a>	Carriage of LPG Cylinders by Road
<a href="#">CP 29</a>	Hazard Information and Packaging Labelling for Commercial LPG Cylinders
<b>UKLPG User Information Sheets - UIS</b>	
<a href="#">UIS006</a>	Check list for the assessment of safety standards at operator owned sites
<a href="#">UIS008</a>	Electrical Installations Associated With Bulk LPG Installations
<a href="#">UIS010</a>	Separation distances between LPG cylinders and Tanks and domestic oil tanks
<a href="#">UIS015</a>	Inspection and Maintenance of LPG Pipework at Commercial and Industrial Premises
<a href="#">UIS022</a>	Owning Your Own Tank
<a href="#">UIS025</a>	LPG Installation Record and Documentation
<a href="#">UIS029</a>	Portable Gas Detectors used at LPG Installations



# 2 - MOD Gases Organisation

Chapter Sponsor - DSFA Technical Gas Manager

## Gas Storage

1. For the purposes of this publication, gas storage<sup>3</sup> is defined as the storage of Industrial Gases and cryogenic liquids within the following types of facilities:
  - a. Centralised gas cylinder storage compounds storing more than 20 cylinders.
  - b. Bulk LPG vessel installations.
  - c. Static bulk cryogenic liquid installations.

## TLB Responsibilities and Contact Points

### Defence Safety Authority - Defence Land Safety Regulator DSA –FGSR

2. The FGSR, through the authority of Defence Safety Authority defines the role, responsibility and authority for the regulation of the storage and handling of Fuel and Gases within the MOD.
  - a. Sponsorship and setting of gases safety policies, standards and procedures as described in [DSA 02 & 03](#).
  - b. Assisting the Defence Estates Competent Authority and the Competent Authority for Major Accident Control with the interpretation of gases related risk management and safety policy direction.
  - c. Monitoring the Command TLBs compliance with JSP 319, Air Safety Publications and other safety legislation applicable to fuels, gases and lubricants.
  - d. Conducting audits on gas infrastructure as detailed in paragraph 1 above across the MOD estate in accordance with [DSA 02 & 03](#).
3. FGSR is to provide assurance to S of S that the MOD is operating as safely as reasonable practical, and is complying as far as is reasonably practicable with national legislation”

Address	Contact details:
FGSR, DLSR Hazel, level 1 # 0019 MOD Abbey Wood North Bristol BS34 8QW	MOD Abbey Wood Mil (9679) Ext: SO2: 83798 Compliance : 83802 Gas Auditor: 83797 Email: <a href="mailto:DSA-DLSR-FGSR-Gas@mod.gov.uk">DSA-DLSR-FGSR-Gas@mod.gov.uk</a>

<sup>3</sup> End to End policy of gas storage defined in; JSP 319 Part 1 – Preface – paragraph 16

## Navy Command HQ

4. For shore based RN and RM establishments, the Navy Logistics and Infrastructure desk is able to advise units. Contact details are:

Address	Contact details:
Navy Log Infra SP SO 2 Navy Command HQ Leach Whale Island Portsmouth, PO2 8BY	Mr M Capewell Navy Log Infra Sp - SO2 Mil: 93832 Ext: 5789 <a href="mailto:NAVYLOGINFRA-INFRASPSO2@mod.uk">NAVYLOGINFRA-INFRASPSO2@mod.uk</a>

5. **Units.** Customer Liaison sections at each of the three Naval Bases (Portsmouth, Devonport and Clyde) are responsible for processing demands from RN and RFA units for liquid and compressed gases via the [LEIDOS-TVS-OLG-InvMgr1@mod.uk](mailto:LEIDOS-TVS-OLG-InvMgr1@mod.uk).

6. DES LCS Oils, Lubricants, and Gases Team sponsored contract. The Naval Base logistics organisations are responsible for the receipt, issue and **UK-Based** returns processing of compressed gas cylinders and monitoring of liquefied gases deliveries from the contractor. Appropriately trained technical personnel are responsible for the operation and maintenance of gas production, concentration and dispensing equipment.

7. Team LEIDOS is responsible for developing, publishing and implementing policy for contractual supply of gas products to Navy Command units.

## Army HQ

8. **Army Headquarters Combat Fuels:** The Combat Fuels team is responsible for implementation of policy and procedures within the LAND dependency and for monitoring the service, products and infrastructure provided by the DE&S. It provides SME advice and represents the user/operator requirement to AHQ Eqpt Dir, CESO(A), D Infra, RLC Headquarters.

Address	Contact details:
<b>Army Headquarters</b> Logistic Support Branch Blenheim building, Zone 2, IDL 3 Marlborough Lines Andover SP11 8HT	Army HQ Logistics Support - Combat Fuels Office  Andover Mil (94393) Ext: SO2 6566 Email: <a href="mailto:arianne.kidd175@mod.gov.uk">arianne.kidd175@mod.gov.uk</a>
<b>Regional Command</b> (UK) Petroleum Inspectorate (S) HQ 101 Log Bde Thornehill Road Aldershot Garrison Hants, GU11 2BN	Aldershot Mil (94222) Ext: WOIC: 7121 SNCOs: 7171 Email: <a href="mailto:Barry.Costello@mod.gov.uk">Barry.Costello@mod.gov.uk</a>
<b>Regional Command</b> (UK) Petroleum Inspectorate (N) HQ 102 Bde Building 29 Prince William of Gloucester Bks Grantham, NG31 7TJ	Grantham Mil (94452) Ext: 3118 Fax: 3045 Email: <a href="mailto:Stephen.Martin361@mod.gov.uk">Stephen.Martin361@mod.gov.uk</a>

## **GENERAL**

### **HQ Regional Command (RC) Petroleum Inspectorate**

9. The HQ Regional Command Petroleum Inspectorate, consisting of the United Kingdom (UK) Petroleum Inspectorate North, (UK) Petroleum Inspectorate South are staffed by RLC Petroleum Operator manpower identified against RC unit establishments.

- a. The Inspectorate's primary operational role is to deploy as Subject Matter Experts (SMEs), in order to advise the deployed Command. This will require the SME to give technical advice on the storage and handling of Fuels and Lubricants (F&L), Gases and pipeline operations.
- b. The HQ RC Petroleum Inspectorate conducts Fuel & Gas Safety Assurance Assessments (FGSAA) in order to maintain operational capability and ensure that current legislation, MOD Policy and best practice is adhered to. This applies to units based within the UK, Germany, LWC dependencies and operational theatres.
- c. To meet operational and peacetime roles, RLC Petroleum Operators employed within the Inspectorates must be of WO/SNCO rank and qualified to the minimum grade of Class 1 Petroleum Operator.

### **SCOPE OF RESPONSIBILITY**

10. HQ RC UK Petroleum Inspectorate North & South assume primacy for conducting the Audit & Inspection regime for UK based Army HQ units and overseas.

### **OPERATIONAL ROLE**

11. The operational roles of the HQRC Petroleum Inspectorate are as follows:
- a. To provide SME staff support to the deployed Joint Force Logistic Component (JFLogC), National Support Element (NSE) or Log Bde HQ.
  - b. To provide technical direction and SME advice on the storage and handling of F&L, Gases and deployed JOFS components.
  - c. Carry out Fuel & Gas Safety Assurance Assessments (FGSAAs) in support of Logistic Support Assurance Framework (LSAF) on operationally deployed 1<sup>st</sup> line units and where applicable contractors employed in support to operations.

### **PEACETIME ROLE**

12. The peacetime role of the HQ RC Petroleum Inspectorate is as follows:
- a. Undertake the annual Fuel & Lubricants Audit and Inspection Regime in accordance with the requirements of Army Command Standing Order (ACSO) 9001.
  - b. As authorised by the DSA FGSR and directed by HQ RC, the Petroleum Inspectorate is to conduct FGSAA's of all fuel & gas infrastructure on the Army HQ estate for all intervening years between FGSR licensing visits in accordance with

the requirements of the DSA FGSR Fuel Safety Management Plan and [DSA 02 & 03](#).

- (1) Attend Siting, Acceptance and Decommissioning Boards for bulk/packed fuel and gas cylinder storage facilities.
- (2) Advise units on petroleum matters and provide technical training to personnel if access to central training is not practicable.
- (3) Investigate and report on significant petroleum related incidents and technical problems as directed by HQ Regional Command, Logistic Support Branch.
- (4) Provide the technical focal point between units and HQ RC Log Sp Branch on all F&L matters.
- (5) Attend DSFA Sub Committees/ Working Groups as directed by HQ RC Log Sp Branch.
- (6) Provide input to DE&S and Army eBrief bulletins to encourage best practice and keep units up-to-date on prevalent problems and new information/regulations with respect to F&L and Gases.
- (7) Report any environmental, health and safety issues to HQ RC, Log Sp Branch, FGSR and CESO (A) Environmental Protection (EP).

## AUTHORITY

13. The relevant authorities are as follows:

- a. **Defence Strategic Fuels Authority (DSFA).** DSFA is the Commodity Manager for MOD F&L products and gases; the authority for Fuel, Lubricants and Gases Policy and is the sponsor for the JSP's that contain policy relating to Fuel and Gases Safety Assurance and provide the procedures for storage and handling of F&L products and Gases.
- b. **Defence Safety Authority (DSA) & Fuels and Gases Safety Regulator (FGSR).** The Fuel & Gas Safety Regulator (FGSR) role is to review fuel and gas safety across the MOD estate on behalf of the Secretary of State. The FGSR is tasked to monitor gas risk, provide advice and guidance on how to control or mitigate risks, to explain the implications of operating at risk and to provide the Heads of Establishment and TLBs with Subject Matter Expert (SME) advice on gas safety.
- c. **Defence Supply Chain Management (Policy) (D SCM (Pol)).** D SCM (Pol) is the Defence Equipment and Support (DE&S) focus for supply chain policy.
- d. **Joint Operational Fuels System Project Team (JOFS OIP).** JOFS OIP are responsible for the through life management of all Tactical Fuel Handling Equipment (TFHE) and the Joint Operational Fuel System (JOFS).
- e. **Army Headquarters Equipment Directorate.** The Equipment Directorate is the lead on all new and existing equipment requirements, in the LAND dependency.

- f. **The Directorate of Infrastructure Operations (D Infra).** D Infra provides the lead for the provision and maintenance of infrastructure throughout the Regional Command Structure, Reserve Forces and Cadet Associations (RFCA) and the Defence Training Estate (DTE).
- g. **Chief Environmental Safety Officer (Army) (CESO (A)).** Policy for the Environment and Health & Safety rests with the Chief Environmental Safety Officer (Army) (CESO (A)), HQLF.
- h. **Military Design Authority (MDA) - Joint Operational Fuels Systems.** The Military Design Authority for JOFS is the 516 Specialist Team Royal Engineers (Bulk Petroleum).

## Supporting Agencies and Units

- 14. Team LEIDOS has responsibility for the implementation of policy pertaining to liquefied and Industrial Gases within the Army including units of the Adjutant General, GOC Northern Ireland, Army units of the JHC, units of the Field Army and the Army Training Estate (ATE).
- 15. DIO SD EUS- Sutton Coalfield, have the responsibility for the provision and advice on the supply of LPG. The Army HQ D Infra Sp is responsible for co-ordinating and planning the supply of LPG to operational theatres. Land Log CSS Ops is responsible for the co-ordination and planning the supply of IG to operational theatres.
- 16. **Units.** Unit Quartermasters are responsible for ordering of liquefied and Industrial Gases, either from the Team LEIDOS managed gas contract or the DIO SD EUS- Sutton Coalfield sponsored LPG contracts. They are also responsible for the receipt, issue and return of compressed gas cylinders and monitoring of liquefied gas deliveries from the current LPG contractors. The Army rules for accounting for LPG are contained in the Army Infrastructure Manual Leaflet available on the Army HQ D Intranet Web site.
  - a. Accommodation Services Units are responsible for the receipt, validation and payment of all LPG both bulk and cylinders. They are also responsible for the procurement of LPG cylinders except in NI where the responsibility lies with CSS.

## Air Command HQ

- 17. For HQ Air Command units, the Fuels Role office is able to advise units. Contact details are:

Address	Contact details:
Air Command 38 Gp A4 Commodities Fuels Role Office Room 46 Gladiator Block 1 Site, RAF High Wycombe Buckinghamshire, HP14 4UE	RAF High Wycombe Mil (95221) Ext: SO2: 6214 SO3: 7215 FS: 7043 <a href="mailto:Air-A4FuelsGrpMail@mod.uk">Air-A4FuelsGrpMail@mod.uk</a>

18. **Air Command HQ External Quality Audit (EQA) Team.** The RAF has chosen to apply the ISO 9000 series of QA requirements to its Logistics (engineering and supply) activities and therefore, undertakes EQA activity on their Units.

19. **Command.** JFC - Defence Logistics - DSFA has responsibility for implementing policy pertaining to liquefied and compressed gases within the RAF, including units of Air Command, Joint Helicopter Command (JHC) and other Directly Administered Units.

20. The HQ Air Airfield Support Capability Role Office (ASCRO) has responsibility for the fleet management of, and provision of operation and engineering advice on, in-service gas production and gaseous equipment in conjunction with the Aircraft Commodities Team (ACT), the Support Authority for such equipment. Team LEIDOS have the responsibility for the provision of advice on the supply of gases. The HQ Air A4 Fuels RO coordinates assurance activity relating to the safe storage and handling of compressed gas cylinders.

21. **Units.** Unit Supply staffs are responsible for the ordering of gases, in both liquid and compressed forms, from the LEIDOS managed gas contract. They are also responsible for the receipt, issue and return of compressed gas cylinders and the monitoring of liquefied gas deliveries from the current gas contractor. Competent engineering tradesmen are responsible for the operation and maintenance of gas production, concentration and dispensing equipment.

22. **Deployable Gas Cylinders - Options:**

a. Movement of cylinders between the UK and overseas locations. Units are to demand cylinders via the current contractor using normal demand procedures. Where appropriate units may request cylinders are delivered direct to the designated APOE/SPOE for despatch to theatre. Demanding units/LFPs are responsible for liaison with the Supply Sqn at the receiving APOE/SPOE for the provision of receipt checks, supply accounting procedures and raising applicable movement's documentation. Movement of consignments is to be in accordance with extant movements bidding procedures.

b. There is a possibility that the contractor can enter into a partnership contract with a local supplier to provide gas to the relevant standards. Command TLB staffs/Units (as applicable) that may require this service are to contact LEIDOS to discuss their requirements and to determine if a local supplier is a suitable option.

c. In certain circumstances the Air Separation Unit (ASU) may be deployed. In this instance the Team LEIDOS managed gas contractor is able to provide cylinders that can be re-filled using the ASU. The permission of the owner of the cylinders, as well as Team LEIDOS, has to be obtained before refilling can take place. All Team LEIDOS managed gas contractor cylinders which are refilled from the ASU are to be managed and controlled in accordance with the procedures detailed within Part 2, [Chapter 5](#).

23. **Deployable Gas Production.** The RAF maintains a capability to provide gases to aircraft deployed on operations. The Air Separation Unit (ASU) is an air transportable liquefied gas production unit maintained at operational readiness by Cryogenics & Gas Section (CGS), at No 6 site DECA Stafford. Engineering support is provided by CGS to any ASU deployed in a non-hostile environment with training for Service personnel conducted by the Cryogenic and Gas Maintenance School, (CGMS) at No 6 Site DECA



Stafford. 5001 Squadron is responsible for the deployment and installation of the ASU, and if necessary it's supporting generator working in close conjunction with 170 (Infra Sp) Engr Gp who design and construct the base. The operation and maintenance of deployed ASU assets is undertaken by trained personnel of the deployed Unit once it has been installed by 5001 Squadron. Tasking of 5001 Sqn is undertaken by the HQ Air A4 Ops in liaison with the JLOC at RAF Wittering, as appropriate. Only personnel who have successfully completed the ASU training courses and whose qualification remains current are allowed to operate and maintain this equipment. Relevant qualifications are Q-GE-PCI (OP), Q-GE-PCI (I) and Q-GE-PCI (QA).

## Joint Force Command

24. For JFC Units, including the Permanent Joint Operating Bases (PJOBS) and operational deployments within a CJO Joint Operations Area, the Chief Environment & Safety Officer is available to advise units. Contact details are:

Address	Contact details:
CESO(JFC) Teak #5010 Abbey Wood Bristol, BS34 8JH	JFC-CESO-SHEP6 9352 30646 <a href="mailto:Kevin.Read234@mod.gov.uk">Kevin.Read234@mod.gov.uk</a>
ACDS Log Ops DSFA NH2, Larch 3b, Abbey Wood Bristol, BS34 8JH	<b>Defence Fuels Technical Authority (DFTA)</b>  Technical Gases Manager Civ: 030679 89678 Mil: 9679 89678 Email: <a href="mailto:joseph.lam102@mod.gov.uk">joseph.lam102@mod.gov.uk</a>
ACDS Log Ops DSFA NH2, Larch 3b, Abbey Wood Bristol, BS34 8JH	Chief of Staff - DSFA Chairman - JSP 319 Working Group  Mil: 9679 83564 Email: <a href="mailto:Graham.Wood104@mod.gov.uk">Graham.Wood104@mod.gov.uk</a>
ACDS Log Ops DSFA NH2, Larch 3b, Abbey Wood Bristol, BS34 8JH	Technical Editor & Policy WO1 Secretariat - JSP 319 Working Group Mil: 9679 83799 Email: <a href="mailto:Paul.Franks898@mod.gov.uk">Paul.Franks898@mod.gov.uk</a>

25. **Command.** LEIDOS is responsible for developing, publishing and implementing policy for contractual supply of gas products to Joint Forces Command units.

26. **Units.** Unit Logistics staffs are responsible for the ordering of gases, in both liquid and compressed forms, from the LEIDOS managed gas contract. They are also responsible for the receipt, issue and return of compressed gas cylinders and the monitoring of liquefied gas deliveries from the current gas contractor. Competent engineering tradesmen are responsible for the operation and maintenance of gas production, concentration and dispensing equipment.

27. **PJOBS / Operations.** JFC Units, including the Permanent Joint Operating Bases (PJOBS) and operational deployments within a CJO Joint Operations Area utilise the RAF



deployable gas cylinder and deployable Gas production processes as previously described.

## Defence Equipment and Support - DES

28. **DE&S.** For DE&S, DM and DSG sites, the DE&S Technical Quality Safety & Environmental Protection (QSEP) office is available to advise units. The management of the current MOD gas cylinder supply contract is owned by the Logistics Delivery Operating Centre (Logistics Delivery - LD), based at Abbey Wood. As part of the logistics transformation programme, Team LEIDOS manage the current industrial gas contact. Contact details are:

Address	Contact details:
DE&S Tech QSEP Elm DE&S Abbey Wood Bristol, BS34 8JH	Email: <a href="mailto:DESTECH-QSEPEnv-Man@mod.uk">DESTECH-QSEPEnv-Man@mod.uk</a> Mil: 9679 Ext: 82509
Team LEIDOS 8 Monarch Court, The Brooms, Emerson's Green, Bristol BS16 7FH	OLG Team Lead Email: <a href="mailto:LEIDOS-TVS-OLG-Teamlead@mod.uk">LEIDOS-TVS-OLG-Teamlead@mod.uk</a> Tel: 01173328725  OLG Senior Contract Officer Miss Rachel McGrath Email: <a href="mailto:rachel.mcgrath@leidos.com">rachel.mcgrath@leidos.com</a> Tel: 01173328709

## Defence Infrastructure Organisation (DIO)

29. For Gas facilities, DIO is responsible for, Design and Maintenance Guidance of gas facilities; the LPG gas cylinder and bulk gas supply contract, and gas storage process on the Defence Training Estate (DTE). Contact details are:

Address	Contact details:
For Gas Infra / MMO / Policy DIO SEE Eng Mech AH DE RPC Office, Building 118, Airfield Site, Mildenhall, Bury-St-Edmunds - IP28 8NF	Email: <a href="mailto:DIOSEE-EngMechAH@mod.uk">DIOSEE-EngMechAH@mod.uk</a>  Tel: 02052 385835
For Bulk LPG Technical Service Delivery Energy Utilities St George's House Kingston Road Sutton Coalfield, B75 7RL	Email: <a href="mailto:DIOSDEUS-EnDel1a@mod.uk">DIOSDEUS-EnDel1a@mod.uk</a>  Mil: 94221 Ext :3662
For LPG Supply Commodity Supply Management Accounting for Fuels, Lubricants and Gases - ( <a href="#">DLF</a> )	Email: <a href="mailto:DIOSDEUS-EnDel1a@mod.uk">DIOSDEUS-EnDel1a@mod.uk</a>  Mil: 94221 Ext: 3662
For <a href="#">DTE</a> - DIO H&S Policy St George's House	<a href="#">Energy Utilities &amp; Sustainability</a> <a href="#">JSP375-Part2-Volume 3</a>

Kingston Road Sutton Coalfield - B75 7RL	Email: <a href="mailto:DIOSDEUS-PMO@mod.uk">DIOSDEUS-PMO@mod.uk</a>
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30. The Reserve Forces and Cadets Association (RFCA) manage the estate for all reserve units and cadet associations. They are divided into 13 regional administrative areas throughout the UK and manage the bulk LPG facilities throughout the respective sites. However the “Operator” of the site / facility and the respective TLB are still the Delivery and Operating Duty Holders Respectively.

## Gases Support to Operations

31. Whilst each Service is primarily responsible for planning the support of its own forces, for joint operations there are well defined divisions of responsibility between the 3 Services which reflect their particular attributes and capabilities.

32. NATO Standardization. The aim of NATO Standardization is to enhance the Alliance’s operational effectiveness through the attainment of interoperability among Alliance forces, and additionally between NATO forces and forces of Partners and other states, thus improving efficiency in the use of available resources. Standardization is the key tool required to reach the level of interoperability of NATO, its Partners and other countries forces. Interoperability allows forces and when appropriate, forces of Partners and other Nations, to train, exercise and operate effectively together. It is a capability multiplier and ensures that you get the best results out of resources used.

33. The UK participates in the NATO Standardization Office (NSO), Aircraft Gaseous Systems Working Group (GGSWG). The GGSWG reports to the Air Standardization Board (MCASB). The GGSWG collectively manages the Aviator’s Breathing Oxygen (ABO) correlation programme (refer to Part 2, Chapter 6 Section 3). Contact details for the UK delegation to the GGSWG are:

Address	Contact details:
NATO Doctrine  <a href="http://nso.nato.int/nso/">http://nso.nato.int/nso/</a>	DSFA Technical Gases Manager Tel: 03067989678 Mil: 967989678 Email: <a href="mailto:joseph.lam102@mod.gov.uk">joseph.lam102@mod.gov.uk</a> Address: MP #2317, Larch 3b, NH2, Abbey Wood, Bristol BS34 8JH

# 3 - Accident / Incident / Dangerous Occurrence Reporting

Chapter Sponsor - DSFA Technical Gases Manager

## Scope

1. This chapter discusses the MOD policy and procedures for reporting accidents, incidents or dangerous occurrences associated with pressure systems and pressure vessels. It introduces a requirement to report any occurrences involving gas cylinders to the Fuel and Gas Safety Regulator (FGSR).

## General

2. **Definitions.** [JSP 375](#) makes the following definitions:

a. **Accident / Incident.** Any event which causes, or has the potential to cause injury, loss or damage to people and plant or premises.

**Dangerous Occurrence.** A specific, unplanned, uncontrolled event which has the potential to cause injury or damage and is listed in Schedule 2 of the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013 ([RIDDOR](#))

b. **Pressure System.** A system comprising one or more pressure vessels of rigid construction, including any associated pipework and protective devices, which contains, or is intended to contain, a relevant fluid. The pipework along with its protective devices, to which a gas container is, or is intended, to be connected; and is used, or is intended to be used, to contain a relevant fluid.

c. **Pressure vessel.** A closed vessel consisting of one or more independent chambers, any of which may be subject to an internal pressure greater than 0.5 bar and is used, or is intended to be used, to contain a relevant fluid.

d. **Relevant Fluid.** Means in relation to a pressure system:

(1) Steam.

(2) Any fluid or mixture of fluids which is at a pressure greater than 0.5 bar above atmospheric pressure, and which fluid or mixture of fluids is:

(a) A gas. Or:

(b) A liquid which would have a vapour pressure greater than 0.5 bar above atmospheric pressure when in equilibrium with its vapour at either the actual temperature of the liquid or 17.5 degrees Celsius, or:

(c) A gas dissolved under pressure in a solvent contained in a porous substance at ambient temperature and which could be released from the solvent without the application of heat. (Examples include any compressed or liquefied gas, including air).

## MOD Reporting Policy

3. **Requirements.** All accidents, incidents and dangerous occurrences are to be reported through the MOD incident reporting chain. An Accident/Incident reporting flowchart is provided in [Annex A](#).
4. MOD policy for accident reporting is detailed within [JSP 375 Part 2 Volume 1 Chapter 16](#). MOD policy for fatality reporting is detailed within [DSA 01.1 - Chapter 3](#).
5. Responsibility for ensuring accidents and incidents are recorded rests with the line manager in control of the location where the event occurred, or the line manager of the injured person if the injury occurred at a location not under MOD control.
6. The line manager is responsible for ensuring that all accidents, incidents and dangerous occurrences are reported to the MOD Support Authority which is responsible for the equipment involved.
7. The line manager is to ensure that the unit Health and Safety Officer is informed of any accidents, incidents and dangerous occurrences involving gas cylinders.
8. The FGSR has a responsibility to the Defence Fuels and Gas Stakeholder Committee for the safe use of gases and their containers. To ensure that lessons learnt through all incidents are assimilated into safety and environmental arrangements, all incidents, accidents or dangerous occurrences involving gases and their containers are to be reported to the FGSR using the format detailed within [Annex B](#). Copies of reports, involving all incidents with gases and their containers, provided to other authorities are also to be copied to the FGSR.
9. If any persons are hurt as a result of MOD activities they are to record and action their incident in the individual command accident / incident reporting forms.
10. **RIDDOR.** If in the UK, report to the Health and Safety Executive (HSE), under RIDDOR, if there is any incident which involves an explosion, collapse or bursting of any pressure equipment and associated system, regardless of whether or not there is personal injury. This is a defined dangerous occurrence under RIDDOR which needs to be reported to the HSE by the quickest practicable means, e.g. by telephone or by completing an on-line electronic [RIDDOR Report Form](#) applicable to the incident.
11. **Fire.** Incidents involving fire can involve the loss of assets, the death or injury of personnel and, in the case of the MOD, could also have an adverse effect on its operational capability. It is essential therefore that the MOD has a system for recording fire incidents so that not only can statistical information be maintained for assessing future fire protection policies, but also timely action can be taken on any developing trends. Refer to [Part 1, Chapter 5](#) for further information regarding the immediate action to be taken in the case of gas cylinders and fires.
12. All fires and related incidents are required to be reported to the appropriate TLB Hds and Hd DFRMO. MOD Form [1059](#) should be used for this purpose. Additionally, all serious fires or any emergency incident which results in the death of, or injury to, any person, where arson is suspected or where chemicals are involved, are to be communicated to the appropriate Regional [DFRMO](#) Office (out of hours the DFRMO HQ Duty Officer) within 24 hours of their occurrence. Where possible, initial notification is to be by telephone followed up by MOD Form [1059](#), refer to [JSP426 Fire Safety Manual](#).

13. **Montreal Protocol Substances.** [JSP 418 - Part 2, Leaflet 6](#), MOD Sustainable Development and Environment Manual (clause 7229) requires that any accidental discharges of Montreal Protocol substances, which result in a significant accidental loss of material, must be investigated and measures taken to prevent a recurrence. All single event accidental discharges of greater than 25 kg of any ozone depleting substance must be notified to the appropriate Montreal Protocol Task Force Member [DESTECH-QSEPEnv@mod.gov.uk](mailto:DESTECH-QSEPEnv@mod.gov.uk) or [DESTECH-QSEPEnv-Systems@mod.gov.uk](mailto:DESTECH-QSEPEnv-Systems@mod.gov.uk)

14. **Aircraft accidents or incidents, oxygen contamination and sampling.** Procedures for the reporting and investigation of accidents and incidents to UK military aircraft are contained within the Military Aviation Authority Regulatory Publications [MRP](#), Supporting Manuals, and the Manual of Post-Crash Management. Post-crash management procedures require that oxygen samples are taken from the dispensing equipment, bulk tanks or supply containers. Policy on, reports and the procedure to follow whenever contamination of breathing oxygen is suspected or confirmed in aircraft breathing oxygen systems, bay maintenance and test equipment, associated replenishment trolleys, bulk storage or production units is contained within the Military Aviation Authority Regulatory Publications (MRP), Regulatory Article 4514 and Supporting Manuals, Maintenance and Airworthiness Processes [MAP-01](#), Chapter 11.10.

**Note:** [STANAG 3318](#) provides a guide to standardise the essential points to be covered in the aeromedical investigation of accidents and/or incidents in order to facilitate the exchange of comparable information between nations.

15. **Transportation of dangerous goods by road, rail & sea - [JSP 800 - 4b](#).** Units and establishments are to report and investigate accident and incidents (including near misses) concerning loading, unloading and the carriage of dangerous goods. Copies of reports, irrespective of formats, are to be forwarded to Defence Dangerous Goods and Hazardous Stores Group (DDGHSG) and the appropriate Compliance Monitoring Group (CMP) Focal Point. This is to assist in pan-MOD performance measurement (part of the legally mandated compliance monitoring process) and to determine if a Dangerous Goods Safety Advisor will be required to assist in subsequent investigation.

16. Serious accident/incidents as defined by 1.8.5 of [ADR](#)/RID are to be reported immediately using the model report form shown at 1.8.5.4 of ADR/RID to DDGHSG and the appropriate TDGC member (and to FGSR refer to Annex B). Contact details for DDGHSG and TDGC are given in [JSP 800 - 4b](#).

17. [JSP 800 - 4b](#) - Dangerous Goods by Road, Rail and Sea refers (Clause 1.8.5). The form for Dangerous Goods Non-Compliance Report is found at [F-Mov 999](#).

**Note:** On-line Dangerous Goods Non-Compliance reporting is available on the Defence Movements & Transport Policy division website via the Defence Intranet: [Transport Safety](#)

18. **Transportation of dangerous goods by air.** If the dangerous goods are being transported by air then follow the procedures in [JSP 800-4A](#) - Dangerous Goods by Air Regulations.

19. Initial reports are to be made by signal within 12 hours of the accident or incident by the RAF air movement's squadron/unit or by an aircraft captain when operating from an airfield where there is no RAF movements' presence.

20. A full follow-up report, to be supplemented by photographs, may be requested by DSCOM and the appropriate parent command.

21. All accidents and incidents involving dangerous goods that occur on the ground prior to loading Air Transport aircraft or after off-loading are to be reported to Air Freight Policy DSCOM by using the [F-Mov 999](#) DG by Air – Ground Accident/Incident Report Form. The form is to be completed and forwarded no later than 48 hours after the accident or incident has occurred. This form is also to be used for incidents involving the discovery of undeclared dangerous goods in freight, passenger's baggage or on a passenger's person.

22. **Cylinders containing contaminated gas.** All cylinders of gas which are suspected of not meeting the required specification are to be locally quarantined and not used. Advice is to be sought from the support authority responsible for provisioning the gas cylinders. Advice is also to be sought from the equipment support authority where it is believed contaminated gas may have been used to service that equipment. All gas cylinders which do contain contaminated gas are to be returned using the procedure for returning unserviceable cylinders detailed in [Part 2, Volume 1, Chapter 4](#), within Procurement, Maintenance and Disposal.

23. For contaminated aviation breathing oxygen refer to JSP 319 within para 14 of this chapter.

24. It is possible that the contaminated gas may be part of a poor quality production batch. As such it is may be necessary to ensure that the manufacturer and any other MOD units who may have been issued with this gas are informed so that appropriate action can be taken. In all cases the support authority responsible for provisioning the gas cylinders is to be informed. Additionally, complete and return the [MOD Form 7777](#) – Gas Container / Incident Report.

25. Analysis of gases can be undertaken by ACDSLOGOPS DFTA, via the nominated Test Laboratory (refer to JSP 319 Part 2, Volume 1, Chapter 6, [Annex D](#)) by prior arrangement.

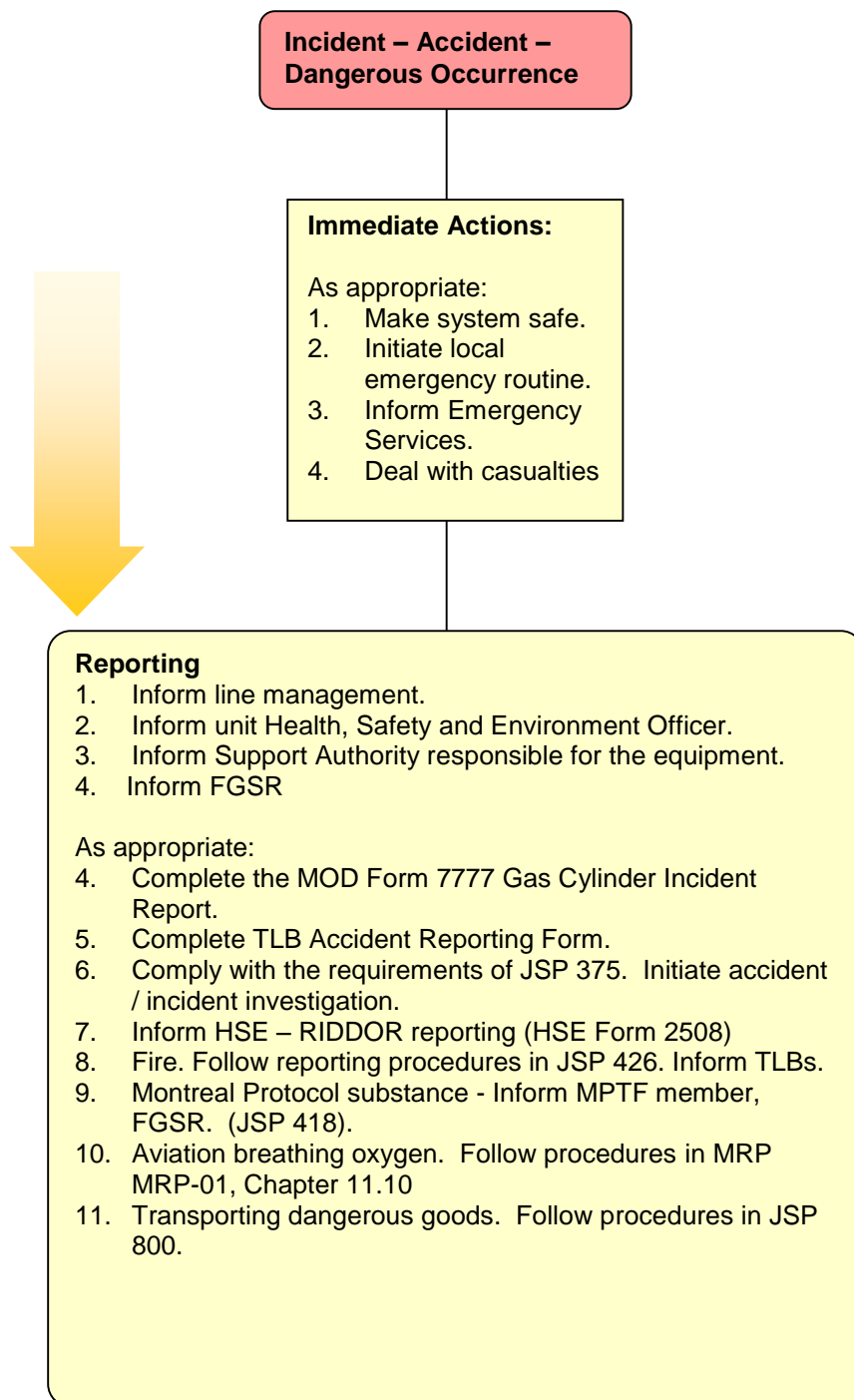
26. **External contamination of packages.** Externally contaminated packages, i.e. gas cylinders and their valves, guards, etc., shall not be presented for transportation. The contamination is to be removed, neutralised, or mitigated before transportation. However, for medical gas cylinders refer to Part 2, Chapter 15.

## Bibliography

1. [JSP 375](#) - MOD Health and Safety Handbook.
2. [JSP 418](#) - MOD Sustainable Development and Environment Manual.
3. [JSP 426](#) - MOD Fire Risk Management.
4. [MAA](#) Regulatory Publication, Manual of Post-Crash Management.
5. [JSP 800](#) - Defence Movement and Transport Regulations.
6. [DSA 01.1](#) - Defence Environment and Safety Management.
7. The Reporting of Injuries Diseases and Dangerous Occurrences Regulations 1995, as amended ([RIDDOR](#)).
8. [F/Mov 999](#) DG by Air - Ground Accident/Incident Report Form.
9. [MF 7777](#) - Gas Container / Incident Report.
10. [STANAG 3318](#) - Aeromedical aspects of aircraft accident and/or aeromedical incident investigation.
11. [RAF Form 7454](#) - Accident / Incident Report.
12. [ADR](#) - The European Agreement concerning the International Carriage of Dangerous Goods by Road.
13. [MAA](#) Regulatory Publication, Maintenance and Airworthiness Processes (MRP) - 01.



# Annex A – Accident/Incident Reporting Flowchart



# Annex B - Reporting of Gas Cylinder Incidents on MOD Form 7777

1. **Aim/purpose of reporting to FGSR.** The purpose of this reporting system is to monitor incidents involving gas cylinders and to enable action to be taken to identify any weaknesses in procedures, training and equipment which may require corrective action. The system is not designed to enable staff to make comment on the performance of individuals, or to apportion blame.
2. The need for prompt and complete reporting of incidents / accidents cannot be overstated. Prompt notification of incidents will also make the task of arranging assistance, whether from MOD or commercial sources, much easier. Therefore, it is clearly in the interest of units to report incidents / accidents as promptly and completely as possible.
3. The incident / accident report form is available independently as an electronic download in a pdf format, it is found at the JSP 319 website.
4. **Responsible reporting officer.** The MOD Line Manager responsible for the area or activity in which the event occurred is responsible for ensuring that the report is raised.
5. **Reporting timescale.** The FGSR - Gas is to be notified as soon as is practicable of an incident involving gas cylinders, where reports are to be made available within ten working days of the incident as far as is reasonably practical using the MOD Form 7777.
6. **Recommendations or Lessons Learnt.** Comment on recommendations or lessons learnt.
7. **Environmental Impact.** Describe any likely environmental impact from the release of gas.
8. **Media Involvement.** Describe any Media involvement, and list occurrences.
9. Copies of the [MF 7777](#) are to be sent to the FGSR. For the attention of [DSA-DLSR-FGSR-Gas@mod.gov.uk](mailto:DSA-DLSR-FGSR-Gas@mod.gov.uk) Refer to Part 1, Chap 3, [Annex A](#) for contact details.

# 4 -Training

## Chapter Sponsor - Defence Logistics, DSFA (SO2 Plans)

### Scope

1. This chapter details the requirement to provide training for all personnel involved with the generic handling and use of gases.
2. This publication does not mandate the policy for training of personnel involved with operation and maintenance of gases installed / supplied into platforms and /or equipment's. The responsibility of gas training for equipment and platforms using gaseous systems is the responsibility of the respective Equipment Sponsor / Support Authority.

### Legislation

3. The Health and Safety at Work Act ([HASAWA](#)), of which the MOD does not have an exemption, [JSP 375](#) provides the legislative framework for all MOD activities. As such all UK based establishments are liable to inspection by the Health and Safety Executive (HSE). Furthermore, the Secretary of State for Defence requires that standards adopted overseas are to be as stringent as those in the UK where reasonably practicable and, in addition, comply with relevant host nations' standards.
4. The [HASAWA](#) requires the employer (HoE) to provide adequate information, instruction, training and supervision as is necessary to ensure so far as reasonably practicable the health and safety at work of his employees. This responsibility may be formally delegated within the chain of command.
5. **Civilian Contractors.** Throughout this chapter the references made to MOD service personnel are to be equally read across to civilian contractors conducting their duties on the MOD estate. For example the duties of a Commanding Officer or Station Commander, are to be read across equally to a Civilian Head of Establishment responsible for the management of employees. In the main, the term Head of Establishment (HoE) refers to the highest ranking/most senior manager in post at any given unit/establishment.

### Training Requirements

6. Anyone who examines, refurbishes, fills or uses a gas cylinder must be competent to do so. All personnel involved in the supply, handling, transportation and disposal of gas containers shall be trained to a level appropriate to their involvement. All personnel are to be suitably trained and have the necessary skills to carry out their job safely. They are to understand the risks associated with gas cylinders and their contents. In particular:
  - a. New employees shall receive training and be supervised closely.
  - b. Users must be able to carry out an external visual inspection of the gas cylinder, and any attachments (e.g. valves, flashback arresters, regulators and hoses), to determine whether they are serviceable for use of gas. Users shall be able to identify visual indicators of damage such as: dents, bulges, evidence of fire damage (scorch marks) and severe grinding marks etc.

c. All personnel handling gas cylinders are to have had appropriate manual handling training.

7. Training shall be planned, recorded and reviewed regularly. Training must be in accordance with documented operating and safety procedures. To maintain high skill levels, a schedule of regular continuation training shall be undertaken by all personnel. Trainees should be checked to ensure they have a thorough understanding of the topics on which they have been trained.

a. **Initial Training.** Personnel are to be given the appropriate instruction in the storage and handling of gases and their containers to enable the individual to carry out the work they may be expected to undertake. The instruction is to be provided by a qualified instructor for the subject matter being taught. The training will be conducted as a formal course, usually at a recognized training establishment. Following thorough testing, successful students are to be certified as qualified.

b. **Continuation Training.** Continuation training is deemed as training given at the place of work or any training received in the normal course of duty from suitably qualified personnel. It is to be given to all personnel, military, civilian or contractors who are involved in the handling, storage and transportation of gas and gas containers. All checks and continuous training shall be recorded and authenticated by the signatures of both trainer and trainee. Training will be required:

(1) On appointment to any job related to the handling, storage and use of gases.

(2) Whenever a new gas procedure is introduced or when an existing procedure is modified.

(3) At the discretion of line management when concern is expressed as to an operator's standard of operation with respect to his/her duties.

(4) At least every 5 years. Line managers or personnel may decide that the time between specific appointments renders their specialist knowledge imperfect and they are therefore deemed to require either continuation or repeat initial training. Line managers are to exercise extreme caution when re-employing personnel without any form of refresher training.

## Training Programmes and Syllabus

8. Training courses will vary according to the equipment, role, service and the specific duties of personnel. Training programmes will cover the following subject areas with the depth of information being tailored to prior knowledge held by personnel when regarding Hazardous Material (Hazmat) training:

- a. The hazards regarding the safe transportation, storage, handling and use of gases.
- b. Stock control and measurement requirements.
- c. The operation of specific gas equipment.

- d. Loading and unloading procedures of packed gases.
- e. First Aid, Safety procedures, the use of Safety equipment (to include fire-fighting equipment) and Personal Protective Equipment (PPE).
- f. Emergency procedures, including raising the alarm.
- g. Knowledge of pertinent legislation.
- h. Prevention of escaping gases and the reporting of incidents.
- i. Types of gaseous product in service.

9. **Health and Safety Awareness.** All personnel are to be made aware of their responsibilities when working with pressure equipment, whether transportable pressure vessels or fixed pressure systems. Line management will have ensured that they have implemented the requirements of the HASAWA and that they operate safe working procedures as defined within JSP 375 and that where appropriate they have applied the Defence Estates Safety Rules and Procedures.

10. Site managers are to have a working knowledge of the HASAWA, the Control of Substances Hazardous to Health ([COSHH](#)) Regulations, 2002 and the [Manual Handling Operations Regulations](#) , 1999. As a minimum standard, all personnel working with transportable gas containers are to have a thorough knowledge of:

Safety regulations detailed in this document and all policies, procedures and operation/work instructions for the sites on which they are authorised to work.

- a. Safety Data Sheets for the gases they are likely to be involved with.
- b. Safe handling of gas containers.
- c. Identification and hazards of gas container contents.
- d. Gas properties (physical, chemical, hazardous).
- e. Potential hazards of high pressure containers.
- f. Procedure for the supply and disposal of gases, and associated activities.
- g. Personal protective equipment (selection, storage and use).
- h. Emergency equipment (location and use).
- i. Emergency procedures (gas leaks, fire, etc).
- j. Gas container safety checks on receipt and before return to supplier.

k. Designated smoking and no-smoking areas.

11. [JSP 375 Part2 Volume 3](#) contains detailed rules and procedures that are the MODs safe systems of work for the management and control of significant risk activities on the defence estate. For all personnel who are required to undertake the design, construction, operation and maintenance of facilities under the ownership, in the widest sense, of the MOD (e.g. boilers and pressure systems; natural gas and LPG systems; medical gas pipeline systems; dental air and vacuum systems) the implementation of JSP 375 Volume 3 is mandatory. Appropriate training is to be provided in the application of the rules and procedures within JSP 375 and to ensure that certain competent persons are in place.

12. **Environmental awareness.** All personnel are to be made aware of the environmental impact of gases. There are many different gases in-use across the military, some of which can have negative effects on our environment and which are therefore controlled (e.g. refrigerants). MOD policy for the protection of the environment is detailed in [JSP 418](#), where environmental protection is a line management responsibility. Line management ensure compliance with the [Environmental Protection Act 1990](#), the [Environmental Act 1995](#) and other relevant statutory provisions and any additional requirements arising from international treaties and protocols to which the UK is a signatory. All units will have an Environmental Management System (EMS) in place in accordance with JSP 418. Personnel are to be made aware of their responsibilities for protecting the environment, their role within the unit EMS, and are to receive appropriate training in the safe handling of gases to prevent releases to atmosphere.

13. **Fire awareness.** As required by Fire Safety Policy and Regulations, all personnel who handle or use gases and their containers are to have adequate fire training. The training is to take account of any significant findings from the fire risk assessment carried out at each site and is to be recorded in the Fire Safety Management Plan Refer to [JSP 426](#).

## Training within the MOD

14. **Responsibilities.** Unit Commanders, Heads of Establishment and Heads of Department are responsible for ensuring that all Military, Civilian or Contractor personnel are correctly trained for the specific gas duties on which they are employed. Gas duties include the following:

- a. The safe storage and handling, use and accounting of gas products.
- b. Transportation and road movement of packed gas products.
- c. Operation of in-service gas production & concentration equipment.

15. **Methods of Training.** Depending on the degree of skill and knowledge required by an employer of his employee, three methods of training exist:

- a. Attendance on formal training courses.
- b. Formal in unit training.
- c. Informal in unit training.

16. **Formal External Courses.** These courses are for personnel who:
- a. Will be in full time employment in gas duties.
  - b. Are to be employed as instructors within the unit.
17. Details of formal external courses and how to apply for places for both civilian and service personnel are published in DIN's and in single Service courses programmes.
18. **Validity.** Where training qualifications are not life-time awards, i.e. have a set expiry date or 5 years for example, the individual and the chain of command is to ensure personnel in applicable posts requiring specific gas training, undertake refresher or indeed complete re-training as required.
19. **Training Providers.** The MOD recognised training for handling compressed gases and Cryogenic Liquids is provided by RAF Halton Logistic (Supply) Training School, and the Defence Petroleum Training Squadron (DPTS), who deliver the 'approved LSTS' course package (CN3252) as part of the syllabus on the F&L Mangers course. (See para 37 & 40).
20. **External Training.** Training support for bespoke courses not delivered at DPTS or LSTS may be sourced from external providers subject to TLB authority. Additionally, contractors employed by TLBs in gas cylinder compounds may be instructed by suitable civilian gas training providers. As a minimum, TLBs must be satisfied that the training provider is competent, accredited to an industry standard and assessed by an appropriate Conformity Assessment Body. TLBs shall be satisfied that the course content is compatible to that taught by the MOD recognised training school and that all contractor gas cylinder operators shall be fully conversant with the MOD procedures detailed within JSP 319 and other applicable MOD publications.
21. **SOTR Course Planning.** The Statement of Trained Requirement (SOTR) process looks out 18-24 months, and sets the scale of training requirements. This process is jointly run by HQ DRLC and HQ 22 Training Group, and invites all interested parties including contractors into the process.
22. **Army Formal / Informal in Unit Training.** Instructors who attend formal external all arms courses are qualified, on successful completion of the course, to conduct as directed by their CO/OC formal and informal in unit training courses. Units who do not have qualified instructors should request assistance from their Regimental Brigade HQ, G3 Training branch, quoting why they are unable to provide their own instructional staff. Informal training normally requires an instructor to assess an individual who has been carrying out a specific duty for a period of time and whose duty would not warrant attending a specific course.
23. **Department / Unit Documentation.** Heads of departments or units are required to ensure a record of personnel instruction and training is maintained. In addition a copy of all such records is to be made available to the individual concerned. Unit documentation and records may include a combination of all or any of the following:
- a. Issue of certificates: to instructors and operators.



b. Publication of military or civilian orders.

c. Inclusion of details of specialist qualifications in the individual's personal records.

24. The HSE and the LAND Petroleum Inspectorate are empowered to request details of all unit records on any person within a unit who has LPG / Industrial Gas responsibilities.

25. **Responsibilities for Personnel not Employed by the MOD.** The HASWA requires every employer to conduct his activities in such a way that persons not in his employment but who nevertheless may be affected by those activities are, so far as is reasonably practicable, not exposed to any risk to their Health & Safety. The employer has a duty to ascertain, so far as reasonably practicable, if the operations of contractors on his premises are likely to give rise to any hazards which could affect his own employees, other persons on site, or members of the public at large. The engagement of contractors or agents to undertake work for the MOD does not relieve MOD of any of its responsibilities for Health & Safety. Contractor competency and skilled person appointment procedures should be followed in accordance with Defence Estates Safety Rules and Procedures as detailed in [JSP 375](#).

26. **Contractors.** The prime responsibility for Health & Safety rests with the employer. When a contractor is employed, the MOD still retains duties under HASWA towards its own employees. MOD also has some additional duties to the contractor or agent about potential hazards, which might arise from MOD activities. These are:

a. The safety of materials and plant equipment.

b. Services supplied to the contractor or agent.

c. The safety of any buildings they work in.

d. Any work systems they are required to follow.

27. In conjunction with the contractor or agent the MOD has a duty to ensure that the operations of contractors or agents on MOD premises do not give rise to hazards which could affect either MOD personnel or the public, and the contractor's or agent's employees.

28. **RAF Training.** RAF Logistics Supply personnel employed within F&L complete a pre-employment phase 3 training course at SMTW, RAF Halton. This training provides Logistics Supply personnel with a detailed knowledge in the safety precautions associated with the receipt, storage and handling of all full and empty gas cylinders. This does not include gas cylinders that are in use. All Logistics Supply personnel involved with the external transportation and shipment of LPG and Industrial Gas are to receive training in the transportation of dangerous goods. Compressed gases are classified as dangerous goods and therefore only Q-Sup-CG qualified Logistics Supply personnel are to oversee the transportation documentation aspects of these materials. (See paragraph 37)

29. RAF Engineering tradesmen are trained, as appropriate, in the relevant safety precautions associated with, and operation of, gas cylinders and gas dispensing equipment as part of their

basic trade training. Personnel employed on the production of gases, in Cyprus, Falkland Islands or at deployed locations, the control and issue of liquid oxygen or liquid nitrogen and the operation of nitrogen concentration equipment attend specialist pre-employment training courses. Course allocation is controlled by 22 (Training) Group and is based on qualification requirements approved and funded in Local Unit Establishments (LUE). Specialist training courses are detailed in Support Policy Statements promulgated in AP 119L-0001-2(R).

## Specialist Training Requirements

30. **Personnel Working With Cryogenic Liquids.** It is a mandatory requirement that all personnel working within a Liquid Oxygen (LOx) or Liquid Nitrogen (LiN) aviation maintenance bay, or using LOx or LiN aviation Ground Support Equipment are appropriately trained and authorised. All Service and MOD personnel working in an aviation cryogenics workshop are to attend the Oxygen Bay Maintainers Course run from DECA Stafford. Personnel successfully completing the course are awarded the qualification QQ-A-Oxy-795/RAF. Contractors working in MOD aviation cryogenic workshops, or on MOD aviation cryogenic Ground Support Equipment, are also to attend the Oxygen Bay Maintainers course, or be able to prove an equivalent, or better, level of training/competence to work with cryogenic equipment.

31. **Personnel Working with Refrigerants.** The Fluorinated Greenhouse Gases Regulations 2015 ([SI NO 310](#)) list the certification and evaluation bodies that provide nationally recognised qualifications in the Refrigeration, Air Conditioning and associated industries. The regulations make it an offence for personnel to undertake certain activities involving Fluorinated greenhouse gases unless they are suitably qualified.

32. These activities fall under the following headings:

- a. Stationary refrigeration, air conditioning and heat pump equipment (RAC).
- b. Air conditioning systems in certain motor vehicles (MAC).
- c. Fire protection systems and fire extinguishers.
- d. High-voltage switchgear.
- e. Fluorinated greenhouse gas-based solvents.

33. Project Team Leaders, Project Sponsors, Equipment, Property and Facilities Managers and others (including RPCs, Private Partners and other such contractors) responsible for equipment or facilities which use, or might use, an ozone depleting substance and other fluorinated gases in refrigeration, fire protection, or other applications – are termed the *Responsible Authority*. The Responsible Authority shall ensure that personnel employed on such systems using Ozone Depleted Substances and other fluorinated gases are trained and certified to an accrediting authority. Full details of mandatory training requirements and certification can be found in [JSP 418 Leaflet 6](#) & [JSP 418 Leaflet 7](#).

**Note:** The Air Conditioning and Refrigeration Industry Board (ACRIB) currently manages a voluntary register of personnel qualified as Safe Refrigerant Handlers. Any individual who handles refrigerants must be able to do so safely and with due regard to the environment and the scheme aims to provide a national register of all those individuals who have successfully completed an approved refrigerant handling competence assessment.

34. **Personnel working on Natural Gas and LPG.** Any individual working on Natural Gas and/or LPG must have successfully undertaken technical and practical training and assessment to enable them to be a member of a class of persons approved by HSE; their registration must be applicable to the type of work and responsibilities found on the particular establishment(s). They must hold a valid identity card as a member of a class of persons approved by HSE (registered with Gas Safe Register) with the relevant areas either endorsed on the rear of identity card or contained in a relevant certificate of competence from a Nationally Accredited Certification Body ([ACRIB](#)) Compliance is required with [JSP 375](#), Volume 3.

35. If members of the Operating Authority gain access to LPG compounds for accounting purposes (e.g. to take LPG content readings from gauges), they shall have adequate instruction/ training by a competent person. Such instruction and training shall detail the dangers associated with LPG, and the actions to be taken in an emergency. Training and instruction shall be recorded on the operators training record. Access to LPG compounds shall also be Risk Assessed and recorded by local Line Management. Refer to [JSP 319 Part 2, Volume 1, Chapter 1](#) for LPG properties and [Chapters 17 & 18](#) for precautions.

**Note:** [Gas Safe Register](#) replaced CORGI as the gas registration body in the UK on 1<sup>st</sup> April 2009. CORGI gas registration is no longer recognized in law.

36. **Personnel working on Medical / Dental Gas Systems.** All personnel working on Medical Gas Pipeline Systems (MGPS) and Dental Gas Systems (DAVS) are to be trained and competent to do so. Personnel must be able to verify competence in appropriate techniques including supervision by qualified managers. Annual reviews of all staff training requirements are to be carried out. Skilled Persons must be able to demonstrate suitable experience and that they are fully familiar with:

The Department for Health, Health Technical Memorandum (HTM) series of documents (e.g. [HTMI 02-01](#)).

- a. Medical Gas Pipeline Systems).
- b. Their own pipeline systems.

**Note:** Compliance is required with JSP 375.

37. **Logistics and Supply Personnel Working with Compressed Gases and Cryogenic Liquids.** The RAF Logistics and Supply Training Squadron at RAF Halton provides a supply specialist training course for all logistics and supply personnel who are employed on compressed gas and cryogenic liquid duties (Course No. 3252). Personnel successfully completing the course are awarded the trade qualification annotation Q-Sup-CG. This qualification is valid for a period of 5 years. Continued employment on compressed gas and cryogenic liquid duties requires further attendance on this formal training course.

38. **LSTS Course Bids.** RAF Units / other Services and MOD Civil Servants are to submit course applications to:

Manning AST  
Support Ground Trades  
ACOS Manning  
HQ Air Comd RAF High Wycombe  
Mil 95221 6850

39. **ITD (A) Course Bids.** Non MOD civilians for LSTS RAF Halton courses are requested to bid via:

Courses Clerk  
International Defence Training (Army)  
Mil: 94344 8079/8091, Civ: 01980 618091

40. **DLS SMTW - Defence Petroleum Training Squadron (DPTS) Course Bids.** The DPTS delivers the 'All Arms' Fuel & Lubricant Mangers Course ([Compendium of Mandated Trg-Ser 60](#)) which encompasses the Compressed Gases & Cryogenic Fluid material (Course No 3252). This course comprises of both 'online learning' and theoretical and practical elements delivered at DPTS. All elements have to be completed to receive the qualification / competency. Course applications are to be sent to:

Courses Clerk  
Defence Petroleum Training Squadron  
West Moors Station  
West Moors  
Wimborne, Dorset  
BH21 6QS

Tel: 01202 654392  
Tel Mil: 94379 4392  
Email: [DLS-SMTW-DPTS-CLK@mod.uk](mailto:DLS-SMTW-DPTS-CLK@mod.uk)

## Bibliography

1. [Health & Safety at Work Act 1974 \(SI 1973 No: 31\)](#).
2. [The Control of Substances Hazardous to Health Regulations 2002](#) (SI 2002 No: 2677).
3. [The Manual Handling Operations Regulations 1992](#), (SI 1992 no 2793).
4. [The Gas Safety \(Installation and Use\) Regulations 1998](#), (SI 1998 no 2451).
5. AP 119L-0001- 2(R) - Gas (including Liquid Gas) Production, Storage and Test Equipment.
6. [JSP 375](#) - MOD Health and Safety Handbook.
7. [JSP 418](#) - Sustainable Development and Environment Manual.
8. [JSP 426](#) - Defence Fire Safety and Fire Risk Management

# 5 - Emergency Situations, Preparation and Actions

Chapter Sponsor - DFRMO HQ SD Ops

## Scope

1. This chapter details the MOD policy for the preparation for, and the subsequent actions to be taken in the event of, an emergency situation involving gas cylinders. It discusses the properties of the main gases and their associated containers and provides advice on dealing with gas cylinders involved in an emergency situation.
2. Any gas cylinder that is exposed to fire or extreme heat may rupture due to an increase of temperature and pressure. This is valid even for cylinders that have pressure relief devices as in extreme circumstances the device cannot operate quickly enough. Acetylene cylinders have the additional problem where a decomposition reaction may develop. Gas cylinders may also rupture if they are hit, accidentally or deliberately, by high velocity bullets or armour piercing ammunition.
3. The hazards associated with cylinder rupture arise from pressure shock, flying cylinder pieces and from the release of the flammable, toxic, or corrosive content of the cylinder. A ruptured gas cylinder can travel a distance of 150 m or more; shrapnel from the cylinder, including the valve, cylinder accessories and objects close to the cylinder during the rupture can be expected to travel up to 200 m or more.
4. Compressed gas containers shall be afforded adequate protection from known risks.
5. All accidents / incidents involving gas cylinders are to be reported. Refer to [Chap 3](#).
6. When not-in-use or being transported, all gas cylinders are to be kept in an approved gas cylinder store which has been designed specifically for the storage of gas cylinders. The gas cylinder store is to be designed and managed in accordance with [Part 2 Vol 1, Chap 9](#).

## Gas Leaks and Escapes

7. In the event of a gas leak from a valve which has not ignited, and if it is safe to do so, the valve should be securely closed. Carry out the following actions:
  - a. Eliminate sources of ignition.
  - b. Ventilate the area.
  - c. Control access until the area is safe.
8. If the valve cannot be closed, or the valve is still leaking, do not attempt to tighten the cylinder valve into the cylinder or tamper with safety devices. Take the following actions:
  - a. Eliminate sources of ignition.
  - b. Evacuate the area (with consideration of the flow of the gas).

- c. Ventilate the area.
- d. Call emergency services as appropriate.
- e. If safe to do so, remove the cylinder to a safe, well-ventilated area.

9. Where leaks are suspected test with an approved leak detection fluid. [Part 2, Vol 1 Chap 7](#), refers. All cylinders found leaking are to be made safe. If maintenance is required to the valve or cylinder, then it is to be declared unserviceable and returned in accordance with [Part 2, Vol 1, Chapter 4](#).

## MOD Fire Policy and Emergency Actions

10. **Major Emergencies.** Major emergencies, those which have the potential to significantly disrupt the operation of a unit or establishment, shall be thoroughly considered when formulating an emergency plan. In particular, the risk to life, property, and serious disruption to the surrounding community, shall be mitigated by robust work instructions and well exercised emergency procedures. A major emergency will require the use of outside resources to recover the situation effectively. Natural phenomena such as severe electrical storm; accidents such as aircraft crashes; and deliberate acts such as arson and sabotage, may initiate major emergencies.

11. **Legislation.** Certain gases are 'Named Substances' as defined by the Major Accident Control Regulations (MACR), which is the MOD application of the Control of Major Accident Hazards Regulations 1999 (COMAH). JSP 498 provides the relevant information for MACR sites. Additionally, all managers shall be familiar with the requirements of the Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995 (RIDDOR).

15. Correct handling, storage and use of gas cylinders will contribute to minimising the risk of an accident involving them. All cylinder storage facilities shall have comprehensively written emergency procedures, which may be incorporated into other unit or site plans. The plan is to include the actions to be taken in the event of cylinder and/or tank leaks, fire and explosion, and all predictable local hazards such as hurricanes, earthquakes and volcanic eruptions. This will help to minimise the risks to personnel and property, and to restrict the escalation of the incident. A guide for producing emergency procedures for gas storage areas is in [Annex A](#) and [Annex B](#). Refer to [Part 2 Chap 9, Sect 6](#). Further guidance for the production of site specific emergency plans is also contained in the Gas Escape Emergency Plan ([GEEP](#)) available on the [DSA DLSR FGSR Homepage](#) as well as in the DIO Gas Safety Management Plan (GSMP) Sect C.

13. **Exercises.** Emergency procedures are to be exercised annually. Such exercises may be office based and conducted in phases over the year. However, exercises shall involve all of the agencies in the plan. Those persons with specific practical involvement in dealing with gas storage emergencies (e.g. fire and rescue teams) are to undergo annual on-site training which may be conducted independently from the main exercise. These rehearsals and practices must be recorded within unit management checks or SOP's, but also could be captured within a locally produced Annex of the units / establishments specific [GEEP](#) document.

14. **First Aid Fire Appliances (FAFA).** Advice on firefighting equipment and fire precautions shall be sought, in the first instance, from the unit fire officer or DFRMO



Service Delivery Manager as appropriate. The appropriate level of FAFA is to be determined by the unit fire officer, and shall be deployed as directed by them or their staff. As a minimum requirement, two fire extinguishers suitable for use on a Class C (gases or liquefiable gases) fire are to be readily available.

15. **Fire Precautions.** JSP 426 sets out the central policy and standards for the effective management of fire safety in the MOD.

16. Fires involving compressed gases can be extremely difficult to contain and control. Procedures shall be put in place to prevent gas leaks and escapes, and to prevent fires occurring in the vicinity of compressed gas stores.

17. The probability of fire and explosion hazards is reduced by the provision of good design, layout, and appropriate operating procedures. All personnel engaged in the handling of compressed gases shall be trained in accordance with [Chapter 4, Para 41](#) and shall be aware of their responsibilities under JSP 375 - MOD Health and Safety Handbook.

18. Only approved and appropriate PPE shall be worn ([refer to Part 2, Chap 2](#)).

19. The key actions by the person discovering a fire in a cylinder storage facility are:

- a. Shout "FIRE, FIRE, FIRE!" to alert anyone in the vicinity.
- b. Operate the FIRE ALARM.
- c. Call the Fire & Rescue Service using the method detailed in the fire/emergency plan.
- d. Attempt to EXTINGUISH THE FIRE only if suitably trained and it is safe to do so.
- e. Ensure that all personnel EVACUATE the area to an initial cordon area of 200 meters. (This may be reduced where there is suitable shielding identified / or as directed by DFRMO / FRS).

20. **Evacuation.** The area is to be evacuated for a minimum distance of a radius of 200 m from any gas cylinder involved in the fire. A cordon is to be created around the hazard zone. This area is to be controlled by the emergency services and a dynamic assessment made of the danger from any gas cylinder(s). The area is to remain evacuated until advised by the emergency services that it is safe to reduce or remove the cordon.

21. The risk of gas cylinders exploding reduces and becomes very unlikely once the fire has been extinguished and appropriate cooling has been applied. For acetylene cylinders cooling should continue for a minimum of one hour followed by one hour where each acetylene cylinder is monitored for re-heating. [Refer to Annex A.](#)

22. The emergency services will require specific information about the fire, such as:

- a. Location.
- b. Quantity of gas cylinders involved.

- c. The names of the gases contained in the cylinders. In particular they will require knowing if acetylene is involved.
- d. Whether there are any personnel within the evacuated area.

23. In addition to unit fire resources, the local Fire & Rescue Service shall be alerted to any fire involving compressed gas as they have the necessary skills and equipment to deal with such incident. On their arrival, the local fire service shall be given command of the fire-fighting and rescue operation.

24. Fire hydrants, monitors and fixed water systems for compressed gas stores shall be designed to provide a water supply that can be controlled from a safe remote location. Any manually operated systems shall be clearly identified and the method of operation clearly indicated.

25. In the case of a gas leak, fire, or other emergency, consideration needs to be given to the effects of the prevailing wind. The provision of an indicator, such as a windsock or other device within the storage area, will provide an indication of which neighbourhood might be exposed to any fumes, smoke and/or plume ground strike arising from the incident.

26. Excessive vegetation and unnecessary combustible material shall be removed from the vicinity of the storage area. Refer to [Part 2, Chap 9](#).

27. A telephone, suitable for use in an emergency situation, shall be provided. Refer to [Part 2, Chap 9](#).

## Gas Cylinders in Fires

28. Gases react differently in a fire situation; however all gas cylinders, regardless of contents, are potentially dangerous when exposed to a fire, due to the pressures inside the cylinder. It is important to try to identify which particular gas is being dealt with. The primary means of identifying the gas contents is by reading the label on the cylinder. It may not always be possible to read the label so there are other indicators such as shape, size of the cylinder and colour (particularly the colour on the shoulder).

29. Refer to [Part 2, Chap 3](#), for further information on identifying gas cylinders.

30. **Classification.** Gases can be classified with regards to the gas properties and fall into four main categories. They are:

- a. **Oxidants.** These do not themselves burn but support combustion, possibly vigorously so. Examples: oxygen, nitrous oxide.
- b. **Inerts.** These do not generally react with other materials. They do not support combustion or support life. Examples: argon, nitrogen.
- c. **Flammables.** These gases when mixed with an oxidant and provided with an ignition source will burn. The gases are often referred to as fuel gases. Examples: acetylene, hydrogen, LPG.

- d. **Toxics/Corrosives.** These react chemically with other materials and have the potential to cause injury or threaten life even in small concentrations. Examples: chlorine, carbon monoxide, ammonia.

**WARNING: Gases may possess the properties of more than one main category, e.g. a gas may be flammable and toxic, so rules for allocating a primary category and a secondary category(ies) exist** (refer to Part 2, Chap 3).

31. Just as there are a number of gas types (flammables, oxidants, toxics and inert) there are also different gas storage conditions: compressed gas, liquefied gas and gas dissolved in a solvent (as in the case of acetylene). Some cylinders are equipped with safety devices, which are designed to relieve pressure by venting gas as the cylinder heats up. All cylinders may fail catastrophically in a fire situation and the effect of the consequent explosion will depend upon the nature of the gas contained.

**32. Cylinders Containing Compressed Gas (Usually High Pressure Cylinders).**

These cylinders are tested up to 1½ times their Working Pressure. Examples include oxygen, nitrogen, argon and hydrogen. As the cylinder heats up in the fire, the pressure inside the cylinder increases and the cylinder wall may also start to weaken at temperatures in the region of 300°C. If heat continues to be applied then the maximum safe working pressure of the cylinder may be exceeded. This may eventually cause the cylinder to fail in a violent manner resulting in the release of a considerable amount of energy. Subsequent events will depend upon the gas type. For inert gases this is the end of the event.

33. Cylinders containing oxidant, toxic or flammable gases may produce other hazards and specialist advice should be sought from the gas supplier. For example, flammable gases such as hydrogen or methane will rapidly expand explosively following the cylinder rupture because of the very high internal pressure. This could actually extinguish the fire by blasting it out but also could result in a delayed ignition of the unconfined gas cloud. Hydrogen is lighter than air, it is highly flammable and leaks readily disperse. The flames from burning hydrogen are almost invisible in daylight.

**34. Cylinders Containing Liquefied Gas.** Liquefied gases are generally of two types: high pressure (carbon dioxide, ethane) or low pressure (LPG – propane, butane). As the cylinder heats up in the fire, the liquefied gas absorbs some of the heat and boils, increasing the pressure in the cylinder. This will normally result in the operation of a safety relief device, fitted to the cylinder valve, which relieves the excess gas pressure. If the cylinder wall becomes excessively heated, the effective maximum working pressure of it is reduced and the cylinder may fail catastrophically. LPG cylinders failing under heat may result in a BLEVE. The boiling liquid in the cylinder rapidly vaporises and expands explosively. If there were a source of ignition, this would result in a fireball.

**35. Cylinders Containing Dissolved Acetylene.** Acetylene cylinders differ from other compressed cylinders in that they contain a porous filler material, usually monolithic in form though older packed materials are still in use. They also contain a solvent, typically acetone that is absorbed by the material. The acetylene dissolves into the acetone and is held by it in a stable condition. The function of the porous material is to evenly distribute the acetone throughout the cylinder and prevent the presence of large internal voids. The porous material contains thousands of small pores, which act as a stabiliser by dividing the acetylene into small units. If decomposition was to occur or a flame develops, the small pores would act as flame arrestors. Some cylinders are equipped with relief devices but

more modern cylinders are not. Industry testing has confirmed that mechanical impact alone (cold shock) cannot initiate acetylene decomposition.

36. Whenever a cylinder fire occurs, even if it has been brought under control or completely extinguished, the Unit Fire & Rescue Service (or local Fire & Rescue Service) is to be alerted. If the situation becomes out of control, the use of FAFA has failed to extinguish the fire, or it is unsafe to attempt to use FAFA, further attempts shall be abandoned. Heat and flame increase the risk of explosion so it is essential that the emergency fire plan is activated and the area evacuated as quickly as possible.

37. Cylinders which are not directly involved in the fire, and which have not become heated, should be moved as quickly as possible to a place of safety, provided that this can be done without undue risk. It should be confirmed that the cylinder valves are closed.

38. It is important to cool cylinders with water if that can be done safely. This applies to cylinders suffering direct flame impingement and also to those affected by radiant heat. Personnel engaged in this activity should take a position that will provide adequate protection from exploding cylinders

39. Once the fire has been put out, most gas cylinders do not represent a hazard if they are not leaking and the incident may be drawn to a close. The exception to this is acetylene cylinders; therefore, it is important to be able to recognise acetylene cylinders. This will enable the correct and safe procedures to be followed where acetylene is involved whilst, if it is not, it will ensure safe handling of the incident and result in savings of emergency service resources. Refer to Annex A.

40. The cylinder owner, as well as the Support Authority with responsibility for the cylinder, shall be notified of any cylinder involved in a fire.

41. Cylinders that have been subjected to fire or heat, may have had their physical properties modified and therefore, may no longer be safe for further use. This is particularly critical with cylinders manufactured from composite or aluminium. Any cylinder that has been involved in a fire, or where there is a possibility that it has been affected by excessive heat, is to be declared unserviceable and returned in accordance with [Part 2, Volume 1, Chapter 4](#), using the specialist advice as required in specialist advice section, Para 45 below An Equipment Conditioning Label (U/S) (e.g. MOD Form 731) is to be attached to the cylinder indicating that the cylinder has been exposed to fire / heat. The following information is to be included on the label:

**NOT TO BE FILLED. EXPOSED TO FIRE / HEAT.**

42. If an acetylene cylinder heats up in a fire, the porous material - an insulator; will gradually increase in temperature. If the temperature exceeds 350 °C the acetylene is likely to undergo an internal decomposition (chemical reaction) creating further heating of the cylinder shell and increasing the internal pressure. This internal heating may continue after the fire has been extinguished. Several things may then happen:

- a. The safety device on the cylinder (bursting disc or fusible plug) may operate, releasing acetylene to further intensify the fire. The cylinder will not necessarily explode but could still do so.

- b. The cylinder shell will weaken due to the heat; this could lead to it splitting open resulting in an explosive ejection of the contents. The acetylene would expand rapidly in the form of a large fireball of up to 25m radius.

43. After initial cooling any internal decomposition may continue and cooling water must be sustained until this reaction has stopped. The Wetting Test is used to provide an indication of this. The cylinder may still fail if it is moved or there is a leak of gas from it. The one hour cooling period and the one hour monitoring period has been established to allow sufficient time for internal decomposition to stop. During this period it will be necessary to prevent the cylinder from being moved or interfered with in any way. If the cylinder appears cool but is still leaking, there is a flammability risk in the local area. Due to the nature of the risk a specific Risk Assessment is to be carried out, taking account of advice received from the Competent Person.

**Note:** If the cylinder appears cool but is still leaking, there may be two problems

44. Fresh acetylene can feed any suppressed decomposition, starting it up again. There is a flammability risk in the local area where the acetylene is leaking.

## Specialist Advice

45. **How to Identify the Cylinder Owner.** In the UK there are four major companies who supply gas cylinders. During an incident involving cylinders it is important to identify the gas company that owns the cylinder and/or the Support Authority responsible for the cylinder.

46. This will enable the gas company / Support Authority to provide assistance in identifying the contents of the cylinder and to provide any assistance required in order to manage the incident effectively. The owner of the cylinder can be identified in a number of ways:

- a. Via the persons responsible for the gas store, by asking for the name of the gas supplier; and in the case of cylinders supplied under the DES LCS OILS, LUBRICANTS, AND GASES TEAM contract, ([refer Chap 2](#)).
- b. From the cylinder label if it is possible to get close enough safely.
- c. By inspecting the label on any other cylinders in safe locations elsewhere on the premises. It is probable that the same gas company supplies the majority of the gas cylinders at any particular location.

47. **Telephone Contact Numbers.** The following are the 24-hour telephone numbers of the four main cylinder gas companies:

- a. Air Products: 0500 020202
- b. BOC: 0800 111 333
- c. Energas: 01482 329 333
- d. Air Liquide (previously Messer UK): 01675 462 695

e. Flogas

0845 601 6118

48. The telephone numbers above can be used by the emergency services to obtain information such as:

- a. Help with identifying who owns the cylinder and the contact numbers of other gas companies.
- b. What records there are of customer cylinder holdings, type and number.
- c. Help with identifying the cylinder type i.e. LPG, compressed or liquefied gas or acetylene.
- d. A broad description of the wetting test (or arranging for a competent person to be contacted).
- e. How to make heat damaged cylinders safe (valve operation / gas release) at the end of the incident.
- f. How to arrange for cylinder collection at the end of an incident. The numbers can also be used to arrange for a specialist advisor to consult over the telephone or to attend the scene.

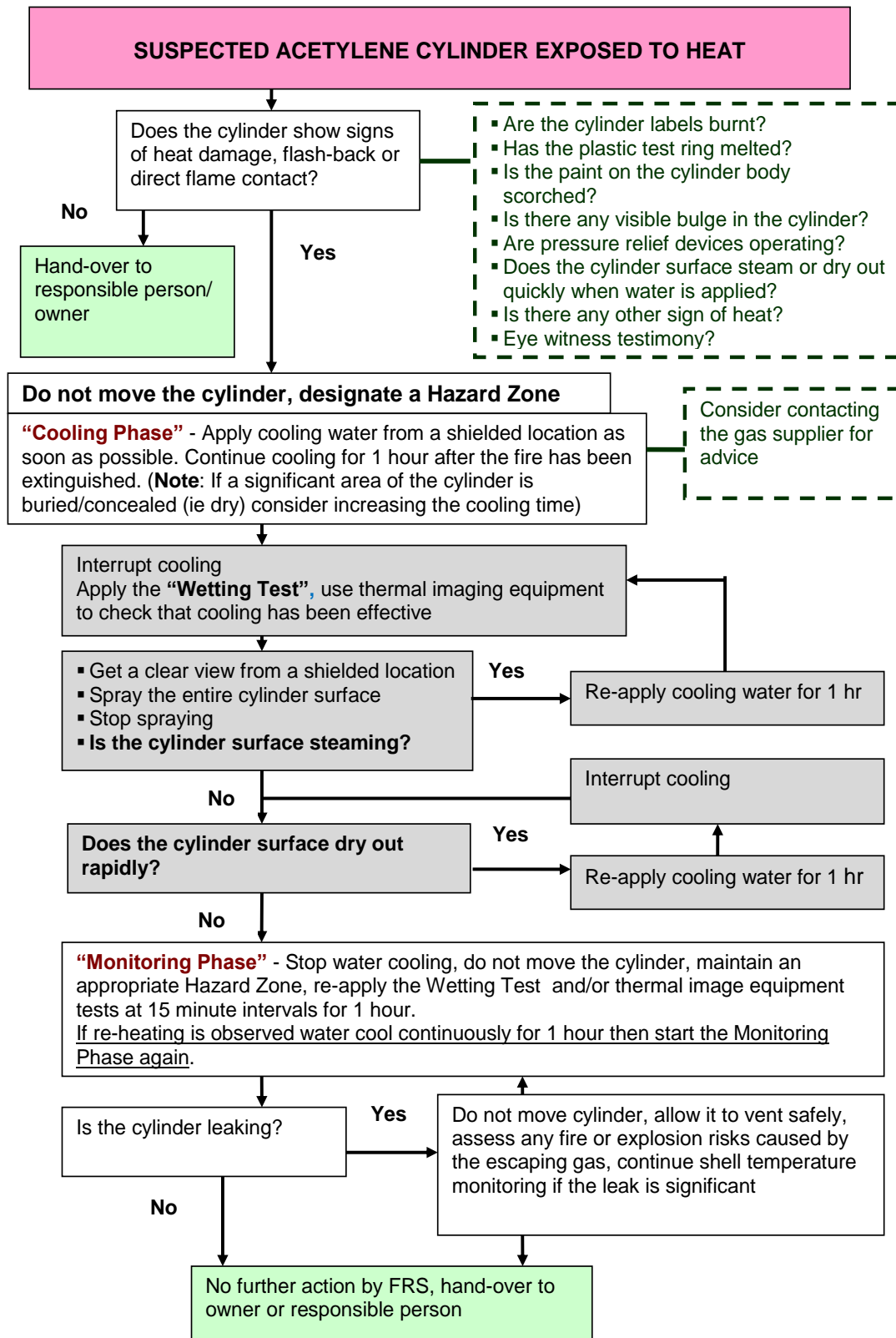
49. **Competent Person.** All gas companies who supply cylinder gases will train Competent Persons to support the Fire Service. The Competent Person will be able to provide advice on all aspects of dealing with gas cylinders involved in a fire. To request a Competent Person to attend the scene contact the gas company that owns the cylinders via the company contact numbers above.

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16. British Compressed Gas Association, Leaflet 6, Cylinders in fires
17. Fire Service Manual, Volume 2, Fire Service Operations, Acetylene and Natural Gas Incidents.



# Annex A - Cylinders Involved in a Fire / Heat Exposure



# Annex B - A Guide to Preparing Emergency Procedures for Compressed Gas Storage Areas

Serial (a)	Action (b)	Remarks (c)
1	State the hazard.	Highlight main safety precautions to be followed. Identify gas storage facilities as a restricted area.
2	Identify the risks.	Type of gases stored. Location of storage area. Degree of security.
3	Identify the areas that might be affected by the risk.	Distance to vulnerable areas (buildings, thoroughfares, etc.). Distance from other dangerous sites (Ammunition dumps, fuel installations, etc.).
4	Consider the best means for raising the alarm.	Shouting a warning is appropriate in relatively quiet small areas only.
5	Detail the locations of alarm systems.	
6	Consider how best to account for those persons within the storage area.	Everyone within the storage areas must be accounted for at all times. At all times, there is to be a nominated person in charge present.
7	Formulate a means of evacuating the storage area	Route plans and line drawings should be employed where practicable. Include evacuation routes and rendezvous points.
8	Detail the location(s) of emergency telephones.	
9	Specify the procedure for alerting the emergency services.	Employ a flow diagram if practicable. Ensure any switchboard or operator services involved have a copy of the plan.
10	Detail the locations of First Aid Fire Appliances (FAFA) and cooling/sprinkler systems.	Seek the advice of the Unit Fire Officer. Detail how personnel will be trained to use the FAFA.
11	Detail the actions to be taken by persons detecting leaks, fires, and other dangerous occurrences.	The actions of each person's unique responsibilities are to be listed in a separate annex. Where groups or teams are responsible for executing the same tasks (cordon controllers, medical teams, etc.) their actions are to be listed in the same annex.
12	Nominate trained persons to undertake specific tasks.	
13	Detail the personal protective equipment (PPE) required by those involved in dealing with incidents.	Include the location of PPE. State the limit of PPE protection and use.
14	Include actions to be taken in the event of predictable local phenomena which have the potential to cause a hazard in a gas storage area.	Extreme weather conditions. Natural phenomena (earth quakes, volcano eruptions, etc.). Operational considerations (effects of enemy weapons, sabotage, etc.).
15	Consider the advice given by the gas supplier and the DFRMO.	
16	Ensure compliance with relevant legislation, Codes of Practice, Guidance Notes and Standards.	BCGA GN15

# Annex C - A Guide to Preparing Emergency Procedures for LPG

## General

1. Any fire involving bulk LPG can be extremely difficult to contain and control. Procedures must be in place to prevent LPG loss due to leakages and also to prevent fires occurring in the vicinity of LPG in use or in storage. Radiant heat reaching a LPG vessel will raise the vapour pressure in the vessel and the Pressure Release Valve (PRV) may operate, releasing LPG vapour.
2. Commercial propane and commercial butane both form flammable mixtures with air, with LPG vapour concentrations of between 2% and 10%. Ignition of an accidental release can occur, resulting in fire or explosion. If ignition of LPG occurs immediately, then it burns in the form of a jet or pool fire. If an LPG cylinder or tank is exposed to flame above the liquid fuel line, it may rupture (BLEVE) causing violent release of the LPG, resulting in a fireball.
4. The possibility of a fire and/or explosion hazard is reduced by the provision of good design, layout, and adequate/appropriate operating procedures (see [Part 2, Vol 2, Chap 6](#)).
5. All persons engaged in the handling of LPG must receive adequate instruction and training to understand the dangers associated with LPG and the actions to be taken in an emergency. In addition they must be fully aware of the duties required of them in accordance with JSP 375 MOD Health and Safety Handbook. Only approved and appropriate PPE is to be worn (see [Part 2, Vol 1, Chap 2](#)).
6. Even with adequate safety systems in place, the potential effects of any fire involving LPG is so great that fire precautions are needed to minimise the risks to equipment and personnel; and to restrict the escalation of the incident (see [Part 2, Vol 2, Chap 6](#)). These precautions must include:
  - a. Protection of plant and equipment especially that not directly involved in the fire.
  - b. Water Supplies both for fire fighting and for fire protection systems.
  - c. Fire and Rescue access both for vehicles and fire fighting operations.
  - d. Arrangements for calling assistance inclusive of the emergency services.
  - e. The provision of any fire suppression systems, which subject to risk assessment unless required by specific regulations shall be designed, installed and commissioned in accordance with the relevant BS/ENs or international (ISO) equivalents.
7. A fire and/or explosion hazard may arise from:

- a. Leakage of LPG and subsequent ignition of flammable gas mixtures.
  - b. Heat from an adjacent fire reaching gas pipes, meters, appliances or compressed gas cylinders and bulk storage vessels.
  - c. LPG plant and cylinders may become damaged by external forces such as vehicles.
8. Various measures can be taken to reduce the risks and these include:
- a. Effective ventilation to ensure dispersal of any leakage.
  - b. Safe siting of meters and LPG storage areas.
  - c. Adequate and appropriate operating practices.
  - d. Appropriate maintenance.
  - e. Adequate and effective staff instruction and training.
9. There are two aspects which must be considered when LPG is used/stored within a building:
- a. LPG cylinders and storage tanks need protecting from a fire in the building.
  - b. The building needs protecting from a fire and from leaks from the LPG cylinders, storage tanks and pipe work.
10. It is therefore important that the risk is assessed in each and every case, and should take cognisance of life safety issues, asset losses; consequential losses and the effect on national and strategic importance (see [Part 2, Vol 2, Chap 8](#)).

## **Specific Emergency Actions**

11. In any fire/incident involving LPG the Local Fire and Rescue Service must be called to the incident. They have the necessary skills and equipment to deal with this type of incident. Once they have arrived they will assume responsibility for fire fighting. The LPG supplier and the owner of the storage vessel(s) should also be informed.
12. When dealing with LPG incidents a careful risk assessment must be undertaken; and the correct PPE equipment, including clothing and head protection, must be used. In many instances the affected area will have been declared a Restricted Area and access to the area strictly controlled by the Authorised Person using a Permit to Work system (see JSP 375, Volume 3), or under the control of a Fire Officer.

13. For gas and LPG leaks non-sparking hand tools and equipment must be used, as specified on the Permit to Work (if appropriate). The hazards to personnel range from cold burns (frost bite), from direct skin contact with LPG; through to heat burns from thermal radiation, from fire and explosion; and exposure to toxic smoke and combustion products (see [Part 2, Vol 1, Chap 2](#)). Any approach must be made from upwind; and you must ensure you have both safe access and egress from the incident. It must be borne in mind that compressed gasses / vapours may cause rupture of the vessels causing in itself changes in the size of the fire and or vapour cloud. If in doubt at all do not approach the incident.

**WARNING: Users must be made aware that any clothing or PPE that becomes “wetted” with LPG remains a severe fire hazard to the user and bystanders until all the LPG gas has been safely vented from it. LPG saturated clothing or PPE may also induce hypothermia or frost bite.**

14. Any LPG equipment or cylinders that may have been affected by an incident (dropped, crushed, etc) must be thoroughly inspected for signs of damage and or leaks, if it is safe to do so. Leaks although not present at the time may well develop and lead to catastrophic failure. Until the inspection and assessment is carried out access to the area must be restricted and if needed the cylinders and or plant should be cooled with water spray. In any case every effort must be made to isolate the fuel supply by closing valves.

15. An exclusion zone, known as a Restricted Area (see JSP 375, Volume 3), must be set up around the incident; wind direction should be taken into account with the evacuation route directed in an upwind direction away from the incident. Everybody should be evacuated from within this exclusion zone and entry prohibited except those authorised by the Authorised Person or Fire Officer, as appropriate. Refer to [Annex A](#) for example gas escape notice.

16. Every precaution must be taken to prevent ignition of the escaping LPG gas / vapour. If safe to do so, then ignition sources should be removed for instance shutting down boilers, stop all smoking and extinguishing naked flames and fires. Electrical equipment must be switched off at a remote point from the leak. Switch off vehicle engines, however vehicles within the exclusion zone must be left there and no attempt should be made to remove them.

17. The exclusion zone must be reviewed constantly as it may be possible to reduce it or may need to be extended as the circumstances require. LPG leaks, especially as a liquid, can remain flammable for considerable distances from the source. This condition is affected by weather conditions and the layout of the site or facility, which must be taken into account when assessing the exclusion zone. Never search for leaks with a naked flame, use only approved detectors.

Size of Leak	Exclusion Zone (m)
Small Vapour Leak (smell of Gas)	30
Large Vapour Leak (Loud hissing sound of gas escaping)	100
Liquid leak (Loud roaring sound)	200

**Table 2.2.5.1** - Suggested Initial Exclusion Zones (also known as a Restricted Area)

18. Should the escaping LPG vapour be ignited and a fire has resulted then every effort should be made, if safe to do so, to isolate the fuel supply, wherever possible. Do not attempt to put out the fire as an assessment will be required, as you may well make the situation worse by introducing an explosion hazard due to the vapour escaping.

19. Should other vessels become threatened by the effects of the fire, then water sprays should be considered to cool the affected surface of the vessels and prevent the pressure building within them. If available, the option to remove LPG cylinders should be taken if safe to do so.

**Note:** This does not apply to acetylene cylinders; they must not be moved or approached for 24 hours (see Part 1, [Chap 9](#)).

20. Additional guidance on specific issues can be found in documentation listed in the Bibliography, any further assistance can be sought from the DFRMO Service Delivery Manager and where appropriate, the relevant Defence Safety Regulator.

21. **Action in the event of a spillage.** An assessment of the quantity, and therefore the actions required to contain and control the spillage will be required, however the general procedure to be followed for a spillage is:

- a. Evacuate the area except for personnel dealing with the emergency.
- b. Do not operate electrical equipment unless flameproof.
- c. Summon the aid of emergency services.
- d. Treat or refer casualties if necessary.
- e. Extinguish naked lights e.g. cigarettes - AVOID MAKING SPARKS.
- f. Isolate power from sources of ignition and ventilate the area.
- g. Position fire fighting equipment.
- h. Try to stop the flow of liquid product.
- i. Cover drains and sewers. Disperse vapour with water spray.
- j. Inform the relevant authorities of the incident

**Notes:**

1. Vapour may collect in confined spaces.
2. Details on the range of Pollution Control Equipment that is available to help stop the flow of liquid product is listed in JSP 317, Part 5, Chapter 6.

## 22. Action in the event of a fire.

### **IN CASE OF FIRE, VACATE THE AREA AND IMMEDIATELY ALERT THE EMERGENCY SERVICES**

- a. Evacuate the area except for personnel dealing with the emergency.
- b. Do not operate electrical equipment unless flameproof.
- c. Summon aid from the emergency services.
- d. Treat or refer casualties if necessary.
- e. Ensure an escape path is always available from any fire.
- f. If gas has ignited, do not attempt to extinguish but, if safe to do so, stop gas flow and allow it to burn out.
- g. Use water spray to cool heat-exposed containers, and to protect surrounding areas and personnel effecting shut-off.
- h. Beware of vapour accumulating to form explosive concentrations. Explosive vapours may travel, be ignited at remote locations and flash back. A water spray may be used for vapour dispersal.
- i. Every precaution must be taken to keep containers cool to avoid the possibility of a boiling liquid expanding vapour explosion (BLEVE).
- j. Pressurised containers are liable to explode violently when subjected to high temperatures

## 23. Extinguishing Media

### **Large Fires**

- a. None. Product flow must be stopped and container cooled by water spray. Water fog should be used to assist approach to source of the fire. Large fires should only be fought by the Fire and Rescue Services.

- b. **DO NOT USE WATER JET**

### **Small Fires**



- a. Use dry powder or carbon dioxide extinguishers
- b. **DO NOT USE WATER OR FOAM**

**Note:** Fires in confined spaces should be dealt with by trained personnel wearing approved breathing apparatus.

## Fire Precautions and Prevention

19. In any fire/incident involving LPG the Local Fire and Rescue Service must be called to the incident. They have the necessary skills and equipment to deal with this type of incident; on arrival they will assume responsibility for fire fighting (see [Part 2, Vol 2, Chap 5](#)), for further details, including suggested Initial Exclusion Zones).

**Note:** These are known as Restricted Areas in JSP 375.

20. LPG storage tanks and vessel should be sited to provide adequate access for the local Fire and Rescue Service and have adequate free ventilation. Access from more than one direction should be provided wherever practicable to enable an escape route and for any fire or spillage to be tackled from up-wind (see [Part 2, Vol 2, Chap 4](#)).

21. If a LPG fire should occur and only if it is safe to do so steps should be taken to cool the vessel and any adjacent storage vessels in an effort to reduce the internal pressure being increased by the action of radiated heat and to minimise LPG discharges through Pressure Relief Valves (PRVs). No attempt is to be made to extinguish the fire until the supply has been isolated, as gas that continues to escape may create an explosive atmosphere (see [Part 2, Vol 2, Chap 4](#)).

22. **Water Supply.** LPG installations are to be provided with a water supply that meets the requirements of CFS for fire fighting which can be useful in several ways, e.g. for cooling storage vessels and containers adjacent to a fire, affording protection to fire fighters during their duties, and for the extinction of fires.

23. Typical water supply systems shall be able to provide the required flow rate for a minimum of 60 minutes. Self-contained water supply systems with re-circulation systems shall be capable of supplying at least 30 minutes supply without recirculation.

24. For LPG installations greater than 25 Tonnes total capacity, the road tanker bay shall be provided with water protection to the level appropriate to the size and type of installation as summarised in [Table 2.2.6.1](#).

25. LPG installations with capacities between 25 Tonnes and 50 Tonnes shall be fitted with deluge systems. These deluge systems shall be capable of achieving a flow rate of 9,8 litres / m<sup>2</sup> / minute (i.e. supply 9,8 litres on every square meter of tank surface area per minute for 60 mins).

26. Fire hydrants, monitors and fixed systems should be designed so that the water supply can be controlled from a remote location in relation to the storage so as to be relatively safe. Any manually operated systems should be clearly identified and the method of operation clearly indicated.

27. Fire hose reels and portable fire fighting equipment must be selected and installed in accordance with CFS. One of these must be within 15 m of any LPG dispenser.

**Note:** Foam extinguishers are not suitable for LPG fires due to the fact that the products are gases at atmospheric temperatures.

28. In addition to the usual water mains with hydrants fitted for the attachment of fire hoses, LPG storage vessels may be equipped with a water spray system utilising non-clogging spray nozzles. When in operation the system is to be capable of enveloping the entire vessel in water spray. This may be used for cooling purposes during periods of exceptionally high ambient temperatures or to protect an adjacent storage vessel or other equipment against radiated heat from fires. A typical design spray rate is a minimum of 9.8 litres/m<sup>2</sup>.

29. The UKLPG recommended fire fighting requirements can be summarised in Table 2.2.6.1; however, DFRMO shall be consulted on the appropriate fire equipment and water supply / hydrant requirements for particular LPG storage facilities.

Bulk LPG Installation Capacity Tonnes (Litres)	Fire Equipment	Water supply / Water Source Use of mains water, hydrants must be approved by DFRMO, Part 2, Vol 2, Para 29
< 1.1 Tonnes (<2500L)	Water supply for Fire Service use <b>And either</b> 2 x 9 kg dry powder extinguishers. and 19 mm fixed hose reel (or extinguishers). <b>OR</b> 4 x 9 kg dry powder extinguishers. <b>OR</b> 2 x 9 kg dry powder extinguishers and 2 x 9 litre water extinguishers	1. Mains water, hydrants. 2. Ponds, canals rivers - see note 1 3. Max distance from vessels 100m-see note 2.
1.1 Tonnes – 25 Tonnes (≈2500L – 56250L)	Water supply for Fire Service use <b>And</b> 2 x 9 kg dry powder extinguishers. <b>And</b> 19 mm fixed hose reel.	1. Mains water, hydrants. 2. Ponds, canals rivers - see note 1 3. Max distance from vessels 100m-see note 2.
25 Tonnes-50 Tonnes (≈56251L – 112500L)	Water supply for Fire Service use <b>And</b> 2 x 9 kg dry powder extinguishers. <b>And</b> 19 mm fixed hose reel. <b>And</b> Fixed or portable monitors for vessels and LPG vehicle bays.	1. Water for deluge system to be supplied from either: a. Bespoke water storage facility – see note 3 b. Mains water, hydrant /other sources – see note 1

#### **Notes**

1. Permission from the owner and EA / SEPA for water abstraction permit. **Natural water supplies i.e. rivers and ponds** must have sufficient capacity **Due regards must be given to climate and potential for drought conditions** – Part 2, Vol 2, Para 23.

2. At remote installations, subject to approval from DFRMO, public water sources more than 100m distance from the vessels and hydrants may be used – Part 2, Vol 2, Para 29.
3. Water storage facility for deluge system must be capable of supplying the deluge requirement - Part 2, Vol 2, Para's 23, 24 and 25.

**Table 2.2.6.1** - Recommended Fire Fighting Requirements - subject to DFRMO FRA, See para 29.

30. Weeds, long grass deciduous shrubs and trees and any combustible material must be removed from LPG Hazardous Areas. Chemical weed killers which introduce a potential fire hazard, such as those containing sodium chlorate or other oxidising agents, should not be used (see JSP 375, Volume 3). Grass cutting within the LPG Hazardous Area shall be strictly controlled using a Permit to Work system issued by the Authorised Person (see JSP 375, Volume 3).

31. The LPG Hazardous Areas should be kept free from a build up of combustible materials such as fallen leaves and grass cuttings, this is particularly important during dry weather.

## Annex D - Gas Escape Immediate Action Poster

# Gas Leak Action

### Action to be taken by person(s) discovering a gas leak

- Attempt to prevent further leakage if considered safe to do so by closing valves or ceasing operations.
- Eliminate any potential sources of ignition.
- Ventilate the area.
- Evacuate to appropriate muster point the gas leak area.
- Establish safety cordon until the area is safe.

*Unit to insert location here – LPG min distance 300m*

Raise the alarm by ringing

**Ext: (Unit to complete)**

and give the following information:

- Name, Rank and Telephone Number.
- Exact location of gas leak (e.g. Unit, Bldg N<sup>o</sup>, Area).
- Type and size of gas leak (cylinder, bulk vessel & product if known).
- Container markings, e.g. HAZCHEM / UN Numbers etc.
- Number of casualties (if known).
- Any additional information.
- If possible, and safe to do so, contact the gas supplier emergency telephone number

*Relevant gas suppliers emergency No -unit to complete)*

**REMAIN AT THE LOCATION UNTIL RELIEVED BY THE INCIDENT COMMANDER**

**Note:** To be affixed onto gas cylinder / bulk LPG compound fence or other applicable location

# 6 - Siting, Commissioning, Transfer, and Decommissioning

DIO SEE Engineering Mechanical AH

## Scope

1. This chapter includes the generic siting board requirements for:
  - a. Gas cylinder compounds.
  - b. Bulk LPG vessel installations.
  - c. Bulk cryogenic installations.
2. For the purpose of this chapter, these will be collectively known as **gas facilities**. Specific requirements for these facilities are detailed in:
  - a. Gas cylinder compounds – Part 2, Vol 1, Chap 9.
  - b. Bulk LPG vessel installations - Part 2, Vol 2.
  - c. Bulk cryogenic installations – Part 2, Vol 1, Chap 11.
2. The installation of gas facilities should be undertaken in accordance with the procedures given in [JSP 434](#) Part Two and [JSP 435 Leaflet 6-7](#), reference is also to be made to [JSP 375](#).
4. A feature common to all new gas facilities is the mandatory requirement for a properly constituted Siting Board at the initiation stage of the project. The Siting Board should be held as early as is practicable for the project.
5. The latest point in time in the project initiation programme for the Siting Board should be when option and feasibility studies are complete and prior to the preparation of the technical brief for the project manager appointed to deliver the project or task. However, before a Siting Board can be convened, a Statement of User Requirement (SUR) or Statement of Requirement (SOR) must have been prepared. A Land Quality Assessment should be conducted either before the Siting Board, or just afterwards, before construction commences. This will ascertain what level of contamination, or pollution may already exist at the site. Land Quality Assessments are conducted by the Military Works Force. Siting of gas facilities is to be carried out in consultation with the regional DFRMO Regional Fire Safety Manager.
6. The Siting Board is a mandatory requirement for all new gas facilities or any significant changes to existing gas facilities. It is the responsibility of the sponsor of the project to task the person responsible for all works services at the base or site to convene the Siting Board. He/she must ensure that all organisations with responsibility for facilities and/or functions which potentially may be affected by the proposed installation are called to the Siting Board. These functions can include explosives, radar, air traffic control and local works staff.

7. The Siting Board will take into account the siting and layout of the gas facility, primarily based on safety, efficiency and economy, having regard to the proximity of associated military installations such as explosive stores, aircraft and aprons, and HM Ships and their associated instruments (e.g. radio, radar and lasers) and living accommodation, where appropriate; in some cases that Local Authority Planning Permission is also required. The amenity value and environmental aspects of the site and its surroundings must be taken into account.

8. In countries outside of the UK, the standards specified in this publication shall be applied unless the host nation requires a higher standard in which case that standard must be applied. In Germany, where the Status of Forces Agreement (SOFA) has precedence, all facilities must be constructed to German Standards irrespective of the standards specified in this publication.

9. Gas facilities must be sited, wherever possible on level, well drained, open and ventilated areas, as far from explosive stores, dangerous goods stores, airfield runways and aircraft taxiways, buildings, sources of ignition and fire as is practicable and, in any case outside the prescribed safety distances for such installations or areas. Consideration must be given to the most efficient traffic flow and proximity to utilities such as water, power and firefighting facilities.

10. When the Siting Board is satisfied that all conditions have been met, it will be empowered to issue the appropriate service document that will authorise the siting of the installation. Siting Boards for all other infrastructure proposals are to ensure that the safety, efficiency and economy, with regard to the proximity of associated Fuels and Lubricants installations, are fully taken into account.

## **Attendees**

11. As a minimum, a properly constituted Siting Board is to comprise of:

A qualified officer/ SNCO / WO from the TLB representing the site (e.g. Army HQ Petroleum Inspectorate for land establishments , Air Comd - Fuels Role Office for RAF Stations etc.).

- a. Representation from DIO.
- b. Management Maintenance Organisation.
- c. AP (Pet), AP (Mech) as applicable.
- d. Project Manager.
- e. Contractor of development.
- f. DFRMO Regional Fire Safety Manager.
- g. Unit / Station H&S / Environment Officer.
- h. Proposed Operator.

12. The following may also be required:

- a. Ammunition Technical Officer.
- b. Communications Officer / Radiation Hazard Officer.

13. It is the responsibility of the Chairman of the Siting Board to ensure that gas facilities comply with all current and foreseeable legislation and MOD regulations relevant to the new construction. Any existing or intended encroachment must also be examined to ensure that the combined hazard will be manageable. Measures may need to be taken beyond those stated in this document to comply with any applicable legislation.

16. The unit officer responsible for gas facilities shall provide the board with local information pertaining to the site, types of gas cylinders, bulk storage, and the quantities to be stored. Advice may also be sought from [DIOSDEUS-EnDel1a1@mod.gov.uk](mailto:DIOSDEUS-EnDel1a1@mod.gov.uk) Utilities. Siting Board members should also consult with one another.

## **Siting Constraints**

15. The siting of gas facilities are subject to certain constraints, known as separation distances, which require hazardous substances to be separated from other hazards and hazardous substances. This applies to the separation of various gas cylinders within the stores; separation from other hazardous materials such as explosives, fuels and lubricants; separation from other hazardous energy sources, such as radio transmitters and power cables; separation from “vulnerable populations”; and separation from the site boundaries.

16. Gas facilities shall have well defined boundaries; have appropriate ventilation for the type of gases stored and shall be located with due regard to the respective separation distances and the potential hazards of the particular gases it contains (refer to the relevant Safety Data Sheets).

17. When complete, but prior to commissioning, the Maintenance Management Organisation must obtain to their satisfaction a Certificate of Fitness for Purpose (CFFP) for the new or modified gas facility. The project manager, the Maintenance Management Organisation, or the contractor may issue this certificate. The certificate must state that the facility has been constructed, or modified, in conformance with the approved design and that it is fit for its intended purpose.

18. The certificate must be counter-signed by:

- a. Project manager.
- b. AP (Petroleum).
- c. DFRMO Regional Fire Safety Manager.

## **Handover / Commissioning**



19. Commissioning of the gas facility is a contractor's responsibility. To commission an installation, the appropriate live product(s) must be used. Prior to receiving live product, a CFFP must be issued and approved by the Maintenance Management Organisation.

20. Once the gas facility has been commissioned, the Acceptance and Handover Plan produced, and the system is considered ready for take-over by the Services, the original Siting Board is to re-convene as an Acceptance/Handover Board (refer to [JSP 434](#), Part Two).

21. The Acceptance/Handover Board is to ensure that the gas facility has been constructed in accordance with all safety and legislative requirements, has been correctly commissioned and is in a fit and proper state for take-over by the user. When the Acceptance/Handover Board is satisfied that all conditions have been met, it is empowered to issue the appropriate Service document that will authorise take-over of the facility. This document is to be signed by all members of the Acceptance/Handover Board and, in particular, is to accept the installation for the following reasons:

- a. For use: by the Operating Authority.
- b. For maintenance: by the Maintenance Management Organisation.

22. As part of the take-over process, the Project Manager / Design Authority/ Original Equipment Manufacturer shall provide suitable and applicable written instructions (Written Schemes of Examination), maintenance procedures, safety precautions and operating instructions to the Maintenance Management Organisation (MMO), AP(Petroleum), AP(Mechanical), maintainers, and the operators of the installation. An appropriate record of those personnel who have received training is to be maintained by the Operating Authority / MMO as applicable.

23. Once accepted, all future responsibility for the gas facility (maintenance and operator training) shall be the responsibility of the MMO.

## Existing Installations

24. The regulations contained in Part 2 are generally applicable to new gas facilities and to those installations which are subject to significant modification. There may be older facilities which do not fully conform to the new build requirements, such as Zoned electrical installations to the BS 5501 series specifications rather than the newer BS EN 50014 specification.

25. The approach selected for evaluating such older gas facilities is for the officers responsible for the facilities in question to note the areas of non-compliance and to perform or manage an assessment of the risks to gain an indication of the impact of the non-compliance. The risk areas appropriate to the particular non-compliance can include levels of maintenance, safety and environmental issues. The output of the assessment can then be used as a basis for decision making regarding the continued operation of the facility and the need for development. The non-compliance areas and the assessments must be recorded.

26. However, when a one-for-one replacement is carried out for an existing gas facility; the new system must comply with all mandatory legal requirements, such as Pressure Systems Regulations, Gas Safety (Installation and Use) Regulations, Dangerous Substances and Explosive Atmospheres Regulations (DSEAR), etc. Refer to JSP 375.

## Transfer, Closure and Decommissioning

27. **Transfer.** Operating authorities are required to inform the FGSR when planning a unit move or the transfer of site ownership from one TLB to another. JSP 375 Volume 2 Leaflet 16 should be consulted.

28. **Closure.** For units/sites that are closing, Defence Infrastructure Organisation Functional Standard, Design and Maintenance Guide 12 - Site Closure Guide is to be consulted. Gas facilities should be considered for retention if DIO advise that they would add to the value (and therefore receipt) of the site. For bulk LPG / cryogenic facilities, DIO utilities [DIOSDEUS-EnDel1a1a@mod.gov.uk](mailto:DIOSDEUS-EnDel1a1a@mod.gov.uk) and [LEIDOS-TVS-OLG-TeamLead@mod.gov.uk](mailto:LEIDOS-TVS-OLG-TeamLead@mod.gov.uk) shall be informed for cessation of bulk LPG / LOx deliveries, and for bulk vessel contractors to consider removal of their leased assets.

29. **Decommissioning.** Units no longer wishing to retain a gas facility must consult with their TLB for agreement to decommission. FGSR are to be informed and may be approached for advice in the first instance. There are three states in which the installation can exist; In Use, Temporarily decommissioned, or decommissioned.

30. **Temporary Decommission (TD).** A unit wishing to assess the need to retain a gas facility without decommissioning it may TD the facility for a maximum period of 1 year. In this circumstance, the facility must be made safe electrically, mechanically and to the environment. This should be carried out in accordance with current DIO guidance. A decision is to be made in-year either to re-commission the facility, or to decommission.

31. **Permanently Decommissioned.** The unit starts a programme of de-commissioning and removal or making inert, a Land Quality Assessment (LQA) is required. The works budget (Long Term Costing) reflects the costs and date for completion. Current guidance applies.