BS EN 13109:2010

BSI Standards Publication

LPG equipment and accessories — LPG tanks and drums — Disposal

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National foreword

This British Standard is the UK implementation of EN 13109:2010. It supersedes BS EN 13109:2002 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PVE/19, LPG containers and their associated fittings.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Compliance with a British Standard cannot confer immunity from legal obligations.

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LPG equipment and accessories - LPG tanks and drums - Disposal

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Flüssiggas-Geräte und Ausrüstungsteile - Behälter und Fässer für Flüssiggas (LPG) - Entsorgung

This European Standard was approved by CEN on 20 November 2010.

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Foreword

This document (EN 13109:2010) has been prepared by Technical Committee CEN/TC 286 “Liquefied petroleum gas equipment and accessories”, the secretariat of which is held by NSAI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2011, and conflicting national standards shall be withdrawn at the latest by June 2011.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13109:2002.

The main technical change in this revision is the inclusion of an environmental checklist Annex C.

Users of this standard, prepared in the field of application of Article 118A of the EC Treaty, should be aware that standards have no formal legal relationship with Directives that may have been made under Article 118A of the Treaty. In addition, national legislation in the Member states may contain more stringent requirements than the minimum requirements of a Directive based on Article 118A. Information on the relationship between the national legislation implementing Directives based on Article 118A and this EN may be given in a national foreword of the national standard implementing this standard EN.

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Introduction

This European Standard specifies methods for the safe disposal of LPG tanks and drums.

This European Standard calls for the use of substances and procedures that may be injurious to health and/or the environment if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health, safety and environmental protection at any stage.

Protection of the environment is a key political issue in Europe and elsewhere. Protection of the environment is taken in a very broad sense. The standard takes into consideration the total lifecycle aspects of the activities involved in complying with the standard. These activities include all phases such as scrapping, recycling of materials, etc.

It has been assumed in the drafting of this European Standard that execution of its provisions is entrusted to appropriately qualified and experienced people.

1 Scope

This European Standard specifies methods for the safe gas freeing and disposal of LPG tanks and drums above 150-litre water capacity.

This European Standard is applicable to the following:

— tanks manufactured in accordance with EN 12542;

— drums manufactured in accordance with EN 14893, and

— LPG tanks and drums manufactured in accordance with any other pressure vessel code.

2 Normative references

Not applicable.

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
liquefied petroleum gas
LPG
mixture of predominantly butane or propane with traces of other hydrocarbon gases classified in accordance with UN number 1965, hydrocarbon gases mixture, liquefied, NOS or UN number 1075, petroleum gases, liquefied

NOTE In some countries, UN numbers 1011 and 1978 may also be designated LPG.

3.2
gas free
with an LPG concentration in air less than 20 % of the lower explosive limit

3.3
disposal
gas freeing and discarding LPG tanks and drums either in the form of scrap metal or for use in non-pressure applications

3.4
competent person
person who, by qualification, training, experience and resources, is able to make objective judgements related to the safe disposal of LPG tanks and drums

3.5
hydrate
hydrocarbon and water compound which forms under reduced temperature and pressure, e.g. venting, and in appearance resemble snow or ice, and can plug equipment

4 Gas freeing of tanks and drums

4.1 Residual liquid LPG shall be safely removed from a tank or drum by a competent person.

4.2 LPG shall be either:

— returned to an in-service LPG tank, or

— flared through a purpose designed flare stack fitted with a flame arrestor, or

— vented through a purpose designed high level vent, in a controlled manner, that ensures that the vented gas is diluted to less than 20 % of the lower explosive limit before it reaches ground level or any potential source of ignition (see Annex B), or

— a combination of any of these options.

For safety and environmental protection reasons the first option is preferable.

4.3 Tanks and drums shall be made gas free by a method chosen and controlled by a competent person.

NOTE 1 Annex A gives examples of gas freeing methods.

NOTE 2 The method of gas freeing should be selected so that it is technically effective and the environmental impact reduced to a minimum. After selecting the appropriate method, all suitable measures should be implemented in order to minimise the loss of energy, the emissions to air, raw material consumption and waste (e.g. inert gas, water, steam).

NOTE 3 Noise levels from additional equipment (e.g. compressor or vacuum pump) should be evaluated and measures put in place to minimise the impact upon the external environment.

4.4 Any flammable liquids remaining in the tank or drum (e.g. oily residues) shall be removed and disposed of in a suitable manner before the tank or drum can be considered gas free.

4.5 LPG tanks and drums shall be appropriately labelled e.g. "gas free" or "N_2 purged".

WARNING — If entry into the tank is necessary, a valid safe entry certificate shall be required.

4.6 Pressure relief valve assemblies, LPG fill couplings and all other fittings shall be removed. These fittings shall be scrapped and recycled or reconditioned where possible.

NOTE It may be necessary to render valve outlets beyond repair to prevent reinstallation of LPG equipment where there is a concern that tanks and drums may be illegally reused for LPG.

5 Scrapping of tanks and drums

5.1 Tanks and drums shall be certified gas free and a hot work certificate issued prior to hot-work or cutting operations being undertaken.

5.2 All nameplates shall be removed or permanently defaced.

5.3 Tanks and drums shall be scrapped by either:

— mechanical shredding,

— crushing by mechanical means, or

— cutting each tank or drum into two or more irregularly shaped pieces.

NOTE Noise levels from crushing or cutting should be evaluated and measures put into place to minimise the impact upon the external environment.

5.4 After the above procedures as described in 5.3, tanks and drums shall be considered as scrap material. Scrap material shall be passed only to an authorised scrapping agent who is liable for the effective disposal of

the material and the minimising of waste. The selection of the scrapping agent shall consider the total scrapping cycle of the tanks and drums (e.g. energy, transportation, waste). The scrapping agent shall be given details of any tank or drum coatings.

5.5 Underground tanks, if left in place, shall be filled with water or inert materials. All relevant measures shall be taken to ensure that the underground tank will not leak and contaminate the soil.

NOTE National Building Codes or other relevant National Regulations should be considered.

6 Disposal of tanks and drums for uses other than for LPG storage

6.1 The use of tanks and drums for non-pressure applications is not excluded and can be considered as a good way of recycling tanks and drums which are unfit for service as pressure equipment. Adequate precautions shall be taken with respect to the nature and use of the product stored. The tanks and drums shall be appropriately labelled, e.g. "Do not pressurise".

6.2 Tanks and drums shall be checked to ensure that they are depressurised and gas free.

6.3 All nameplates, any direct stamp markings and other labelling shall be removed or permanently defaced.

Annex A
(informative)

Methods of gas freeing

A.1 Preparation for gas freeing

In each of the methods described below, tanks and drums should be nominally free of liquid LPG before gas freeing.

Once liquid free, tanks and drums should be depressurised e.g. piping LPG vapour from a suitable tank connection to a safely located flare burner, which should be fitted with a permanent pilot flame.

The internal tank pressure should be reduced to a suitable level to enable one of the methods in A.2 to be used to gas free the tank or drum.

A.2 Methods of gas freeing

A.2.1 By water

Care should be taken to ensure that the tank and its supports are capable of safely supporting the extra weight of water.

Water is progressively introduced and LPG vapour expelled via suitable tank connections, selected so that as far as possible no vapour space is left in the tank or drum when the procedure is completed, i.e. when the tank or drum is full of water.

The vapour shall be piped, in a controlled manner, to:

— a purpose designed flare stack fitted with a flame arrestor, or

— a purpose designed high level vent that ensures that the vented gas is diluted to less than 20 % of the lower explosive limit before it reaches ground level or any potential source of ignition.

Once the water has been drained, the tank or drum should be checked by a competent person and certified gas free and suitably labelled "gas free".

WARNING — Hydrates may be formed in the tank. Hydrates will release LPG vapour when they melt.

Water should be recycled ready for further purging applications or disposed of by appropriate means and should not be allowed to contaminate the ground or drainage systems.

Any flammable liquids remaining in the tank or drum (e.g. oily residues) shall be removed and disposed of in a suitable manner before the tank or drum can be considered gas free.

A.2.2 By inert gas

A suitable inert gas, e.g. nitrogen or carbon dioxide, is used to displace and dilute the LPG vapour to a gas free level. Care should be taken to avoid hazards associated with inert gases such as:

— over pressurisation of the tank or drum;

— electrostatic hazards, and

— low temperatures e.g. if the inert gas is generated from a liquid phase.

Once the tank or drum has been prepared (see A.1), the inert gas can be introduced via a tank connection. The connections should be chosen considering the relative properties of LPG and the inert gas. The exhaust mixture should then be:

— flared through a purpose designed flare stack fitted with a pilot burner and flame arrestor; or

— vented through a purpose designed high level vent, in a controlled manner, that ensures that the vented gas is diluted to less than 20 % of the lower explosive limit before it reaches ground level or any potential source of ignition.

When a non-flammable mixture reaches the flare burner, the inert gas should continue being introduced and vented until a gas free condition is reached.

Tank and drum orifices should be plugged if the tank or drum is left filled with an inert gas.

The tank or drum should be certified as being gas free and suitably labelled e.g. "gas free" or "N_2 purged".

NOTE It should be checked that all other flammable liquids (e.g. oily residues) have been removed before the tank or drum can be certified gas free.

A.2.3 By steam

The procedure is similar to that described in A.2.2. The use of steam requires the following additional precautions:

— comparatively high temperatures should be taken into account, as this may cause tank expansion. Care should be exercised to ensure this expansion does not cause instability of tank supports;

— any oily residues in the tank or drum will be made more volatile. Care should be exercised when confirming that the tank or drum is gas free; and

— oily residues shall be disposed of properly.

A positive pressure should be maintained throughout the procedure to avoid air being introduced into the tank or drum leading to the formation of flammable mixtures. Care should also be taken to avoid rapid condensation of steam which could cause negative internal pressure.

A.2.4 By vacuum pump or compressor

It should be established that the tank or drum is rated for the negative pressure to be generated.

Vapour is removed from the tank or drum through a vacuum pump/compressor and discharged:

— through a purpose designed flare stack fitted with a pilot burner and flame arrestor; or

— through a purpose designed high level vent, in a controlled manner, that ensures that the vented gas is diluted to less than 20 % of the lower explosive limit before it reaches ground level or any potential source of ignition; or

— to an LPG storage tank; or

— to a safe location.

Following evacuation of the LPG vapour the vacuum should be broken and the tank or drum should be certified as being gas free and suitably labelled, e.g. "gas free".

Annex B
(informative)

High level venting of LPG tanks and drums

B.1 High level venting should only be carried out under the supervision of a competent person.

B.2 High level venting should only be carried out in the open air and in a controlled area.

B.3 The competent person should ensure that there are written procedures covering high level venting to ensure safe working practices. These procedures should include:

— extent of the controlled area which is kept free of sources of ignition;

— means of identifying the controlled area;

— weather conditions under which venting may or may not be allowed; and

— location of the vent.

B.4 Venting will normally be from the vapour phase. Where liquid is present precautions should be taken to guard against freezing of valves and loss of vapour pressure due to product chilling.

B.5 At least 2 dry powder fire extinguishers of 6 kg capacity should be present in the immediate area.

B.6 The vent outlet should not normally be greater than DN 50 and should terminate with a flame arrestor.

B.7 During venting the gas concentration should be regularly checked down wind at the edge of the controlled area to ensure that it is below 20 % of the lower explosive limit.

B.8 After venting the vent pipes should be purged of LPG vapour with an inert gas.

Annex C
(informative)

Environmental checklist

Environmental Aspect	Stages of the life cycle										All stages
	Acquisition		Production		Use			End-of-Life			
	Raw materials and energy	Pre-manufactured materials and components	Production	Packaging	Use	Maintenance and repair	Use of additional products	Reuse / Material and Energy Recovery	Incineration without energy recovery	Deposition	Transportation
Inputs											
Materials								4.6 6.1	4.2		
Water									4.3		
Energy								5.3	4.2	5.3	
Land											
Outputs											
Emissions to air								4.2 6.1	4.2		
Discharges to water								4.3			
Discharges to soil										5.5	
Waste								5.3 5.4		4.6 5.4	5.4
Noise, vibration, radiation, heat losses								4.3 5.3			
Other relevant aspects											
Risk to the environment from accidents or unintended use								Intro 4.6			
Customer information					4.5 6.1	4.5		6.1			
Comments:											

Bibliography

[1] EN 12542, *LPG equipment and accessories — Static welded steel cylindrical tanks, serially produced for the storage of Liquefied Petroleum Gas (LPG) having a volume not greater than 13 m^3 — Design and manufacture*

[2] EN 14893, *LPG equipment and accessories — Transportable Liquefied Petroleum Gas (LPG) welded steel pressure drums with a capacity between 150 litres and 1 000 litres*

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