



Department of Environment, Food and Agriculture

Orphaned Gas Cylinders in Waste Guidance

Date	Rev No.	Description
20.03.2023	Draft V01	Initial Draft version
21.04.2023	Draft V02	Draft amendment from HSWA
03.05.2023	V01	Initial document

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Introduction

The guidance applies to a wide range of gas cylinders, including compressed gases at high pressure, liquefied gases such as LPG which are at lower pressures and those cylinders that may contain toxic substances, e.g. chlorine and fire extinguishers which can contain small internal CO₂ cylinders under high pressure. It does not include advice on the safe use of gases.

Gas cylinders can present considerable risks to operators if they are not handled and stored properly. This guidance is about eliminating or reducing the risk of serious injury associated with the handling, storage and disposal of unwanted or unidentifiable gas cylinders ('orphaned' cylinders) that may appear in the waste stream.

It is particularly relevant to the transfer stations, metals recycling industry and those who operate civic amenity sites and is primarily aimed at managers, supervisors and operators who work in these waste management and recycling activities.

The guidance also includes important advice on the arrangements currently available to arrange for retrieval of some of the unwanted gas cylinders where a disposal route is known.

The Risks

Cylinders containing gases (or which are apparently empty but in fact still contain some original content) commonly appear in the waste stream, especially at civic amenity sites and transfer stations. Refillable LPG cylinders are considered to be full whatever the state of their contents unless they are officially labelled as being decommissioned and gas free.

They are not wanted by the waste and recycling management industry, and instead of being returned to the supplier, they are sometimes disposed of because:

- They are empty and are deliberately discarded as too troublesome to return
- They have ended their normal or useful life
- They may be damaged and therefore not returnable to the supplier
- The owner/supplier cannot be identified
- The cylinders have a residual value and are to be processed as scrap

Due to actual or perceived difficulties in returning cylinders, it is common that gas cylinders may be hidden in loads of scrap or end-of life vehicles (ELVs). They may also be an integral component of dual fuel cars. Along with risks associated with handling and storing these cylinders can also present an explosion risks where scrap vehicles are processed in crushers.

The residual gas inside an empty gas cylinder is under pressure and when exposed to high temperature it expands. The resultant expansion can cause the cylinder to rupture and explode. There is a significant risk from gas cylinders hidden and not found in the waste sent to the Energy from Waste facility.

Exploded and ruptured gas cylinders



Unless properly handled, orphaned gas cylinders are a safety risk because their contents can be:

- Pressurised – presenting the risk of the violent release of their contents; if a valve is knocked off (intentionally or by accident) or damaged it could present a 'missile hazard', Boiling Liquid Expanding Vapour Explosion (BLEVE)
- Flammable, such as propane, butane or acetylene, e.g. if an acetylene cylinder is mishandled it can generate heat spontaneously and present an explosion hazard
- Toxic (such as chlorine)

In addition, gas cylinders can present other risks:

- The release of inert gases in confined spaces can displace oxygen and cause asphyxiation
- Contact with the cold gas as it escapes from the cylinder can damage the skin

Assessment of Cylinders on Receipt

All cylinders should be examined on receipt to assess their condition (e.g. to check if they are damaged and/or leaking), to identify their ownership and if possible the contents. Identification of contents and ownership will assist with determining a route for disposing of the cylinder.

Segregate damaged cylinders from others and make appropriate arrangements for storing them.

Store cylinders away from heavily travelled areas, especially at Civic Amenity Site so there is no risk of passers-by introducing sources of ignition (e.g. from lighted cigarettes, electrical equipment etc.) to the area where gases could potentially be leaking.

Store cylinders away from, or ensure they are protected against damage from, moving vehicles.

Keep cylinders in an area of the site where a cylinder collection vehicle and driver can safely identify, lift and load the cylinders.

Make sure that no significant reduction of natural ventilation (e.g. by trees, vine creepers and other vegetation, surrounded by buildings etc.) can occur, so gases can dissipate if there is a leak.

Make sure there are no fixed sources of ignition (e.g. naked flames, unprotected electrical lighting and equipment) nearby.

Store cylinders away from combustible materials (e.g. trees, vegetation, timber fences etc.) so that if there is a fire, the gas cylinders will not be affected. If weed killers are used to keep down vegetation, do not use sodium chlorate, because it can create a fire hazard.

Store cylinders away from drains, potholes, sumps etc., as they can hold and accumulate gases which are heavier than air. Heavier than air gases such as liquefied petroleum gas should not be stored below ground level.

Do not store them near doors and fire exits. If there is an incident, all escape routes must be easily accessible.

Construction of Enclosures

To prevent unauthorised access, storage enclosures should be no less than 1.8 metres high, of robust construction and lockable.

- Store should have enough space to allow safe identification and handling of cylinders
- The storage area should be well ventilated to dissipate gas if there is a leak
- Any lighting should be suitable to use in a potentially flammable atmosphere. Alternatively, unprotected lighting can be provided at a suitable distance from the storage area.
- The storage area should display the warning sign 'Gas cylinders may contain highly flammable LPG or toxic gases' (or similar), and 'No smoking. No naked lights'
- The enclosure should be clearly signed with instructions for safely storing and collecting cylinders
- A second exit from the compound may need to be provided, specialist advice should be sought.
- Any materials used to create a lockable compound or 'cage' should be non-combustible. Timber should not be used
- Wire mesh or metal paling cages constitute industry's most common cylinder stores They are non-flammable and maximise ventilation

Site Procedures

Make regular checks of the storage compound (daily is advised to make sure there have been no changes that affect the level of safety at the store.

A site procedure should clearly state how to handle and store cylinders safely.

Devise and put in place an emergency procedure to deal with a gas leakage or fire. Contain this procedure as part of the site rules, the procedure should focus on evacuation. In most circumstances, and at most premises, you should evacuate if there is a substantial gas leakage.

Firefighting should only be expected of suitably trained staff on fires away from the gas storage area. Firefighting should not take place near gas cylinders. Inform the Fire and Rescue Service (FRS) immediately that gas cylinders may be involved, in any instance of a site fire.

Escape routes should be clearly marked, kept clear, and clearly shown on the site plan.

Information, Instruction and Training

Give workers enough information and training to carry out their duties safely and effectively. Waste and recycling activities involving compressed gas cylinders can expose workers to a range of risks and they should be inducted and trained on safe systems of work. It is particularly important to consider the training needs and supervision of:

- New recruits and trainees
- Young people who are particularly vulnerable to accidents
- People changing jobs, or taking on new responsibilities
- Workers for whom English is not their first language

Cylinder Disposal

The following gas cylinders can be collected for disposal:

- Propane & Butane cylinders >3.5 kg may be accepted by Isle of Man Energy, please contact the company directly for more information.
- CO₂ BOC (14 lb or 7 lb) cylinders may be accepted by Heron and Brearley, please contact the company directly for more information.

References & Additional Information Sources

Isle of Man Energy

<https://isleofmanenergy.im/>

Heron and Brearley

<https://hb.im/>

Isle of Man Waste Regulation Home Page

<https://www.gov.im/about-the-government/departments/environment-food-and-agriculture/environment-directorate/environmental-protection-unit/waste-regulation/>

Waste Disposal Licence Register

https://www.gov.im/media/1371063/wdl_register_2023_v1.pdf

Isle of Man Health & Safety at Work Inspectorate Home Page

<https://www.gov.im/about-the-government/departments/environment-food-and-agriculture/regulation-directorate/health-and-safety-at-work-inspectorate/>

The Safe Handling of Gas Cylinders at Waste Facilities British Compressed Gas Association (BCGA)

www.bcga.co.uk

Gas Safety Data Sheets from BOC Industrial Gases UK at

www.boconline.co.uk

Gas Cylinder Identification Chart Air Products 2004

www.airproducts.co.uk

Guidance specific to the storage of LPG

[https://www.gascageshop.co.uk/content/gascageshop/Code-of-guidance-for-storage-of-cylinders\(1\).pdf](https://www.gascageshop.co.uk/content/gascageshop/Code-of-guidance-for-storage-of-cylinders(1).pdf)

<https://www.liquidgasuk.org/>

<https://bcga.co.uk/topics/cylinder-recovery-and-disposal/>