



TECHNICAL INFORMATION SHEET 15

Revision 1: 2015

MODEL RISK ASSESSMENT FOR THE STORAGE AND USE OF GAS CYLINDERS FOR OXY-FUEL APPLICATIONS

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BRITISH COMPRESSED GASES ASSOCIATION

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INTRODUCTION

Every day thousands of gas cylinders are used in the workplace or transported by road without incident. However, if gas cylinders are involved in a fire the emergency services have specific Hazmat guidance to follow, this can cause local disruption as the emergency services set up a cordon around the incident scene and take the necessary action to make the area safe.

Most of the reported incidents would not have happened if users:

- Fully understood the properties of the gases and the associated hazards
- Were properly trained on how to use oxy-fuel equipment
- Followed guidance on the safe transportation, handling and storage of gas cylinders

Five separate model risk assessments have been produced in order to assist users with managing the hazards associated with the following activities:

- 1 - Oxy-fuel cylinders / package outdoor storage.
- 2 - Oxy-fuel cylinders / package indoor storage.
- 3 - Oxy-fuel cylinders / package use.
- 4 - Oxy-fuel cylinders / package use at height.
- 5 - Oxy-fuel cylinders / package, transportation.

For instructions on how to use the model risk assessments refer to " How to carry out the assessment" page.

NOTE: The oxy-fuel package referred to in this document typically consists of an oxygen cylinder, a fuel gas cylinder, for example acetylene, gas regulators for both gases, flashback arrestors fitted to both regulator outlets, oxy-fuel hose assembly fitted with check valves / non-return valves (NRV) at the gas torch or blowpipe end, gas torch or blowpipe and cylinder trolley.

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Where this document is downloaded as an Excel Spreadsheet the user has the option of amending the contents and, as such, it is beyond the direct control of the BCGA. In this situation the user takes full responsibility for the contents of the document.

HOW DO YOU RATE RISK?

Risk is a combination of the likelihood of an incident occurring and the severity of the injury or loss due to the incident. The Likelihood versus Severity Matrix below provides an example of risk rating.

NOTE: Companies may use variations on these Likelihood / Severity criteria.

Likelihood / Severity Matrix

		Risk Rating		
LIKELIHOOD	High	Medium	High	Severe
	Medium	Low	Medium	High
	Low	Insignificant	Low	Medium
		Low	Medium	High
		SEVERITY (LOSS)		

Likelihood: Based on the precautions/controls in place to prevent an incident occurring.

High:	Where no precautions are put in place and the employee can only avoid an incident by following verbally communicated procedures - which typically are only short term. No physical barriers or controls in place.
Medium:	Limited physical barriers or controls in place. The employee can only avoid an incident by working carefully, following training, work instructions and safety procedures.
Low:	Physical barriers or engineering controls such as Flashback Arrestors and Non Return Valves in place to minimise the likelihood of an incident.

Severity: The degree of injury to the employee or third party, or the cost of loss due to property damage.

Personal Injury

High:	Death or disabling injury.
Medium:	Serious injuries requiring medical treatment and time off from work.
Low:	Minor injuries.

Loss

		Business Size	
		Large	Small
High:	Where the cost of the incident would exceed:	£100,000	£20,000
Medium:	Where the cost of the incident is between:	£10,000 & £100,000	£2000 & £20,000
Low:	Where the cost of the incident could reasonably be expected to be less than:	£10,000	£2,000

HOW TO CARRY OUT THE ASSESSMENT

The risk assessment should be carried out by persons who have been trained in the use of oxy-fuel gas equipment and understand the concept of risk assessment.

1	Select the Risk Assessment form for the activity to be risk assessed.
2	Enter details in required fields at the top of the Risk Assessment form.
3	For each Situation / Activity record the existing control measures in place beside each of the applicable recommended control measures.
4	Based on a comparison of the existing control measures in place against the suggested control measures stated carry out risk rating for each situation / activity by entering a rating of Low, Medium or High for both the Severity and the Likelihood .
5	Using the Risk Rating Matrix determine the level of risk and enter the result in the Risk Rating column. Examples: 1. If Likelihood is Low , and Severity is Medium , Risk rating is Low . 2. If Likelihood is High , and Severity is Medium , Risk rating is High .
6	Decide the result for level of control and enter it onto the Risk Assessment form in the appropriate column (Result). There is a link between the Risk Rating and the Result as follows: Risk Rating = <u>Insignificant (IR)</u> , Result is likely to be <u>Adequately Controlled</u> . Risk Rating = <u>Low Risk (LR)</u> , Result is likely to be <u>Adequately Controlled or Minor Residual Risk</u> . Risk Rating = <u>Medium Risk (MR)</u> , Result is likely to be <u>Minor Residual Risk or Not Adequately Controlled</u> . Risk Rating = <u>High Risk (HR) or Severe Risk (SR)</u> , Result is likely to be <u>Not Adequately Controlled</u> .
7	If the result is " Not Adequately Controlled " decide what action is required to reduce the risk to as low as reasonably practicable (ALARP) and record the same in the Remedial Action column.
8	Do not continue with the activity until risk is reduced to as low as reasonably practicable (ALARP).

REFERENCES

- 1) SI 2002 No. 2677 The Control of Substances Hazardous to Health Regulations 2002 (COSHH)
- 2) SI 2002 No. 2776 The Dangerous Substances and Explosive Atmosphere Regulations 2002 (DSEAR)
- 3) SI 2009 No. 1348 The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009 (as amended)
- 4) SI 2014 No. 1639 The Acetylene (England, Wales and Scotland) Regulations 2014
- 5) ECE/TRANS/242 European Agreement concerning the International Carriage of Dangerous Goods by Road
- 6) BS EN 560 Gas welding equipment. Hose connections for equipment for welding, cutting and allied processes.
- 7) BS EN 1256 Gas welding equipment. Specification for hose assemblies for equipment for welding, cutting and allied processes.
- 8) BS EN ISO 3821 Gas welding equipment. Rubber hoses for welding, cutting and allied processes.
- 9) BCGA Code of Practice 7 The safe use of oxy-fuel gas equipment (individual portable or mobile cylinder supply).
- 10) BCGA Code of Practice 31 The safe storage and use of cylinders in mobile workshops and service vehicles.
- 11) BCGA Guidance Note 2 Guidance for the storage of gas cylinders in the workplace.
- 12) BCGA Guidance Note 3 Safe cylinder handling and the application of the manual handling operations regulations to gas cylinders.
- 13) BCGA Guidance Note 27 Guidance for the carriage of gas cylinders on vehicles.
- 14) BCGA Technical Information Sheet 18 Gas equipment inspection/replacement date marking.
- 15) BCGA Technical Information Sheet 24 Welding Fumes. Safety Alert.
- 16) BCGA Technical Information Sheet 26 Model risk assessment for the transport of gas cylinders.

Further information is available at:

www.legislation.gov.uk	UK Legislation
www.hse.gov.uk	Health and Safety Executive (HSE)
www.bsigroup.co.uk	British Standards Institute (BSI)
www.bcgga.co.uk	British Compressed Gases Association (BCGA)
www.uklpg.org	The UK Trade Association for LPG



Model risk assessment for the outdoor storage of oxygen and fuel-gas cylinders

Assessment Date

Assessed by

Location

Reviewed by

Workplace /Premises Description

Review Date

No.	Situation / Activity	Hazard	Persons Affected	Recommended Control Measures	Existing Control Measures	Likelihood L-M-H	Severity L-M-H	Risk Rating	*Result M-A-N	Remedial Action Plan
1	Store design. Refer: BCGA GN2	Injury to persons or damage to property if cylinders are accessed / handled incorrectly by unauthorised persons. External fire or heat impacting on cylinders in storage could cause catastrophic failure of the cylinders due to overheating.	Persons or property within the cylinder storage area or in the surrounding area.	1.1 In an external location						
				1.2 Cylinders should be stored in a secure lockable enclosure that prevents access to unauthorised persons. Enclosure should be designed and constructed from appropriate, robust, materials suitable for the location and possible risks e.g. palisade to prevent theft or access by unauthorised persons (such as children).						
				1.3 Good ventilation with natural circulation of air.						
				1.4 No sources of ignition, or materials which will allow a fire to spread.						
				1.5 Display safety signs and warning notices at access points to the cylinder storage area Refer: HSE L64.						
2	Storage of oxygen & fuel-gas cylinders in outdoor storage area. Refer: BCGA GN2	Injury to persons or damage to property if cylinders are accessed / handled incorrectly by unauthorised persons. External fire or heat impacting on cylinders in storage could cause catastrophic failure of the cylinders due to overheating.	Persons or property within the cylinder storage area or in the surrounding area.	2.1 The store is designated and used only for the storage of gas cylinders.						
				2.2 Close gas cylinder valve. Remove the cylinder key from the valve.						
				2.3 Cylinders must be stored in the upright position on a firm level surface. Cylinders are to be kept upright, and secured, for example, by the use of straps or chains.						
				2.4 Comply with minimum recommended safety distances. Store cylinders containing flammable gases at least 3 metres away from flammable / combustible materials e.g. wood, flammable liquids, paper etc.						
				2.5 As necessary, segregate different hazard classes, full and empty cylinders, and ensure adequate internal signage identifying the products being stored. Refer: HSE L64.						
				2.6 Carry out routine management checks to ensure the cylinders in the store remain in a safe condition.						
				2.7 Carry out routine management checks to ensure the store remains safe for the storage of gas cylinders.						
3	Storage of oxygen and fuel-gas package in an outdoor storage area. Refer: BCGA GN2	The impact of external fire or heat could cause catastrophic failure of the cylinders due to overheating.	Persons or equipment working in the vicinity of the package.	3.1 Close gas cylinder valves. Remove the cylinder key from each valve.						
				3.2 Vent the torch, hoses and pressure regulator.						
				3.3 Back-off the pressure adjusting screw on regulators.						
				3.4 Roll up gas hoses then store hoses and torch on the appropriate stowage point on the package.						
				3.5 Store the package in a secure location away from flammable / combustible materials such as flammable liquids, wood, paper, textiles, packaging or plastics and sources of ignition e.g. naked flames etc.						



Model risk assessment for the outdoor storage of oxygen and fuel-gas cylinders

Assessment Date

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Workplace /Premises Description

Review Date

No.	Situation / Activity	Hazard	Persons Affected	Recommended Control Measures	Existing Control Measures	Likelihood L-M-H	Severity L-M-H	Risk Rating	*Result M-A-N	Remedial Action Plan
4	Empty cylinder abuse / waste	Cylinder fire due to ignition of residual gas or hydrocarbon contamination.	Persons or property in the vicinity of the gas cylinders.	4.1	Close cylinder valves on empty cylinders and return the cylinders to designated storage area.					
				4.2	Cylinders should never be considered to be completely empty as they will always contain residual gas. Hence the safety precautions applied to full cylinders should continue to be applied to empty cylinders.					
				4.3	Any cylinders that are damaged are to be identified as such, and the gas supplier informed.					
				4.4	Always return empty cylinders to the gas supplier, or agent, as soon as is reasonably practicable.					
5	Manual handling of gas cylinders Refer: BCGA GN3	Manual handling injury or damage to property if cylinders are handled incorrectly.	Persons or equipment in close proximity to the cylinders.	5.1	All persons required to handle gas cylinders or packages are to have had adequate training in manual handling.					
				5.2	Cylinders are heavy and need to be handled with care. If you are moving large cylinders use suitable mechanical aids, such as a trolley, or seek help.					
				5.3	Do not drop gas cylinders and never try to catch a falling cylinder.					
				5.4	Cylinders should not be left freestanding. They should be secured in a suitable cylinder trolley, cylinder support bracket or placed in a cylinder pen.					
6	Maintain an inventory of gas cylinders	Injury to Fire and Rescue Service personnel due a lack of knowledge of what gas cylinders are present in the fire zone.	Fire and Rescue Service personnel in the fire zone.	6.1	Users shall maintain an inventory of gas cylinders stored on site (location and quantity). This information may be requested by the emergency services in the event of an incident. Refer: HSE L64					
				6.2	Have a Safety Data Sheet available for each gas product stored.					
				6.3	Carry out routine management checks to ensure the inventory remains up-to-date and that the store remains safe for continued use.					

Key to Result: M = Minor Residual Risk (monitor) A = Adequately Controlled N = Not adequately Controlled (stop work and improve controls)



Model risk assessment for the indoor storage of an oxygen and fuel-gas package

Assessment Date

Assessed by

Location

Reviewed by

Workplace /Premises Description

Review Date

No.	Situation / Activity	Hazard	Persons Affected	Recommended Control Measures	Existing Control Measures	Likelihood L-M-H	Severity L-M-H	Risk Rating	*Result M-A-N	Residual Action Plan
1	Store design. Refer: BCGA GN 2	Injury to persons or damage to property if cylinders or package is accessed / handled incorrectly by unauthorised persons.	Persons or property in the vicinity of the cylinders / package.	1.1	A store in an external location should always be the first option for storing gas cylinders. Where this is not possible a documented justification process shall be undertaken to justify indoor storage.					
				1.2	Ensure the premises insurers are notified that gas cylinders are being stored and adequate cover is provided.					
				1.3	Internal store design shall meet the requirements of BCGA GN 2.					
				1.4	Carry out a risk assessment to confirm the suitability of the store and any control measures necessary.					
				1.5	Carry out a DSEAR risk assessment. As appropriate, protected electrical fittings are to be installed.					
				1.6	Adequate ventilation required.					
				1.7	Gas detection may be required.					
				1.8	Cylinders / package should be stored in a secure area with access limited to trained and authorised persons.					
				1.9	Display safety signs and warning notices. Refer: BCGA GN 2 & HSE L64.					
2	Storage of oxygen and fuel-gas package indoors.	Injury to persons or damage to property if package is accessed / handled incorrectly by unauthorised persons.	Persons or property in the vicinity of the package.	2.1	Only those cylinders in-use may be stored indoors. Spare gas cylinders should be stored in an external store.					
				2.2	Close gas cylinder valves. Remove the cylinder key from each valve.					
				2.3	Vent the torch, hoses and pressure regulator.					
		2.4		Back-off the pressure adjusting screw on regulators.						
		2.5		Roll up gas hoses then store hoses and torch on the appropriate stowage point on the package.						
		2.6		Store the package away from flammable / combustible materials such as flammable liquids, wood, paper, textiles, packaging or plastics and sources of ignition e.g. naked flames etc. Refer: BCGA GN2						
Key to Result:		M = Minor Residual Risk (monitor) A = Adequately Controlled N = Not adequately Controlled (stop work and improve controls)								



Model risk assessment for the use of oxygen and fuel-gas packages

Assessment Date

Assessed by

Location

Reviewed by

Workplace /Premises Description

Review Date

No.	Situation / Activity	Hazard	Persons Affected	Recommended Control Measures	Existing Control Measures	Likelihood L-M-H	Severity L-M-H	Risk Rating	*Result M-A-N	Residual Action Plan
1	Incorrect use of an oxygen and fuel-gas package. Refer: BCGA CP 7	Fire resulting from the incorrect use of the package e.g. regulator pressures set wrongly, incorrect torch light up / shutdown procedure used causing a back fire or flashback.	Persons or property in the vicinity of the package.	1.1	No one should use oxy/fuel gas equipment unless they have received adequate training. For example in:- Properties of the gases; The safe use of the equipment; Precautions to be taken; The use of fire extinguishers; The means of escape, raising the fire alarm and calling the Emergency Services.					
				1.2	Understand the hazards and safety precautions required for each gas. Read the Safety Data Sheet. Carry out a COSHH assessment.					
				1.3	As flammable and oxidant gases are in use, a DSEAR risk assessment is required.					
				1.4	After undertaking a risk assessment, the correct Personal Protective Equipment (PPE) should be selected to match the process typically the following are needed - welding gloves, leather apron, suitable coverall and foot protection, eye and head protection.					
				1.5	Protect against the hazard of welding fume. Use appropriate Local Exhaust Ventilation. Refer: BCGA TIS 24					
		1.6		Consider the long term health benefits of a pneumonia vaccination for employees regularly exposed to welding and metal fume.						
		1.7		Procedures for the safe use of the equipment should be readily available for users. Carry out routine inspection of all gas equipment including an annual inspection, conducted by a competent person. Ensure components with an expiry life are in-date for use.						
		1.8		Carry out pre-use equipment checks on the oxygen and fuel-gas package. Refer: HSE HS(G) 139						
		1.9		NEVER use oxygen for dusting down work benches, machinery or clothing.						
2	Use of faulty or incorrect gas equipment.	Fire resulting from the use of faulty or incorrect equipment (regulator, flashback arrestors, torch, hoses, etc.)	Persons or property in the vicinity of the package.	2.1	Only use equipment manufactured to the appropriate standard(s), supplied by a reputable equipment supplier.					
				2.2	Check equipment is within its accepted life. Refer: BCGA TIS 18					
				2.3	Use only equipment which is compatible with the gas service.					
				2.4	Once a component has been used in one gas service, do not use in another gas service.					
				2.5	Replace damaged or defective equipment before use.					

3	Accidental ignition of flammable materials during metal cutting or welding.	If the package is used close to flammable liquids or solids these can be ignited by sparks from the gas cutting or welding activity. The package could also be impacted by the resulting fire.	Persons or property in the vicinity of the package.	3.1	Clear the immediate work area of any flammable materials and or put in place suitable fire screens or blankets to prevent contact between sparks and flammables.						
				3.2	If working close to compartment walls where heat may be a hazard on the opposite side, post a look-out to monitor for fire.						
				3.3	If the package is to be used in a non-routine work area then a safe system of work is required, e.g. Permit to Work.						
4	Hose damage during metal cutting / welding or hose leaking due to aging.	Fuel gas release could cause a fire if ignited and the fire could impact on the gas cylinders or the gas cylinders are depressurised.	Persons or property in the vicinity of the package.	4.1	Position gas hoses out of the line of fire from the flame or metal sputter.						
				4.2	Where hoses are attached together use proprietary clips. Do not tape hoses together (this can impair visual inspection).						
				4.3	Only use hoses of an appropriate length. Keep as short as practical. As necessary keep the gas cylinders close to the work area.						
				4.4	Extended hoses are only to be used where it is unavoidable. Where joints are used they are to comply with BS EN 560. NOTE: Extended hoses may affect the gas flow rate.						
				4.5	Hoses are to be fully uncoiled during use.						
				4.6	Hoses shall be manufactured to BS EN ISO 3821 and correctly coloured for the gas service i.e. blue for oxygen and red for acetylene. The hose assembly should be to BS EN 1256.						
				4.7	Never hang up the welding or cutting torch whilst still alight.						
5	Residual hot spot or smouldering fire after metal cutting or welding.	Localised fire escalating to a major fire.	Persons or property in the vicinity of the fire.	5.1	Carry out work site inspection after completion of hot work to ensure there are no residual hot spots or smouldering fires that could escalate to a large fire.						
6	The use of Flash Back Arrestors. NOTE: Mandatory under the Acetylene Safety Regulations.	Fire caused by the use of a package which has not had flash back arrestors fitted.	Persons or property in the vicinity of the package.	6.1	Flash Back Arrestors shall be fitted to the outlet of both the oxygen and the fuel-gas pressure regulators. Refer: BCGA CP 7						
				6.2	Flash Back Arrestors shall comply with BS EN 730.						
				6.3	With extended hoses a Flash Back Arrestor should be fitted at the torch end.						
				6.4	Replace disposable Flash Back Arrestors after a flashback or backfire.						
				6.5	Flash Back Arrestor's of the resetable type should be reset as per the manufacturers instructions.						
				6.6	Resetable Flash Back Arrestors shall be replaced after 5 years or at the manufacturers recommended intervals.						
				6.7	The causes for a flashback or backfire shall be investigated to identify any damaged or faults to the equipment (particularly the nozzle) before trying to reuse the oxygen and fuel-gas package.						
				6.8	Regular occurrences of flashbacks or backfires are indications of poor welding practice and the need for retraining.						

7	Hose check valves / Non Return Valves (NRV)	Fire affecting the package and the surrounding area.	Persons or property in the vicinity of the package.	7.1	Non Return Valves should be fitted on the hose end connecting to the blowpipe or torch.						
8	Pressure Regulators	Fire affecting the package and the surrounding area.	Persons or property in the vicinity of the package.	8.1	Use the correct pressures and nozzle size for the job. In particular for acetylene the pressure shall not exceed 1.5 bar.						
				8.2	Ensure regulators are matched with their gas service; An acetylene regulator shall only be used in acetylene service; An oxygen regulator only used in oxygen service; A propane regulator used only in propane service. All regulators to be labelled accordingly.						
				8.3	Regulators should be replaced every 5 years or at the manufacturers recommendation. Refer: BCGA CP7						
				8.4	Regulators with damaged gauges or connectors shall not be used and should be replaced. Refer: BCGA CP7						
				8.5	Never attempt to force a regulator connection onto the cylinder (fuel-gases have left hand threads, oxygen has a right hand thread).						
				8.6	Use clean hands or gloves when assembling oxygen equipment e.g. attaching a regulator to a new cylinder or attaching the hoses to the blowpipe or torch. DO NOT USE OIL OR GREASE during assembly.						
				8.7	Always back off the regulator adjusting screw when not in use.						
9	Oxygen and hydrocarbon reaction	Fire affecting the package and the surrounding area.	Persons or property in the vicinity of the package.	9.1	Never attempt to lubricate or use thread sealing tape on gas sealing surfaces.						
10	Empty Cylinder abuse / waste	Cylinder fire due to ignition of residual gas or hydrocarbon contamination.	Persons or property in the vicinity of the gas cylinders.	10.1	Close cylinder valves on empty cylinders and return the cylinders to designated storage area.						
				10.2	Cylinders should never be considered to be completely empty as they will always contain residual gas. Hence the safety precautions applied to full cylinders should continue to be applied to empty cylinders.						
				10.3	Any cylinders that are damaged are to be identified as such, and the gas supplier informed.						
				10.4	Empty cylinders should be stored in a secure area prior to returning to gas supplier. Always return empty cylinders to the gas supplier, or agent, as soon as is reasonably practicable.						
Key to Result:		M = Minor Residual Risk (monitor) A = Adequately Controlled N = Not adequately Controlled (stop work and improve controls)									



Model risk assessment for the use of oxygen and fuel-gas packages at height

Assessment Date

Assessed by

Location

Reviewed by

Workplace /Premises Description

Review Date

No.	Situation / Activity	Hazard	Persons Affected	Recommended Control Measures	Existing Control Measures	Likelihood L-M-H	Severity L-M-H	Risk Rating	*Result M-A-N	Residual Action Plan
1	Lifting the package or cylinders for use at height on a construction site.	If cylinders are dropped from height the valve could shear off on impact with the ground and gases released and fuel gas ignited.	Persons or property below or in the vicinity of the dropped cylinders.	1.1 Lifting of the package for working at height should be avoided, e.g. by use of extended hoses or temporary piped supply. Where this can not be avoided cylinders should be lifted in a proprietary lifting cage or trolley. The cylinder should not be lifted by it's valve or valve guard.						
		Injury to persons below.		1.2 Where practical, use smaller (suitable for manual handling) cylinders.						
				1.3 Conditions on the ground below the lift should be taken into consideration before attempting to lift the package e.g. traffic movements or pedestrians.						
2	Use of an oxygen and fuel-gas package at height.	The package is used close to flammable liquids or solids which are then ignited by sparks from the gas cutting or welding activity. The package could also be impacted by the resulting fire.	Persons or property in the vicinity of the package and on the ground below.	2.1 Clear the immediate work area of any flammable materials and/or put in place suitable fire screens or blankets to prevent contact between sparks and flammables.						
				2.2 The package should only be used at height for the duration of the job, then returned to ground level after use.						
				2.3 Check that the platform on which the gas equipment and the welder have to operate is capable of taking their combined weight, and/or any side forces associated with the use of extended hoses.						
				2.4 At height, there may be additional hazards, such as working in a confined space and the availability of adequate ventilation. If a confined space carry out a confined space risk assessment.						
				2.5 The extent of the spread of sparks and metal spatter needs to be considered as it may have an impact at lower levels e.g. sparks or spatter falling through a mezzanine platform onto a lower level and igniting a flammable material or harming passers by.						
				2.6 If the package is to be used in non-routine work area then a safe system of work is required.						

Key to Result: M = Minor Residual Risk (monitor) A = Adequately Controlled N = Not adequately Controlled (stop work and improve controls)



Model risk assessment for the transport of oxygen and fuel-gas cylinders in vehicles

Assessment Date

Assessed by

Location

Reviewed by

Workplace /Premises Description

Review Date

No.	Situation / Activity	Hazard	Persons Affected	Recommended Control Measures	Existing Control Measures	Likelihood L-M-H	Severity L-M-H	Risk Rating	*Result M-A-N	Residual Action Plan
1	Transportation of an oxygen and fuel-gas package in a closed vehicle (service vans not included). Refer: BCGA GN 27	Fire and or explosion if the vehicle is involved in a fire and the package is engulfed in the flames or heated to very high temperature.	Vehicle driver, passengers, passers-by, emergency services or property in the vicinity of the vehicle.	Gas cylinders are classified as Dangerous Goods and are therefore covered by the UK Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations (these implement the European Agreement concerning the International Carriage of Dangerous Goods by Road,(ADR)). However, these regulations apply to the transport of cylinders using commercial vehicles and NOT the carriage of cylinders in private vehicles. The transport of any gas cylinder in an enclosed vehicle is potentially dangerous, hence the use of an open vehicle or trailer is highly recommended. Refer: BCGA GN 27 & TIS 26. The following precautions need to be taken:						
				1.1	The driver has adequate training about the properties and hazard of the gases being transported and knows what to do in an emergency situation.					
				1.2	The quantity of gas cylinders being carried has been calculated as being below or above the threshold level. The appropriate level of compliance with ADR is applied. The correct paperwork for the journey is available.					
				1.3	The number of cylinders to be transported is limited to the strict minimum.					
				1.4	Ensure that cylinder valves are closed and not leaking. Never transport a cylinder if a leak has been detected on it.					
				1.5	Avoid transporting gas cylinders in the passenger compartment.					
				1.6	Cylinders must be adequately secured against movement and should be in an upright position during transport. Consider the forces involved in a traffic accident.					
				1.7	A minimum of a 2 kg fire extinguisher is required on the vehicle. It is serviceable and the driver has been trained in its correct operation.					
				1.8	Ensure the space occupied by the cylinders is well ventilated. Vehicle air conditioning should be set to circulate air from outside of the vehicle. Open windows.					
				1.9	Never transport gas cylinders with regulators or other equipment attached.					
				1.10	It is always good practice to apply signage to inform the emergency services that gas cylinders are being carried on board.					
				1.11	The journey should be kept as short as possible and cylinders should be removed from the vehicle soon after arrival at the destination.					
				1.12	Do not leave cylinders stored in vehicles, however if the cylinders have to be left in a vehicle for short periods then ensure the vehicle is in a secure / safe parking area and locked.					
	1.13	For acetylene cylinders, if transported horizontally, stand upright for a minimum of 30 minutes before use.								
	Moving load due to vehicle collision could seriously injure driver, passengers or occupants of other vehicles involved.									
	Gas cylinders may be ejected from the vehicle. Hazard from flying objects and a potential release of gas away from the vehicle. Hazard to members of the public.									

2	Service vans equipped with an oxygen and fuel-gas package. Refer: BCGA CP 31	Fire and or explosion if the vehicle is involved in a fire and the package is engulfed in the flames or heated to very high temperature.	Van driver, passengers, persons or property in the vicinity of the vehicle.	2.1	Cylinders must be properly secured in a suitable stowage and stored in an upright position.						
				2.2	As necessary, vehicle should be marked and labelled to comply with ADR.						
				2.3	The vehicle should be equipped with suitably sized ventilation openings. The use of roof ventilators along with side vents is recommended.						
		2.4		Gas cylinders should be carried in a separate gas tight and ventilated compartment.							
		2.5		A minimum of 2 kg fire extinguisher is required on the vehicle. It is serviceable and the driver has been trained in its correct operation.							
		2.6		Gas cylinder valves shall be closed whilst in transit and equipment disconnected from the cylinder.							
		2.7		The driver should be trained in: Potential hazards and dangers of oxygen and fuel-gases, safe handling and secure storage of gas cylinders, emergency procedures and the use of the fire extinguisher.							
Key to Result:		M = Minor Residual Risk (monitor) A = Adequately Controlled N = Not adequately Controlled (stop work and improve controls)									