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Gaseous hydrogen - Cylinders and tubes for stationary storage

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

Táto norma bola oznámená vo Vestníku ÚNMS SR č. 08/25

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English Version

Gaseous hydrogen - Cylinders and tubes for stationary storage

Hydrogène gazeux - Bouteilles et tubes pour stockage stationnaire

Gasförmiger Wasserstoff - Flaschen und Großflaschen zur ortsfesten Lagerung

This European Standard was approved by CEN on 7 April 2025.

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

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European foreword

This document (EN 17533:2025) 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of an identical text or by endorsement, at the latest by November 2025, and conflicting national standards shall be withdrawn at the latest by November 2025.

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

This document supersedes EN 17533:2020.

EN 17533:2025 includes the following significant technical changes with respect to EN 17533:2020:

— requirements for new design have been revised;

— addition of Figure A.1 Concept of Annex A;

— Annexes B and C have been revised.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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Introduction

As the use of gaseous hydrogen evolves from the chemical industry into various emerging applications, such as fuel for fuel cells, internal combustion engines and other speciality hydrogen applications, new requirements are foreseen for seamless and composite pressure vessels, including higher number of pressure cycles.

Requirements covering pressure vessels for stationary storage of compressed gaseous hydrogen are listed in this document and are mainly intended to maintain or improve the level of safety for this application.

1 Scope

This document specifies the requirements for the design, manufacture and testing of cylinders, tubes and other pressure vessels of steel, stainless steel, aluminium alloys or of non-metallic construction material. These are intended for the stationary storage of gaseous hydrogen of up to a maximum water capacity of 10 000 l and a maximum allowable working pressure not exceeding 1 100 bar, of seamless metallic construction (Type 1) or of composite construction (Types 2, 3 and 4), hereafter referred to as pressure vessels.

NOTE Additional requirements with regard to assemblies (manifolded cylinders and tubes and other pressure vessels) are not covered by this document.

This document is not applicable to Type 2 and 3 vessels with welded liners.

This document is not applicable to pressure vessels used for solid, liquid hydrogen or hybrid cryogenic-high pressure hydrogen storage applications.

This document is not applicable to external piping which can be designed according to recognized standards.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN ISO 306, *Plastics — Thermoplastic materials — Determination of Vicat softening temperature (VST) (ISO 306)*

EN ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2)*

EN ISO 1519, *Paints and varnishes — Bend test (cylindrical mandrel) (ISO 1519)*

EN ISO 2808, *Paints and varnishes — Determination of film thickness (ISO 2808)*

EN ISO 2812-1, *Paints and varnishes — Determination of resistance to liquids — Part 1: Immersion in liquids other than water (ISO 2812-1)*

EN ISO 2409, *Paints and varnishes — Cross-cut test (ISO 2409)*

EN ISO 6272-2, *Paints and varnishes — Rapid-deformation (impact resistance) tests — Part 2: Falling-weight test, small-area indenter (ISO 6272-2)*

EN ISO 6506-1, *Metallic materials — Brinell hardness test — Part 1: Test method (ISO 6506-1)*

EN ISO 7225, *Gas cylinders — Precautionary labels (ISO 7225)*

EN ISO 7866, *Gas cylinders — Refillable seamless aluminium alloy gas cylinders — Design, construction and testing (ISO 7866)*

EN ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests (ISO 9227)*

EN ISO 9809-1, *Gas cylinders — Design, construction and testing of refillable seamless steel gas cylinders and tubes — Part 1: Quenched and tempered steel cylinders and tubes with tensile strength less than 1 100 MPa (ISO 9809-1)*

EN ISO 9809-4, *Gas cylinders — Design, construction and testing of refillable seamless steel gas cylinders and tubes — Part 4: Stainless steel cylinders with an Rm value of less than 1 100 MPa (ISO 9809-4)*

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

EN ISO 11114-2, *Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials (ISO 11114-2)*

EN ISO 11114-4, *Transportable gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 4: Test methods for selecting steels resistant to hydrogen embrittlement (ISO 11114-4)*

EN ISO 11114-5:2022, *Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 5: Test methods for evaluating plastic liners (ISO 11114-5:2022)*

EN ISO 11120, *Gas cylinders — Refillable seamless steel tubes of water capacity between 150 l and 3000 l — Design, construction and testing (ISO 11120)*

EN ISO 11357-2, *Plastics — Differential scanning calorimetry (DSC) — Part 2: Determination of glass transition temperature and step height (ISO 11357-2)*

EN ISO 11439, *Gas cylinders — High pressure cylinders for the on-board storage of natural gas as a fuel for automotive vehicles (ISO 11439)*

EN ISO 14130, *Fibre-reinforced plastic composites — Determination of apparent interlaminar shear strength by short-beam method (ISO 14130)*

EN ISO 16474-1, *Paints and varnishes — Methods of exposure to laboratory light sources — Part 1: General guidance (ISO 16474-1)*

EN ISO 16474-3, *Paints and varnishes — Methods of exposure to laboratory light sources — Part 3: Fluorescent UV lamps (ISO 16474-3)*

ASTM D3170/D3170M-14, *Standard Test Method for Chipping Resistance of Coatings*