SLOVENSKI STANDARD
SIST EN 13807:2004

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Premiļne plinske jeklenke ï Baterijska vozila - Naļrtovanje, izdelava, oznaļevanje in preskus

Transportable gas cylinders - Battery vehicles - Design, manufacture, identification and testing

Ortsbewegliche Gasflaschen - Batterie-Fahrzeuge - Konstruktion, Herstellung, Kennzeichnung und Prüfung

Bouteilles a gaz transportables - Véhicules-batteries - Conception, fabrication, identification et essai

Ta slovenski standard je istoveten z: **EN 13807:2003**

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This document (EN 13807:2003) has been prepared by Technical Committee CEN/TC 23 “Transportable gas cylinders”, the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by March 2004, and conflicting national standards shall be withdrawn at the latest by March 2004.

Annexes A and B are normative.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports the objectives of the framework Directives on Transport of Dangerous Goods.

This European Standard has been submitted for reference into the RID and/or in the technical annexes of the ADR. Therefore in this context the standards listed in the normative references and covering basic requirements of the RID/ADR not addressed within the present standard are normative only when the standards themselves are referred to in the RID and/or in the technical annexes of the ADR.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

For some applications a transport unit, known as a battery vehicle, may be used to supply larger volumes of gas in a single unit. A battery vehicle is a vehicle containing elements which are linked to each other by a manifold and permanently fixed to a transport unit.

The following are considered to be elements of a battery vehicle; cylinders, large cylinders known as tubes, and bundles.

Types of battery vehicles also exist which use manifolded cylinder bundles, which are designed to be dis-assembled from the battery vehicle to enable the bundles to be filled individually. These contradict the basic definition of a battery vehicle but are commonly referred to as battery vehicles. Their special requirements are included in annex A.

Unless otherwise stated individual cylinders within the battery vehicle should conform to applicable standards for individual cylinders.

1 Scope

This European Standard specifies the requirements for the design, manufacture, identification and testing of a battery vehicle. It is applicable to battery vehicles containing compressed gas, liquefied gas and mixtures thereof. It is also applicable to battery vehicles for dissolved acetylene. The specific requirements for dissolved acetylene are included in annex B. For toxic gases, this standard is only applicable where the LC_{50} of the gas is above 200 ml/m^3.

This European Standard does not apply to the vehicle chassis or motive unit or to multi-element gas containers (MEGC's), pressure drums and tanks.

This standard is primarily for industrial gases other than Liquefied Petroleum Gases (LPG) but may also be used for LPG. However for dedicated LPG cylinders, see standards prepared by CEN/TC 286 *Liquefied petroleum gas equipment and accessories*.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 287-1, *Approval testing of welders — Fusion welding — Part 1: Steels.*

EN 288-1, *Specification and qualification of welding procedures for metallic materials — Part 1: General rules for fusion welding.*

EN 1089-2, *Transportable gas cylinders — Gas cylinder identification (excluding LPG) — Part 2: Precautionary labels.*

EN 1089-3, *Transportable gas cylinders — Cylinder identification (excluding LPG) — Part 3: Colour coding.*

EN 1800, *Transportable gas cylinders — Acetylene cylinders — Basic requirements and definitions.*

EN 12755, *Transportable gas cylinders — Filling conditions for acetylene bundles.*

EN 13133, *Brazing — Brazer approval.*

EN 13134, *Brazing — Procedure approval.*

prEN 13769, *Transportable gas cylinders — Cylinder bundles — Design, manufacture, identification and testing.*

EN ISO 14113, *Gas welding equipment — Rubber and plastic hoses assembled for compressed or liquefied gases up to a maximum design pressure of 450 bar (ISO 14113 :1997).*

ISO 13769, *Gas cylinders -- Stamp marking*

3 Terms & definitions

For the purposes of this European Standard, the following terms and definitions apply. Definitions specific to acetylene are included in annex B.

3.1
element
individual item of transport equipment (cylinders, tubes and bundles)

3.2
battery vehicle
assembly of elements (cylinders, tubes or bundles) connected to a manifold and securely mounted onto a vehicle chassis such that the assembly is filled, transported and emptied as a single unit

3.3
cylinder
transportable pressure receptacle with a capacity not exceeding 150 litres

3.4
tube
seamless transportable pressure receptacle with a capacity above 150 litres but not exceeding 3 000 litres

3.5
cylinder bundle (bundle)
portable assembly which consists of a frame and two or more cylinders each of capacity up to 150 litres and, with a combined capacity of not more than 3 000 litres, or 1 000 litres for toxic gases, connected to a manifold by cylinder valves or fittings such that the cylinders are filled, transported and emptied without disassembly

3.6
element valve
valve which is fitted into an element and to which a manifold is connected

3.7
element fitting
device with no gas shut-off capability which serves to connect a battery vehicle's manifold to its individual element, where an element valve is not fitted

3.8
manifold
system for connecting a battery vehicle's element valves or element fittings to the main valve(s) or main connection(s)

3.9
main valve
valve which is fitted to a battery vehicle's manifold isolating it from the main connection(s)

3.10
main connection
means of making a gas connection to a battery vehicle

3.11
tare weight
weight of the battery vehicle when empty of gas product

3.12
maximum gross weight
tare weight of the battery vehicle plus the maximum weight of the gas products contained within the battery vehicle

3.13
compressed gas
gas which when packaged under pressure for transport is entirely gaseous at – 50 °C, this category includes all gases with a critical temperature less than or equal to – 50 °C

3.14
liquefied gas
gas which when packaged under pressure for transport is partially liquid at temperatures above – 50°C

A distinction is made between:

high pressure liquefied gas; a gas with a critical temperature between – 50 °C and + 65 °C and,

low pressure liquefied gas; a gas with a critical temperature above + 65 °C

3.15
working pressure
settled pressure at a uniform temperature of 288 K (15 °C) for a full battery vehicle

3.16
design pressure
value of pressure which is used to perform stress calculations of gas retaining components, other than elements within the battery vehicle

3.17
proof test pressure
hydraulic or pneumatically applied pressure which demonstrates the structural integrity of the manifold

3.18
maximum permissible operating pressure
highest pressure permitted to be developed during service

3.19
helium test gas
leak testing gas mixture containing not less than 2% helium

3.20
maximum permissible filling weight
product of the minimum guaranteed water capacity of the elements of the battery vehicle and the filling ratio of the gas contained

3.21
competent body
authority or authorities or any other body designated as such in each state and in each specific case in accordance with domestic law

3.22
toxic gases
gases with an LC_{50} not exceeding 5 000 ml/m^3

NOTE The transport of toxic gases and gas mixtures with LC_{50} of below 200 ml/m^3 is not authorised in battery vehicles.

3.23
home station of the bundle
location (name of the company, address and telephone number) where the documentation is kept

4 Design

4.1 General

Unless stated to the contrary, standards applicable to individual elements shall apply to elements within battery vehicles.

All pressurised components shall be designed to operate in the temperature range of – 20 °C to + 65 °C. They should also be designed to withstand local temperature conditions outside this range.

Battery vehicles which are filled by weight shall not feature component parts which are de-mountable without the use of tools, with the exception of valve outlet protection caps.

For additional requirements for acetylene, see annex B.

4.2 Mounting

4.2.1 Stability

The distance between the outer points of contact with the ground of tyres on the same axle shall be at least 90% of the height of the centre of gravity of the laden battery vehicle. In an articulated vehicle the weight on the axles of the load carrying unit of the laden semi-trailer shall not exceed 60% of the nominal total laden weight of the complete articulated vehicle.

4.2.2 Attachment of elements to a chassis

Attachments shall, at the maximum gross weight, be capable of absorbing the stresses equal to those exerted by:

— in the direction of travel - twice the total weight;

— horizontally at right angles to the direction of travel - the total weight;

— vertically upward - the total weight;

— vertically downward - twice the total weight.

NOTE Values are calculated independently of each other.

Under each force the stress at the most severely stressed point of the element and its fastenings shall not exceed the value of 77% of R_e (yield stress), where R_e is the stress at the R_e point of the material used.

4.2.3 Element supports

Elements shall be secured in a manner that prevents both movement in relation to the chassis and the concentration of local stresses. In particular, the bottom elements of a stack, and elements to which clamping forces are applied, shall not be subjected to point loads which result in concentrations of high local stress. Suitable means shall be provided to distribute this loading.

The elements shall have their weight supported directly from their bodies and not from separate collars or valve caps unless these are specifically designed for this purpose. The supports and holding down straps shall be such as to minimise the risk of corrosion to the elements. Absorbent materials used in supports shall only be allowed if they have been treated to eliminate water absorption.

NOTE Examples of suitable materials are water resistant belting and rubber.

4.2.4 Impact protection

There are two types of impact protection:

a) Rear end protection

An arrangement shall be fitted at the rear of the battery vehicle to provide adequate protection to the rear pipework and fittings to prevent accidental leakage of product in the event of a rear impact. The arrangement shall meet at least the impact requirements for a rear under-run protective device required by EU directives (see 79/490/EEC [1]). The width of this arrangement shall be not less than that of the rear under-run protective device and not less than that of the pipework and fittings. There shall be a clearance of at least 100 mm between the arrangement and the rearmost point of the piping, fittings and valves under gas pressure during transport.

b) Side and rollover protection

Manifolds shall be designed such that they are protected from impact in the event of a battery vehicle rolling onto its side or upside down.

4.3 Elements

Elements within a battery vehicle shall be suitable for the gas, all have the same test pressure and shall conform to the appropriate standards for the individual element type.

4.4 Element valves and fittings

4.4.1 Either an element valve or an element fitting shall be fitted into each element outlet. For acetylene see annex B.

4.4.2 They shall be suitable for the gas and pressure for which the battery vehicle is intended.

4.4.3 They shall be compatible with the inlet thread of the element.

4.4.4 Isolating shut off valves shall be fitted where the battery vehicle contains flammable gas, to limit the total volume of the elements covered by a single valve to 5 000 litres.

4.4.5 An isolating shut off valve shall be fitted where the battery vehicle contains toxic gas, to isolate each individual element or cylinder within a bundle.

4.4.6 When an element valve or element fitting is fitted to the main connection of a bundle it shall be of a form appropriate to the gas to be carried, or of a form which cannot lead to the incorrect connection to other gas product equipment.

4.4.7 Access shall be provided to all valves.

4.5 Manifold

4.5.1 The manifold shall be designed and constructed so as to avoid the risk of damage due to thermal expansion and contraction, mechanical shock and vibration and be compatible with the gas. For acetylene see annex B.

4.5.2 For compressed gases the design pressure shall be not less than 1,5 x working pressure. For liquefied gases the design pressure shall be not less than the test pressure of the element.

4.5.3 The proof test pressure shall be a minimum of 1,0 x design pressure. The maximum stress of the manifolding arrangement at the test pressure shall not exceed 75% of the guaranteed yield strength of the material.

4.5.4 No part of the manifold shall bear against other components except at element valve/fitting interfaces or at defined attachment points to the frame.

4.5.5 Where the manifold is made of metal, the necessary flexibility shall be achieved by the use of bends or coils. Flexible hoses or non-metallic pipework should only be used as part of the fixed pipework on the battery vehicle after trials have proved their acceptability and compatibility. The length of such hoses and pipework should be kept to a minimum.

4.5.6 Joints shall not decrease the strength of tubing as can happen when cutting threads.

4.6 Main valve(s)/connection(s)

4.6.1 The main connection shall be compatible with the gas and the pressure for which the battery vehicle is intended.