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**Oprema in pribor za utekočinjeni naftni plin (UNP) - Kazalniki nivoja v posodah za UNP**

LPG equipment and accessories - Contents gauges for Liquefied Petroleum Gas (LPG) pressure vessels

Flüssiggas-Geräte und Ausrüstungsteile - Füllstandsanzeiger für Druckbehälter für Flüssiggas (LPG)

Équipements et accessoires GPL - Jauges de niveau pour les réservoirs de gaz de pétrole liquéfié (GPL)

**Ta slovenski standard je istoveten z: EN 13799:2022**

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**ICS:**

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| 23.020.10 | Nepremične posode in rezervoarji | Stationary containers and tanks |
|-----------|----------------------------------|---------------------------------|

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## LPG equipment and accessories - Contents gauges for Liquefied Petroleum Gas (LPG) pressure vessels

Equipements pour GPL et leurs accessoires - Jauges de  
niveau pour les réservoirs de gaz de pétrole liquéfié  
(GPL)

Flüssiggas-Geräte und Ausrüstungsteile -  
Füllstandsanzeiger für Druckbehälter für Flüssiggas  
(LPG)

This European Standard was approved by CEN on 8 August 2022.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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 CEN-CENELEC 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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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**EN 13799:2022 (E)****European foreword**

This document (EN 13799:2022) 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 April 2023, and conflicting national standards shall be withdrawn at the latest by April 2023.

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 13799:2012.

The main changes compared to the previous edition include:

- revision to operational conditions;
- introduction of requirements for rubber material;
- introduction of telemetry requirements;
- introduction of an accuracy test;
- introduction of gauge repeatability requirements.

This document has been submitted for reference in:

- the RID [2]; and
- the technical annexes of the ADR [3].

NOTE These regulations take precedence over any clause of this document. It is emphasized that RID/ADR are being revised regularly at intervals of two years which might lead to temporary non-compliances with the clauses of this document.

This document has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s) / Regulation(s).

For relationship with EU Directive(s) / Regulation(s), see informative Annex ZA, which is an integral part of this document.

For the purposes of this document, contents gauges are considered a pressure accessory in accordance with the Pressure Equipment Directive 2014/68/EU [1] in that they have a function additional to that of containing pressure.

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.

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

## Introduction

Provisions are restricted to a general guidance. Limit values are specified in national laws. It is recommended that companies using this document develop an environmental management policy. For guidance see the ISO 14000 series.

Protection of the environment is a key political issue in Europe and elsewhere. For TC 286 this is covered in CEN/TS 16765 [4] *LPG equipment and accessories - Environmental considerations for CEN/TC 286 standards*, and this Technical Specification should be read in conjunction with this document. This Technical Specification provides guidance on the environmental aspects to be considered regarding equipment and accessories produced for the LPG industry and the following is addressed:

- a) design;
- b) manufacture;
- c) packaging;
- d) use and operation; and
- e) disposal.

In this document the unit bar is used, due to its universal use in the field of technical gases. It should, however, be noted that bar is not an SI unit, and that the corresponding SI unit for pressure is Pa (1 bar =  $10^5$  Pa =  $10^5$  N/m<sup>2</sup>).

NOTE Pressure values given in this document are given as gauge pressure (pressure exceeding atmospheric pressure) unless otherwise stated.

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**EN 13799:2022 (E)****1 Scope**

This document specifies minimum requirements for design and testing of contents gauges, which are directly connected to LPG transportable pressure vessels, LPG drums, LPG cylinders and static LPG pressure vessels above 0,5 l water capacity excluding those used for automotive containers.

This document includes minimum requirements for the safe interchangeability of telemetry equipment, which is either integral in or additional to the contents gauge.

This document does not apply to refineries or other process plants.

**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 549:2019, *Rubber materials for seals and diaphragms for gas appliances and gas equipment*

EN 751-1:1996, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water — Part 1: Anaerobic jointing compounds*

EN 751-2:1996, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water — Part 2: Non-hardening jointing compounds*

EN 751-3:1996, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water — Part 3: Unsintered PTFE tapes*

EN 1092-1:2018, *Flanges and their joints — Circular flanges for pipes, valves, fittings and accessories, PN designated — Part 1: Steel flanges*

EN 1563:2018, *Founding — Spheroidal graphite cast irons*

EN 1774:1997, *Zinc and zinc alloys — Alloys for foundry purposes — Ingot and liquid*

EN 12164:2016, *Copper and copper alloys — Rod for free machining purposes*

EN 12165:2016, *Copper and copper alloys — Wrought and unwrought forging stock*

EN 12420:2014, *Copper and copper alloys — Forgings*

EN 12516-1:2014+A1:2018, *Industrial valves — Shell design strength — Part 1: Tabulation method for steel valve shells*

EN 12516-4:2014+A1:2018, *Industrial valves — Shell design strength — Part 4: Calculation method for valve shells manufactured in metallic materials other than steel*

EN 13445-2:2021, *Unfired pressure vessels — Part 2: Materials*

EN 13906-1:2013, *Cylindrical helical springs made from round wire and bar — Calculation and design — Part 1: Compression springs*



EN IEC 60079-0:2018,<sup>1</sup> *Explosive atmospheres — Part 0: Equipment — General requirements (IEC 60079-0:2017/COR1:2020)*

EN ISO 7049:2011, *Cross-recessed pan head tapping screws (ISO/FDIS 7049:2011)*

EN ISO 11114-1:2020, *Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 1: Metallic materials (ISO 11114-1:2020)*

EN ISO 11114-2:2021, *Gas cylinders — Compatibility of cylinder and valve materials with gas contents — Part 2: Non-metallic materials (ISO 11114-2:2021)*

ISO 301:2006, *Zinc alloy ingots intended for castings*

ISO 1817:2015, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 2859-1:1999, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

ISO 6957:1988, *Copper alloys — Ammonia test for stress corrosion resistance*

ANSI/ASME B1.20.1 - 2013, *Pipe threads, general purpose (inch); issued by American National Standards Institute in 2013*

### 3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>  
<https://standards.iteh.ai/catalog/standards/sist/a4ad3ecc-9a70-4bbe-b26c->
- IEC Electropedia: available at <https://www.electropedia.org/>

#### 3.1

##### **liquefied petroleum gas**

##### **LPG**

low pressure 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

##### **contents gauge**

device to indicate the liquid level or contents in a pressure vessel

##### 3.2.1

##### **float gauge**

device to indicate the content of a vessel by means of a float on the liquid surface within the vessel

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<sup>1</sup> This document is impacted by EN IEC 60079-0:2018/AC:2020-02.

**EN 13799:2022 (E)****3.2.2****rotary gauge**

device which operates through a rotating action in order to assess the liquid level in a vessel by means of temporarily venting a limited amount of LPG, whereupon the change from liquid to vapour is detected

**3.2.3****fixed liquid level gauge**

control device which indicates the predetermined liquid level when there is a change in vented LPG from vapour to liquid

EXAMPLE A dip tube in combination with a vent valve.

**3.2.4****slip tube**

device which operates through a linear action in order to assess the liquid level in a pressure vessel by means of temporarily venting a limited amount of LPG, where upon the change from liquid to vapour is detected

**3.3****external leak tightness**

resistance to leakage through the fitting to or from the atmosphere

**3.4****internal leak tightness**

resistance to leakage to atmosphere across the valve seal or any other pressure containing component when the valve is closed

**3.5****maximum allowable pressure**

maximum pressure for which the equipment is designed

**3.6****nominal diameter****DN**

numerical designation of size, in millimetres, which is common to all components in a piping system other than components designated by outside diameters or by thread size

Note 1 to entry: It is a convenient round number for reference purposes and is only loosely related to manufacturing dimensions. The nominal size is designated by DN followed by a number.

**3.7****pressure vessel**

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

**3.8****type test**

test or series of tests conducted to prove that the design meets the requirements of this document

## 4 Operating conditions

Contents gauges designed in accordance with this document shall be suitable for the following conditions:

- a minimum operating temperature of  $-20\text{ °C}$ ;
- a minimum operating temperature of  $-40\text{ °C}$  for those parts of Europe where contents gauges are subject to more severe temperature conditions. The material and design shall be shown to be satisfactory for operations under these conditions and shall meet the requirements of Annex B;
- the maximum operating temperature is  $65\text{ °C}$ ; and
- the minimum pressure to which a gauge is normally exposed is 0 bar gauge. Vacuum conditions on the gauge, arising from butane at low temperature or evacuation of the pressure vessel can expose the device to a vacuum of 0,05 bar absolute.

The maximum allowable pressure for a contents gauge shall be 30 bar.

## 5 Materials

### 5.1 General

**5.1.1** All materials in contact with LPG shall be physically and chemically compatible with LPG under all the normal operating conditions for which the contents gauge is intended to be used.

**5.1.2** Materials for gauge components shall be selected to give adequate strength in service. Materials selected shall adequately protect against other modes of failure such as atmospheric corrosion, brass dezincification, stress corrosion or other material failure.

**5.1.3** Alternative materials to those listed in 5.2 are not precluded, providing they comply with a standard or specification that ensures control of chemical and physical properties, and quality appropriate to the end use.

**5.1.4** Dial inserts shall be sealed to prevent water ingress into the dial insert. The contents gauge shall be designed to ensure that water ingress between the dial insert and gauge body is avoided or does not interfere with the gauge operation if it freezes. This may include filling any void with suitable material or the provision of a drain hole not less than 2,5 mm diameter.

**5.1.5** Optional equipment directly connected to the gauge shall not affect the integrity of the gauge and its function.

### 5.2 Metallic materials

**5.2.1** Metallic materials for gauges shall be steel, stainless steel, copper alloys, aluminium alloys, or zinc alloys in accordance with EN ISO 11114-1:2020.

**5.2.2** Shell materials shall be selected in accordance with EN 12516-1:2014+A1:2018, EN 12516-4:2014+A1:2018 or EN 13445-2:2021.

**5.2.3** Materials for steel flanges shall be in accordance with EN 1092-1:2018. Propane steel flanges shall have a pressure rating of PN 40.

**5.2.4** Stainless steel for components shall contain not less than 16 % chromium, and not less than 6 % nickel.

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**5.2.5** Springs shall be manufactured from stainless steel wire and shall contain not less than 16 % chromium and not less than 6 % nickel.

**5.2.6** Hot stamped brass shall be non-porous and suitable for machining or other processing. Leaded brass shall be CW614N in accordance with EN 12164:2016 or CW617N in accordance with EN 12420:2014 and EN 12165:2016. Sand-cast brass shall not be used. Cold drawn brass rods shall only be used for machining after adequate testing for internal cracking, porosity or other inclusions and shall be heat treated if required. Components produced from stamping brass shall not exhibit cold shuts also known as folds, or surface defects.

**5.2.7** Components manufactured from hot stamped brass or contents gauge bodies made of drawn brass or machined from brass rod shall be capable of withstanding, without cracking, the stress cracking test in accordance with 8.9.

**5.2.8** Spheroidal graphite cast iron shall comply with EN 1563:2018 and amendments, with an elongation at fracture of more than 18 %. Other ductile irons or cast irons shall not be used.

**5.2.9** ZnAl4 and ZnAl4Cu1 shall be in accordance with ISO 301:2006 or EN 1774:1997.

**5.2.10** Castings shall be free from inclusions and surface defects which could adversely affect the strength, leak tightness or performance of the contents gauge.

**5.3 Non-metallic components**

**5.3.1** Non-metallic materials shall be in accordance with EN ISO 11114-2:2021.

**5.3.2** Except for floats, all non-metallic materials in contact with LPG shall not distort, harden or adhere to the body or seat face to such an extent as to impair the function of the gauge.

**5.3.3** Rubber materials, with the exception of floats, in contact with LPG, for temperatures of -20 °C (-40 °C for low temperature applications) to +65 °C, shall meet the requirements of EN 549:2019 for resistance to:

- a) gas (n-pentane test);
- b) lubricants;
- c) ageing;
- d) compression;
- e) ozone (where the material is exposed to the atmosphere);
- f) condensate/liquid phase of combustible gases (liquid B test).

**5.3.4** The buoyancy of the float shall not be adversely affected by the LPG. Non-metallic floats shall be tested in accordance with 8.14 for resistance to gas and for resistance to condensate/liquid phase of combustible gases.

**5.4 Lubricants, sealants and adhesives**

Where used on threads and seals; lubricants, sealants, and adhesives shall be compatible with LPG and not interfere with the operation of the contents gauge. Sealants shall comply with EN 751-1:1996, EN 751-2:1996 or EN 751-3:1996.