BS EN 13483:2022

BSI Standards Publication

Rubber and plastic hoses and hose assemblies with internal vapour recovery for measured fuel dispensing systems — Specification

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National foreword

This British Standard is the UK implementation of EN 13483:2022. It supersedes BS EN 13483:2013, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/66, Rubber and plastics tubing, hoses and hose assemblies.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Rubber and plastic hoses and hose assemblies with internal vapour recovery for measured fuel dispensing systems - Specification

Tuyaux et assemblages flexibles à récupération interne de vapeur pour systèmes de livraison mesurée de carburant - Spécification

Gummi- und Kunststoffschläuche und -schlauchleitungen mit innenliegender Gasrückführung für Zapfsäulen an Tankstellen - Anforderungen

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European foreword

This document (EN 13483:2022) has been prepared by Technical Committee CEN/TC 218 “Rubber and plastics hoses and hose assemblies”, 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of an identical text or by endorsement, at the latest by April 2023, and conflicting national standards shall be withdrawn at the latest by April 2023.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 13483:2013.

In comparison with EN 13483:2013, the following changes have been made:

a) the normative references have been updated;

b) in 7.3 the concentricity tolerance has been narrowed from 1,0 mm to 0,7 mm;

c) in Table 4 the “Low temperature class” has been increased from 18 ml to 22 ml;

d) Clause 9 “End fittings” has been amended so that mechanically suitable, conductive plastics may be used as an alternative to metallic materials;

e) the document has been aligned with the 2017 issue of the guidance document prepared by ISO/TC 45/SC 1 on the layout of ISO and CEN standards on rubber and plastics hoses and hose assemblies (most notably with respect to Clause 11 “Frequency of testing”, Clause 12 “Marking”, and the pressure units used);

f) informative Annex N concerning environmental aspects has been added.

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.

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Introduction

WARNING — Persons using this document are assumed to be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

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1 Scope

This document specifies the requirements and test methods for verification for hose assemblies with vapour recovery for delivery systems on petrol filling stations.

Hoses can be constructed from rubber or thermoplastic elastomer (TPE) and this document specifies the requirements for three types of hoses in two grades and two classes of hose assemblies for measured fuel dispensing systems, including oxygenated fuels (≤15 % oxygenated compounds) with internal vapour recovery tubing or hose made out of rubber or thermoplastic elastomer (TPE).

The assemblies are intended for use at ambient temperatures between −30 °C and +55 °C for normal temperature class and −40 °C and +55 °C for low temperature class at a working pressure ≤ 16 bar [1].

This document is not applicable to multi chamber fuel dispensing hoses.

NOTE As part of the certification of a new dispenser, testing of fuel samples in accordance with EN 228 is carried out at least eight weeks after the first use of the equipment to avoid unrepresentative sulphur content results.

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 6801, *Rubber or plastics hoses - Determination of volumetric expansion (ISO 6801)*

EN ISO 1307, *Rubber and plastics hoses - Hose sizes, minimum and maximum inside diameters, and tolerances on cut-to-length hoses (ISO 1307)*

EN ISO 1402, *Rubber and plastics hoses and hose assemblies - Hydrostatic testing (ISO 1402)*

EN ISO 4671, *Rubber and plastics hoses and hose assemblies - Methods of measurement of the dimensions of hoses and the lengths of hose assemblies (ISO 4671)*

EN ISO 7326, *Rubber and plastics hoses - Assessment of ozone resistance under static conditions (ISO 7326)*

EN ISO 8031:2020, *Rubber and plastics hoses and hose assemblies - Determination of electrical resistance and conductivity (ISO 8031:2020)*

EN ISO 8033, *Rubber and plastics hoses - Determination of adhesion between components (ISO 8033)*

EN ISO 8330, *Rubber and plastics hoses and hose assemblies - Vocabulary (ISO 8330)*

EN ISO 10619-1, *Rubber and plastics hoses and tubing - Measurement of flexibility and stiffness - Part 1: Bending tests at ambient temperature (ISO 10619-1)*

ISO 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles*

[1] 1 bar = 0,1 MPa.

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ISO 554, *Standard atmospheres for conditioning and/or testing — Specifications*

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

ISO 4649:2017, *Rubber, vulcanized or thermoplastic — Determination of abrasion resistance using a rotating cylindrical drum device*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 8330 and the following 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

— IEC Electropedia: available at https://www.electropedia.org/

3.1
hose assembly
fuel hose complete with an internal vapour tubing or vapour hose and fitted with couplings

4 Classification

Hoses for this application shall be divided into three types:

— Type 1, textile reinforced;

— Type 2, textile and helical wire reinforced; or

— Type 3, fine wire reinforced.

Each type of hose shall be divided into two grades:

— Grade M: electrically bonded;

— Grade Ω: electrically conductive.

Each type of hose shall be divided into two temperature classes:

— normal temperature class with an ambient working temperature of −30 °C to +55 °C;

— low temperature class (LT) with an ambient working temperature of −40 °C to +55 °C.

5 Materials and construction

5.1 Fuel hose

The fuel hose shall consist of the following:

a) a smooth, fuel resistant lining of rubber or thermoplastic elastomer (TPE);

b) a suitable reinforcement, related to type;

c) a non-corrugated fuel and weather resistant rubber or TPE cover.

Hose assemblies shall be capable of conducting an electrical charge from coupling to coupling.

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When this capability is provided by means of metallic bonding wires, not less than two (metallic) bonding wires shall be embedded in the hose and the metal used shall have a high resistance to fatigue and corrosion.

Hoses with metallic wires for electrical conductivity shall be designated 'M' and those using conductive compounds shall be designated 'Ω', the relevant mark being branded on the hose, (see Clause 12).

5.2 Vapour hose

The vapour hose shall consist of the following:

a) a smooth fuel and vapour resistant lining of rubber or TPE;

b) a textile and/or metallic reinforcement;

c) a non-corrugated fuel and vapour resistant rubber or TPE.

5.3 Vapour tubing

The vapour tubing shall consist of a smooth and vapour and fuel resistant thermoplastic.

5.4 Vapour recovery fuel hose assembly

The vapour recovery fuel hose assembly shall consist of an outer fuel hose in accordance with 5.1 and an inner vapour recovery hose in accordance with 5.2 or vapour tubing in accordance with 5.3 with the fuel hose and vapour hose or tubing attached to an electrically bonded coupling system.

6 Pressure requirements

The pressure ratings of the fuel hose and the vapour tubing/hose shall comply with values given in Table 1.

Table 1 — Pressure ratings

Property	Pressure ratings bar	
	Fuel hose	Vapour tubing/hose
Maximum working pressure	16	0,2 abs./8 [a]
Proof test pressure	24	[b]
Minimum burst pressure	48	18

[a] The vapour tubing/hose shall be designed for an absolute pressure of 0,2 bar (vacuum) with an external pressurisation of 8 bar.

[b] See Annex B.

7 Dimensions and tolerances

7.1 Diameters and bend radii

Diameters and bend radii shall conform to the values given in Table 2.

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Table 2 — Dimensions requirements

Dimensions in millimetres

Tubing/hose/assembly	Internal diameter max.	Outside diameter max.	Bend radius min.
Vapour tubing/hose	8,4	—	75
Fuel hose	—	32,6	130
Assembly	—	—	130

7.2 Minimum thickness of lining and cover of the fuel hose

When measured in accordance with EN ISO 4671, the thickness of the lining shall be not less than 1,6 mm and the thickness of the cover shall be not less than 1,0 mm.

7.3 Concentricity

When determined in accordance with EN ISO 4671, the concentricity, based on a total indicator reading between the internal diameter and the outside diameter, shall not exceed 0,5 mm for the vapour tubing or hose, and shall not exceed 0,7 mm for the fuel hose.

7.4 Tolerance on cut lengths

For cut lengths, the tolerances on length shall be in accordance with EN ISO 1307. The length of a hose assembly shall be measured from sealing face to sealing face of the end fittings with a tolerance from the nominal length of ± 1 %.

8 Physical properties

8.1 Compounds

When tested in accordance with the methods in Table 3, the physical properties of the compounds used for the lining and cover shall conform to the values given in Table 3. Tests shall be performed either on samples taken from the hose or from moulded vulcanised sheets at a thickness of 2 mm or moulded test pieces vulcanised to the same cured state as the production hoses.

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Table 3 — Physical properties of compounds

Property	Unit	Requirement			Test piece [a]	Test method
		Rubber	TPE	Thermo-plastic		
Tensile strength, min. Lining and cover of fuel hose and vapour tubing and hose	MPa	9	12	12	Test piece cut from hose or from test sheet	ISO 37 ISO 527-1 (Thermoplastic)
Elongation at break, min. Lining and cover of fuel hose and vapour tubing and hose	%	250	350	150		
Accelerated ageing Tensile strength change, Lining and cover fuel hose and vapour tubing and hose, max.		20	10	20		ISO 188 (air oven method) 14 days at (70 ± 1) °C
Elongation at break change, Lining and cover of fuel hose and vapour tubing and hose, max.		−35	−20	−35		
Resistance to liquids Swell of lining of fuel hose; tubing and cover of vapour hose max.		70		70		ISO 1817 70 h at 40 °C in oxygenated fuel Type 3
		25		25		ISO 1817 70 h at 100 °C in oil Nº 3
Extracted matter Lining of fuel hose; tubing and cover of vapour hose max. Normal Temperature Class −30 °C Low Temperature Class LT −40 °C		+10 +15		10 15		ISO 1817 70 h at 40 °C in oxygenated fuel Type 3 then dry 24 h at 100 °C
Swell of cover of fuel hose		+100		100		ISO 1817 70 h at 23 °C in liquid B
Low temperature class resistance, -lining and cover of fuel hose and vapour tubing and hose, at −30 °C (or at LT −40 °C if required)	—	No cracks under x 10 magnification				Annex A
Abrasion, max. -cover of fuel hose	mm^3	500			Test piece from moulded test sheet of cover compound	ISO 4649:2017 Method A

[a] It is necessary that the test report indicates the source of the test piece.

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