BS EN 13776:2013

BSI Standards Publication

LPG equipment and accessories — Filling and discharge procedures for LPG road tankers

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National foreword

This British Standard is the UK implementation of EN 13776:2013. It supersedes BS EN 13776:2002 which is withdrawn.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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Équipements et accessoires pour GPL - Procédures de chargement et déchargement des camions-citernes pour GPL

Flüssiggas-Geräte und Ausrüstungsteile - Füll- und Entleerungsverfahren für Straßentankfahrzeuge für Flüssiggas (LPG)

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Foreword

This document (EN 13776:2013) 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of an identical text or by endorsement, at the latest by December 2013, and conflicting national standards shall be withdrawn at the latest by December 2013.

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 has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

This document supersedes EN 13776:2002.

The main changes regarding the 2002 version include:

— Deletion of Annex A;

— Deletion of Annex B;

— Deletion of maintenance requirements;

— Addition of a new informative Annex A on filling ratios and test pressures for mixtures; and

— Addition of a new informative Annex B environmental checklist.

This European Standard has been submitted for reference into the technical annexes of the ADR [5].

NOTE These regulations take precedence over any clause of this standard. It is emphasised that RID/ADR/ADN are being revised regularly at intervals of two years which may lead to temporary non-compliances with the clauses of this European Standard.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

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: it does not absolve the user from their legal obligations at any stage.

Protection of the environment is a key political issue in Europe and elsewhere around the world. Protection of the environment in this document is understood in a very broad sense. The phrase is used, for example, in relation to the total life-cycle aspects of a product on the environment, including expenditure of energy, and during all phases of its existence, from mining of raw materials, to fabrication, packaging, distribution, use, scrapping, recycling of materials, etc.

NOTE Annex B comprises an environmental checklist which highlights the clauses of this European Standard that address environmental aspects.

Provisions have to be restricted to a general guidance. Limit values are specified in national laws.

It is recommended that manufacturers develop an environmental management policy. For guidance see the EN ISO 14000 series [2], [3] and [4].

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

All pressures are gauge pressures unless otherwise stated.

1 Scope

This European Standard specifies filling, discharge and emergency procedures for road tankers equipped in accordance with EN 12252 used for the transportation of liquefied petroleum gas (LPG).

This European Standard does not apply to “batteries of receptacles”.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12252, *LPG equipment and accessories - Equipping of LPG road tankers*

3 Terms and definitions

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

3.1
liquefied petroleum gas
LPG
low pressure liquefied gas composed of one or more light hydrocarbons which are assigned to UN 1011, UN 1075, UN 1965, UN 1969 or UN 1978 only and which consists mainly of propane, propene, butane, butane isomers, butene with traces of other hydrocarbon gases

3.2
road tanker
rigid vehicle, semi-trailer or trailer comprising of one or more fixed pressure vessels

Note 1 to entry: Referred to as fixed tanks (tank-vehicles) and demountable tanks in the ADR.

3.3
pressure vessel
assembly of the pressure-retaining envelope (including the openings and their closures) and non-pressure-retaining parts attached directly to it

Note 1 to entry: Referred to as “shell” in the ADR.

3.4
competent person
person which by combination of appropriate qualification, training, experience, and resources, is able to make objective judgments on the subject

3.5
anti-drive-away system interlock/installation barrier
method of ensuring that the road tanker cannot be driven away accidentally unless hoses are disconnected and stowed

3.6
tanker loading control system
method of ensuring the integration of the vehicle’s safety systems into the plant safety systems

4 General

4.1 Safety systems as required by EN 12252 shall be used. Personnel carrying out LPG transfer operations shall wear personal protection equipment according to applicable regulations. Filling and discharging shall be under the constant supervision of a competent person.

4.2 The filling and discharge areas shall be inspected for fire hazards prior to beginning operations. Suitable fire protection shall be readily available.

NOTE Responsibilities for fire protection are subject to national regulations

4.3 Written procedures and other appropriate information shall be made readily available, understood and followed by those undertaking filling and discharging procedures. The training programme for driver certification shall be approved by the competent authority.

Consideration shall be given to include specific instructions for the use of the road tanker's LPG equipment and fixed LPG installation relevant to the operations in the training programme.

4.4 Written procedures shall be readily available, understood and followed. This shall be achieved by training and supervision. The responsibilities of all persons involved in the operation shall be clearly defined. For appropriate measures regarding training and written procedures and the corresponding responsibilities refer to national health and safety regulation.

5 Filling procedures

5.1 Preparation for filling

5.1.1 The vehicle shall be driven to the filling area and positioned in accordance with the site procedure.

5.1.2 The filler shall ensure that any device provided to check the loaded quantity is operational and in the correct position.

5.1.3 All road tanker electrical equipment not required for the filling process shall be switched off. Any other sources of ignition shall be removed/de-activated.

5.1.4 The handbrake shall be applied and, where required, the wheel-scotch put in place. Anti-drive-away system interlock/installation barriers shall be engaged.

5.1.5 Precautions shall be taken to ensure that the grade of LPG to be filled is correctly identified and that the road tanker is suitable for the intended load and that it is correctly labelled (see Annex A).

NOTE In the ADR the terms "placarding" and "orange-coloured plate marking" are used in place of "labelling".

Road tankers with pressure vessels which are not divided by partitions or surge plates into sections of not more than 7 500 litres capacity, shall be filled to not less than 80 % or not more than 20 % of their capacity.

5.1.6 Where fitted tanker loading control systems shall be connected.

5.2 Filling operations

5.2.1 The electrostatic potential of the road tanker and the fixed installation shall be equalised before the LPG hoses are connected.

5.2.2 All road tanker outlets and internal valves shall be checked to ensure that they are in the closed position.

5.2.3 The blanking cap shall be removed from the vapour return (where fitted and when used) and the liquid inlet connections.

5.2.4 The transfer couplings (hoses or loading arms) shall be connected without submitting them to any abnormal stresses. The road tanker, product terminal and vapour return valves, where applicable, shall be opened in the required sequence and manner in accordance with the written procedures. The connections between the transfer couplings and the road tanker shall be checked for leakage. Further periodic leakage checks shall be carried out directly after the product transfer operation has begun.

5.3 Completion of filling

5.3.1 The road tanker, product terminal and vapour return valves, where applicable, shall be closed in the required sequence and manner in accordance with the written procedures ensuring that valves closest to the pressure vessel of the vehicle are closed first.

5.3.2 Any LPG between the transfer couplings shall be vented in a safe manner before fully disconnecting.

5.3.3 After disconnection of the filling line and any other connections to the road tanker (vapour return or tanker loading control) all road tanker valves shall be properly closed and the caps secured in place.

5.3.4 A final check shall be made to ensure that the road tanker is in a fit condition to be driven away. There shall be no sign of leakage. The connection made to equalise the electrostatic potential shall be disconnected.

5.3.5 Anti-drive-away system interlock/installation barriers shall be disengaged.

5.3.6 The driver shall verify that the correct quantity and grade of LPG (as per dataplate of the pressure vessel, see Annex A) has been loaded and that the road tanker displays the appropriate hazard warning labels and the legal restrictions applicable are observed before leaving the site.

5.3.7 The driver shall verify completeness and correctness of the required documentation.

5.4 Precautions against overfilling

5.4.1 The gross vehicle mass (weight) shall not be exceeded when the mass of the road tanker's fuel and the driver are taken into account.

5.4.2 Gauging devices shall be monitored continuously during the filling operation, to ensure that the road tanker is not overfilled.

5.4.3 If a road tanker is accidentally overfilled the excess LPG shall be removed in a controlled manner without delay, before departure of the road tanker.

5.4.4 When filling by mass, the tare of the vehicle shall be determined i.e. by weighing before every filling operation to ensure that the vehicle is not overfilled.

6 Discharging procedures

6.1 Preparation for discharge

6.1.1 The electrostatic potential of the road tanker and the fixed installation shall be equalised before the LPG hoses are connected.

6.1.2 The driver shall ensure that the pressure vessel is suitable to receive the LPG product to be discharged. Road tankers with pressure vessels which are not divided by partitions or surge plates into sections of not more than 7 500 litres capacity shall be emptied to not more than 20 % of their capacity.

6.1.3 The vehicle shall be positioned so that the driver has access to:

— the road tanker;

— the vehicle flow metre (where fitted); and

— the receiving pressure vessel contents gauge and fixed liquid level gauge.

6.1.4 The handbrake shall be applied and, where required, the wheel-scotch put in place. Anti-drive-away system interlock/installation barriers shall be engaged.

6.1.5 The immediate surroundings of the pressure vessel shall be checked to ensure there are no potential sources of ignition or any obvious dangers. The area around the road tanker shall be checked to ensure that it is safe to allow LPG to be discharged.

NOTE Necessary distances might be subject to national regulations.

6.1.6 Care shall be taken to avoid damage to the hose caused by:

a) running hoses across sharp objects; or

b) heat sources and naked flames.

6.1.7 Hoses shall normally be routed in the open air. Where hoses are routed through enclosed spaces, access by the public shall be restricted and the area shall be under the direct control of the driver. Where direct control by the driver cannot be ensured, a special procedure shall apply.

6.1.8 Where hoses are run across pavements or foot paths during road side deliveries, a warning sign shall be prominently displayed, e.g.

“FLAMMABLE GAS TRANSFER TAKING PLACE – NO SMOKING OR NAKED FLAMES”.

NOTE National regulations and /or laws regarding road side deliveries can apply.

6.1.9 Delivery hoses shall be visually examined for kinks, wear or obvious damage.

6.1.10 Hose couplings and seals shall be examined to ensure compatibility and that no dirt etc. is present before connection.

6.1.11 Where fitted, road tanker filling control systems shall be connected

6.1.12 During road side delivery at night or during bad visibility the road tanker lighting shall be kept on or other suitable lighting shall be provided.

6.2 Discharge operations

6.2.1 All road tanker outlets and internal valves shall be checked to ensure that they are in the closed position.

6.2.2 Where used the blanking cap shall be removed from the liquid inlet and vapour return connections.

6.2.3 The transfer couplings (hoses or loading arms) shall be connected without submitting them to any abnormal stresses. The road tanker, product terminal and vapour return valves, where applicable, shall be opened in the required sequence and manner in accordance with the written procedures. The connections between the transfer couplings and the road tanker shall be checked for leakage. Further periodic leakage checks shall be carried out directly after the product transfer operation has begun.

6.2.4 Special filler adaptors may be used during discharge as a control to ensure that the risk of leakage is minimised.

6.3 Completion of discharge

6.3.1 The delivery shall be stopped when the maximum fill level in the receiving pressure vessel is reached. Transfer rates may need to be reduced before reaching the maximum fill level to avoid overfilling.

6.3.2 Where the pressure vessel is accidentally overfilled any excess LPG shall be removed in a safe manner without delay.

6.3.3 The road tanker shall be disconnected and hoses stowed and protective caps re-attached and secured.

6.3.4 Where fitted, road tanker filling control system and earth bonding cables shall be disconnected and stowed.

6.3.5 Anti-drive-away system interlocks/installation barriers shall stay engaged until the vehicle can be safely moved. Where any deficiency in the fixed installation is noted, the delivery site owner or their representative shall be immediately notified.

6.3.6 The filled pressure vessel and its immediate surroundings shall be inspected to ensure that there is no sign of leaks before driving away.

7 Emergency procedures

Emergency procedures shall be written to cover at least the following:

— LPG leaks;

— LPG fires;

— vehicle fires;

— accidents; and

— discharge and filling procedures from vehicles involved in accidents.

For detailed requirements, see ADR.

Annex A
(informative)

Table of LPG mixtures

Table A.1 contains minimum test pressures and filling ratios for the different LPG mixtures and grades which may be carried in road tankers.

NOTE Table A.1 has been taken from ADR 4.3.3.2.5 and is subject to change without notice.

Table A.1 — Table of LPG mixtures

UN No.	Name	Minimum test pressure for road tanker pressure vessels				Maximum permissible mass of contents per litre of water capacity
		With thermal insulation		Without thermal insulation		
		MPa	bar	MPa	bar	kg/l
1011	Butane	1	10	1	10	0,51
1965	Mixture A	1	10	1	10	0,50
	Mixture A01	1,2	12	1,4	14	0,49
	Mixture A02	1,2	12	1,4	14	0,48
	Mixture A0	1,2	12	1,4	14	0,47
	Mixture A1	1,6	16	1,8	18	0,46
	Mixture B1	2	20	2,3	23	0,45
	Mixture B2	2	20	2,3	23	0,44
	Mixture B	2	20	2,3	23	0,43
	Mixture C	2,5	25	2,7	27	0,42
	Other mixtures	see ADR, 4.3.3.2.2 or 4.3.3.2.3				
1978	Propane	2,1	21	2,3	23	0,42

Annex B
(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											
Water											
Energy											
Land											
Outputs											
Emissions to air					5.2 5.3 6.2 6.3						
Discharges to water											
Discharges to soil											
Waste											
Noise, vibration, radiation, heat losses											
Other relevant aspects											
Risk to the environment from accidents or unintended use					5.2 5.3 6.1 6.2 6.3						
Customer information											

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[1] EN 12493:2008+A1:2012, *LPG equipment and accessories — Welded steel tanks for liquefied petroleum gas (LPG) — Road tankers design and manufacture*

[2] EN ISO 14021, *Environmental labels and declarations - Self-declared environmental claims (Type II environmental labelling) (ISO 14021)*

[3] EN ISO 14024, *Environmental labels and declarations - Type I environmental labelling - Principles and procedures (ISO 14024)*

[4] EN ISO 14025, *Environmental labels and declarations - Type III environmental declarations - Principles and procedures (ISO 14025)*

[5] European Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), Geneva, 30 September 1957, as amended

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