SLOVENSKI STANDARD
SIST EN 1360:2013

01-september-2013

Nadomešča:
SIST EN 1360:2005

Gumene in polimerne cevi ter cevni priključki za sisteme za merjeno točenje goriv - Specifikacija

Rubber and plastic hoses and hose assemblies for measured fuel dispensing systems - Specification

Zapfstellenschläuche und -schlauchleitungen aus Gummi und Kunststoff - Anforderungen

Tuyaux et flexibles en caoutchouc pour distribution mesurée de carburant - Spécifications

Ta slovenski standard je istoveten z: **EN 1360:2013**

ICS:

75.200	Oprema za skladiščenje nafte, naftnih proizvodov in zemeljskega plina	Petroleum products and natural gas handling equipment
83.140.40	Gumene cevi	Hoses

SIST EN 1360:2013 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1360

June 2013

ICS 23.040.70; 75.200

Supersedes EN 1360:2005

English Version

Rubber and plastic hoses and hose assemblies for measured fuel dispensing systems - Specification

Tuyaux et flexibles en caoutchouc et en plastique pour distribution mesurée de carburant - Spécifications

Zapfstellenschläuche und -schlauchleitungen aus Gummi und Kunststoff - Anforderungen

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

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Foreword

This document (EN 1360:2013) 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of an identical text or by endorsement, at the latest by December 2013, and conflicting national standards shall be withdrawn at the latest by December 2013.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 1360:2005.

Compared with EN 1360:2005, the following fundamental changes were made:

a) In Table 1 hoses with nominal bores of 35 and 50 have been included;

b) The normative references have been updated.

WARNING – Persons using this European Standard should be familiar with normal laboratory practice. This standard 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 minimum requirements and test methods for verification for three types of hoses in two grades and two classes of hose assemblies used for measured fuel dispensing, including oxygenated fuels (up to a maximum of 15 % oxygenated compounds).

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)].

As part of the certification of a new dispenser, testing of fuel samples in accordance with EN 228 and EN 590 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 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 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 apply.

1) 1 bar = 0,1 MPa

4 Classification

Hoses for this application shall be divided into three types:

— Type 1: textile reinforced;

— Type 2: textile and helical wire reinforced;

— 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

The hose shall consist of the following:

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

b) a 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).

6 Pressure requirements

For all types of hoses the following shall apply:

a) maximum working pressure: 16 bar;

b) proof pressure: 24 bar;

c) minimum bursting pressure: 48 bar.

7 Dimensions and tolerances

7.1 Internal diameters and bend radii

When measured in accordance with EN ISO 4671, the internal diameter of the hose shall comply with the values given in Table 1.

When measured in accordance with EN ISO 10619-1, the minimum bend radii for each diameter of hose shall be in accordance with Table 1.

Table 1 — Nominal bore, internal diameter, tolerance and bend radii

Nominal bore	Internal diameter mm	Tolerance mm	Bend radius mm
12	12,5	± 0,8	60
16	16,0		80
19	19,0		100
21	21,0	± 1,25	130
25	25,0		150
32	32,0		175
35	35,0		200
38	38,0		225
40	40,0		225
50	50,0		275

7.2 Minimum thickness of lining and cover

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

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 specified in Table 2, the physical properties of the compounds used for the lining and cover shall comply with the values specified in Table 2. 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 2 — Physical properties of compounds

Property	Unit	Requirement		Test piece[a]	Test method
		Rubber	TPE		
Tensile strength Lining and cover, min.	MPa	9	12	Test piece cut from hose or from test sheet	ISO 37
Elongation at break Lining and cover, min.	%	250	350		
Accelerated ageing - Tensile strength change max. Lining and cover,	%	20	10		ISO 188 (air oven method) 14 days at (70 ± 1) °C
- Elongation at break change max. Lining and cover,	%	−35	−20		
Resistance to liquids					
Lining swell max.	%	+70		Test piece cut from hose or from test sheet	ISO 1817 70 h at 40 °C in oxygenated fuel type 3
		+25			ISO 1817 70 h at 100 °C in oil No 3
Lining extracted matter Normal temperature class max.		+10			ISO 1817 70 h at 40 °C in oxygenated fuel type 3 then dry 24 h at 100 °C
Lining extracted matter Low temperature class max.		+15			
Cover swell max.		+100			ISO 1817 70 h at 23 °C in Liquid B
Low temperature resistance of lining and cover at –30 °C (or at LT –40 °C if required)	–	No cracks under × 10 magnification			Annex A
Abrasion resistance Cover compound max.	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 hose

When tested in accordance with the methods specified in Table 3, the physical properties of the finished hose shall comply with the values specified in Table 3.

Table 3 — Physical properties of hoses

Property	Unit	Requirement	Test piece	Test method
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.	N/mm	 2,4 1,8	Short length cut from hose	Annex B
Ambient temperature bending	–	$\frac{T}{D} \geq 0{,}8$		EN ISO 10619-1 Nominal diameter $C = 10 \times$ nominal bore
Low temperature flexibility	–	No cracks or breaks Maximum bending force 180 N	Annex C, Test piece to be taken from a hose with nominal bore of either 16, 19 or 21	Annex C
Change in length at proof pressure	%	0 to +5	Full length of hose	EN ISO 1402
Ozone resistance of cover	–	No cracks under X 2 magnification	Short length cut from hose	EN ISO 7326 168 h at 40 °C, 50 ppmh, 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. Test Piece to be taken from a hose with nominal bore of either 16,19 or 21	Annex D
Electrical resistance max. Grade Ω Grade M	Ω	1 x 10^6 1 x 10^2	Equivalent to the length of hose assembly	EN ISO 8031:2009 4.5, 4.6, 4.7 EN ISO 8031:2009 4.8

Table 3 (continued)

Property	Unit	Requirement	Test piece	Test method
Flammability	—	a) Burning with a naked flame to cease within 20 s of removal of the burner; b) no further glowing visible 2 min after removal of the burner; c) hose shall show no sign of leakage	Length of assembly to suit test rig. Test piece to be taken from a hose with nominal bore of either 16, 19 or 21	Annex E

8.3 Hose assembly

When tested in accordance with the methods specified in Table 4, the physical properties of the hose assembly shall comply with the values specified in Table 4.

Table 4 — Physical properties of hose assembly

Property	Unit	Requirement	Test piece	Test method
Pull-off test	–	No movement of end fitting after removal of force	Short length of hose assembly	Annex F
Proof pressure at 24 bar	–	No leakage or other signs of weakness	Full length of hose assembly	EN ISO 1402 Proof test pressure
Electrical resistance max. Grade M	Ω/assembly	1×10^2		EN ISO 8031:2009, 4.8
Grade Ω		1×10^6		EN ISO 8031, 4.5, 4.6, 4.7
Leak test	-	No leakage		Annex G
Flex test	–	No defects after 18 000 cycles. No leakage after 50 000 cycles max. electrical resistance. The electrical resistance shall meet the requirements given above.		Annex H

9 End fittings

The following requirements shall be fulfilled:

— end fittings shall be designed for the pressure ratings in accordance with Clause 6;

— end fittings shall be designed so that, where used for their intended purpose, they do not adversely affect in-service reliability of the hose due to sharp edges or burrs;

— end fittings shall be designed with a parallel thread

— end fittings with thread sealing (e.g. with Polytetrafluorethylene (PTFE)-band) are not permitted;