

Transportable gas cylinders — Non-refillable metallic gas cylinders

The European Standard EN 12205:2001 has the status of a
British Standard

ICS 23.020.30

National foreword

This British Standard is the official English language version of EN 12205:2001.

The UK participation in its preparation was entrusted by Technical Committee PVE/3, Gas containers, to Subcommittee PVE/3/3, Gas containers — Design, which has the responsibility to:

- aid enquirers to understand the text;
- present to the responsible European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
- monitor related international and European developments and promulgate them in the UK.

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

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This British Standard, having been prepared under the direction of the Engineering Sector Committee, was published under the authority of the Standards Committee and comes into effect on 15 July 2001

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Transportable gas cylinders — Non-refillable metallic gas cylinders

Bouteilles à gaz transportables — Bouteilles à gaz
métalliques non rechargeables

Ortsbewegliche Gasflaschen — Metallische
Einwegflaschen

This European Standard was approved by CEN on 8 March 2001.

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Contents

	Page
Foreword	3
Introduction	3
1 Scope	3
2 Normative references	3
3 Terms, definitions and symbols	4
4 Requirements	6
5 Design	9
6 Construction and workmanship	10
7 Tests	14
8 Inspection	17
9 Markings	17
Annex A (normative) Prototype and production testing	19
Bibliography	21

Foreword

This European Standard 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of an identical text or by endorsement, at the latest by November 2001, and conflicting national standards shall be withdrawn at the latest by November 2001.

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

This standard has been submitted for reference into the RID and/or 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 implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The purpose of this standard is to provide a specification for the design, manufacture, inspection and approval of non-refillable metallic gas cylinders. The specifications given are based on knowledge of, and experience with, materials, design requirements, manufacturing processes and control during manufacture of cylinders in common use in the countries of the CEN members.

Users of cylinders manufactured to this standard should ensure that they are aware of all relevant regulations concerning the gases that may be filled into non-refillable cylinders (for example see common position 19/1999 of the Council of the EU which specifies that substances which are harmful to the ozone layer shall not be put on the market in disposable containers except for essential uses). Where a cylinder is used for a harmful gas, care should be taken to ensure that it is disposed of in a manner that is in accordance with relevant regulations, is safe and meets environmental requirements.

1 Scope

This European Standard specifies minimum requirements for the material, design, construction and workmanship, manufacturing processes and tests at manufacture of non-refillable metallic gas cylinders of welded, brazed or seamless construction used for compressed, liquefied and dissolved gases.

This standard is not applicable to cartridges/aerosol dispensers and spherical containers.

NOTE For cartridges, see EN 417

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 287-2, *Approval testing of welders — Fusion welding — Part 2: Aluminium and aluminium alloys.*

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

EN 1800:1998, *Transportable gas cylinders — Acetylene cylinders — Basic requirements and definitions.*

EN 1964-1:1999, *Transportable gas cylinders — Specification for the design and construction of refillable transportable seamless steel gas cylinders of capacity from 0,5 litres up to and including 150 litres — Part 1: Seamless steel with a maximum R_m value of 1 100 MPa.*

prEN 1964-2:1998, *Transportable gas cylinders — Specification for the design and construction of refillable transportable seamless steel gas cylinders of capacity from 0,5 litres up to and including 150 litres — Part 2: Tensile strength ($R_{m,max}$) $\geq 1\,100\text{ N/mm}^2$.*

EN 1964-3:2000, *Transportable gas cylinders — Specification for the design and construction of refillable transportable seamless steel gas cylinders of capacity from 0,5 litres up to 150 litres — Part 3: Stainless steel cylinders.*

EN 1975:1999, *Transportable gas cylinders — Specification for the design and construction of refillable transportable seamless aluminium alloy gas cylinders of capacity from 0,5 litre up to 150 litre.*

EN 10002-1, *Metallic materials — Tensile testing — Part 1: Method of test (at ambient temperature).*

EN 10088-1, *Stainless steels — Part 1: List of stainless steels.*

EN 10120, *Steel sheet and strip for welded gas cylinders.*

EN 10130, *Cold rolled low carbon steel flat products for cold forming — Technical delivery conditions.*

EN 12862, *Transportable gas cylinders — Specification for the design and construction of refillable transportable welded aluminium alloy gas cylinders.*

EN 13133, *Brazing — Brazer approval.*

EN 13134, *Brazing — Procedure approval.*

EN ISO 3166-1, *Codes for the representation of names of countries and their subdivisions — Part 1: Country Codes (ISO 3166-1:1997).*

EN ISO 11114-1:1997, *Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials (ISO 11114-1:1997).*

EN ISO 11120:1999, *Gas cylinders — Refillable seamless steel pressure vessels for compressed gas transport of water capacity between 150 L and 3 000 L — Design and testing (ISO 11120:1999).*

EN ISO 13340, *Transportable gas cylinders — Cylinder valves for non-refillable cylinders — Specification and prototype testing (ISO 13340:2001).*

ISO 4706, *Refillable welded steel gas cylinders.*

3 Terms, definitions and symbols

For the purposes of this European Standard the following terms, definitions and symbols apply.

3.1 Terms and definitions

3.1.1

non-refillable cylinder

cylinder which may be filled only once

3.1.2

batch

quantity of completed and pressure tested cylinders of the same design, prototype design, water capacity, material, heat treatment (if any) and manufacturing process, made successively during one production shift of up to 12 hours

3.1.3

burst pressure

highest pressure reached in a cylinder during the burst test

3.1.4

material certificate

document, issued by the material manufacturer, which states the chemical analysis, mechanical properties, heat treatment, processing techniques or other properties/features if required

3.1.5

cylindrical shell

the portion of the cylinder, excluding the heads (ends), which is parallel to the centreline axis of the cylinder

3.1.6

heads (ends)

the portions of a cylinder which are not parallel to the centreline axis of the cylinder

3.1.7

maximum permissible operating pressure

highest pressure permitted to be developed during service. It is the developed pressure at 65 °C

3.1.8

test pressure

required pressure applied during the pressure test

3.1.9

working pressure

settled pressure at a uniform temperature of 288 K (15 °C) for a full gas cylinder

3.1.10

water capacity

the capacity of the empty cylinder when filled with water

3.1.11

design stress factor (F) (variable)

the ratio of equivalent wall stress at test pressure (p_t) to guaranteed minimum yield stress (R_e)

3.2 Symbols

a — Calculated minimum thickness in millimetres of the cylinder shell.

D — Nominal outside diameter of the cylinder, in millimetres.

F — Design stress factor (variable).

- p_h — Test pressure, in bar¹⁾ above atmospheric pressure.
- p_{ms} — Maximum permissible operating pressure, in bar¹⁾ above atmospheric pressure.
- R_e — Minimum guaranteed value of yield stress in megapascals for the finished cylinder in the cylindrical part of the cylinder.
- R_g — Minimum guaranteed value of the tensile strength in megapascals for the finished cylinder.
- V — Water capacity of the cylinder, in litres.

4 Requirements

4.1 General

Cylinders conforming to this standard shall meet the following requirements:

- The maximum permissible operating pressure (p_{ms}) shall not exceed 250 bar.
- The product of the maximum permissible operating pressure (p_{ms}) and the water capacity (V) shall not exceed 1 000 bar·litres.
- Where the maximum permissible operating pressure (p_{ms}) exceeds 35 bar, the water capacity (V) shall not exceed 5 litres.
- Cylinders for service with toxic gases or toxic gas mixtures shall have water capacity (V) not exceeding 2 litres.

Cylinders having a maximum permissible operating pressure (p_{ms}) or water capacity (V) exceeding any of the limits given in a), b), c) or d) above shall not be manufactured in accordance with this standard.

NOTE For such cylinders, see the appropriate refillable cylinder standard (e.g. EN 1964-1:1999, EN 1975:1999).

Cylinders for service with dissolved acetylene shall incorporate an appropriate porous mass. The completed cylinder containing the porous mass shall meet the requirements of EN 1800:1998.

4.2 Materials

4.2.1 General

4.2.1.1 Non-refillable gas cylinders shall be made of carbon or low-alloy carbon steels, austenitic stainless steel, aluminium or aluminium alloys. The materials used are specified by type (see 4.2.2) and chemical compositions (see 4.2.3). Materials shall not present defects which are prejudicial to their use.

4.2.1.2 The cylinder manufacturer shall specify the chemical and mechanical requirements to the material supplier.

¹⁾ 1bar = 10⁵ Pa = 0,1MPa.