SLOVENSKI STANDARD
SIST EN 13483:2013

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Nadomešča:
SIST EN 13483:2005

Gumene in polimerne cevi ter cevni priključki z notranjim sistemom za rekuperiranje hlapov za sisteme za merjeno točenje goriva na bencinskih črpalkah - Specifikacija

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

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

Tuyaux et flexibles à récupération interne de vapeur pour un système de livraison mesurée carburant - Spécification

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83.140.40	Gumene cevi	Hoses

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EUROPEAN STANDARD

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Supersedes EN 13483:2005

English Version

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

Tuyaux et flexibles en caoutchouc et en plastique 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

This European Standard was approved by CEN on 25 April 2013.

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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 CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Foreword

This document (EN 13483:2013) 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of an identical text or by endorsement, at the latest by December 2013, and conflicting national standards shall be withdrawn at the latest by December 2013.

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

This document supersedes EN 13483:2005.

Compared with EN 13483:2005, the following fundamental changes have been made:

a) In Table 3 "Physical properties of compounds" the compound "Thermoplastic" has been added.

b) In Annex L the testing of the ozone resistance has been deleted.

c) The normative references have been updated.

WARNING — Persons using this document should 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.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

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

The hose assemblies with vapour recovery for delivery systems on petrol filling stations need to be capable of withstanding anticipated mechanical, thermal and chemical stressing and be resistant to the combustible liquids used in these applications as well as their vapour and vapour air mixtures. It is imperative that the assemblies be constructed in such a way that actions during normal operation cannot give rise to dangerous electrostatic charges nor that there will be any reduction in the performance of the vapour recovery.

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)].

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.

NOTE This European Standard is not applicable to multi chamber fuel dispensing hoses.

As part of the certification of a new dispenser, testing of fuel samples in accordance with EN 228 should be 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, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 26801, *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 8031:2009, *Rubber and plastics hoses and hose assemblies — Determination of electrical resistance and conductivity (ISO 8031:2009)*

EN ISO 8033, *Rubber and plastics hose — Determination of adhesion between components (ISO 8033)*

EN ISO 8330:2008, *Rubber and plastics hoses and hose assemblies — Vocabulary (ISO 8330:2007)*

EN ISO 10619-1, *Rubber or plastics hoses and tubing — Measurement of flexibility and stiffness — Part 1: Bending tests at ambient temperature (ISO 10691-1)*

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

1) 1 bar = 0,1 MPa

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

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

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

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

ISO 4649:2010, *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 8330:2008 and the following apply.

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.

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.

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 1,0 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.

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 N° 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 4649:2010 Method A

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

8.2 Finished hoses/tubing

When tested in accordance with the methods in Table 4, the physical properties of the finished hoses or tubing shall conform to the values given in Table 4.

Table 4 — Physical properties of tubing and hoses

Property	Unit	Requirement	Test piece	Test method
Vapour tubing/hoses				
Pressure test	–	Free ball passage, no leakage	Short length cut from hose/tubing	Annex B
Change in length due to swelling max.	%	4	Annex C	Annex C
Pressure loss max.	bar	0,030	4 m of hose/tubing	Annex D, D.1
Burst pressure min.		18	Short length cut from hose/tubing	EN ISO 1402
Adhesion (hose only) Un-aged Aged	N/mm	 2,4 1,8	Short length cut from hose	Annex E
Low temperature class flexibility max.	–	No cracks or breaks Maximum bending force 170 N	Annex F	Annex F
Fuel Hoses				
Proof pressure at 24 bar	–	No leakage or other signs of weakness nor abrupt twisting	Full length of hose	EN ISO 1402 Proof test pressure
Burst pressure, min.	bar	48	Short length cut from hose	EN ISO 1402 Burst pressure
Volumetric expansion, max. Type 1 and Type 2 Type 3	%	 2 1	At least 1 m cut from hose	EN 26801 Test pressure 3 bar
Adhesion between components on Un-aged hose, min. Aged hose, min.	kN/m	 2,4 1,8	Short length cut from hose	Annex E
Ambient temperature bending	–	$\frac{T}{D} \geq 0{,}8$		EN ISO 10619-1 Nominal diameter C = 10 × nominal bore
Low temperature class flexibility		No cracks or breaks Maximum bending force 180 N	Annex F	Annex F
Change in length at proof pressure	%	0 to +5	Full length of hose	EN ISO 1402
Change in length due to swelling max.		4	Short length cut from hose	Annex C
Ozone resistance of cover	–	No cracks under × 2 magnification		EN ISO 7326 168 h at 40 °C, 50 pphm, relative humidity (55 ± 10) %, and elongation 20 %
Fuel permeation of hose max. Normal temperature class Low temperature class	ml/(m·day)	 12 18	2 m test piece cut from hose	Annex G