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SLOVENSKI STANDARD
SIST EN 1762:2019

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Nadomešča:
SIST EN 1762:2017

Gumene cevi in cevni priključki za utekočinjeni naftni plin, LPG (tekoča ali plinska faza) in zemeljski plin do 25 barov (2,5 MPa) - Specifikacija

Rubber hoses and hose assemblies for liquefied petroleum gas, LPG (liquid or gaseous phase), and natural gas up to 25 bar (2,5 MPa) - Specification

Gummischläuche und -schlauchleitungen für Flüssiggas LPG (flüssig oder gasförmig) und Erdgas bis 25 bar (2,5 MPa) - Spezifikation

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Tuyaux et flexibles en caoutchouc pour le gaz de pétrole liquéfié GPL (en phase liquide ou gazeuse) et le gaz naturel jusqu'à 25 bar (2,5 MPa) -Spécification

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ICS:

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83.140.40	Gumene cevi	Hoses

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 1762

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English Version

Rubber hoses and hose assemblies for liquefied petroleum gas, LPG (liquid or gaseous phase), and natural gas up to 25 bar (2,5 MPa) - Specification

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This European Standard was approved by CEN on 9 November 2018.

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European foreword

This document (EN 1762:2018) 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of an identical text or by endorsement, at the latest by June 2019, and conflicting national standards shall be withdrawn at the latest by June 2019.

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 1762:2017.

Compared to EN 1762:2017 the following changes have been made:

a) the requirements for the construction of the hose have been amended so that hoses do not necessarily have to be pricked;

b) a requirement for a comparative measurement of permeation between the rubber materials of cover and lining for hoses which are not pricked (required for type tests and routine tests) has been added;

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c) the test for resistance to *n*-pentane (measurement of mass increase/mass reduction) has been removed from Table C.1 “Recommended test frequency for production acceptance tests”;

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d) an environmental checklist (informative Annex D) has been added;

e) the document has been editorially revised.

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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

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1 Scope

This document specifies the requirements for rubber hoses and rubber hose assemblies used for the transfer of liquefied petroleum gas (LPG) in liquid or gaseous phase and natural gas with a maximum working pressure of 25 bar (2,5 MPa) and vacuum within the temperature range of −30 °C to +70 °C and, when designated -LT, −50 °C to +70 °C.

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 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 6179, *Rubber, vulcanized or thermoplastic — Rubber sheets and rubber-coated fabrics — Determination of transmission rate of volatile liquids (gravimetric technique) (ISO 6179)*

EN ISO 7233, *Rubber and plastics hoses and hose assemblies — Determination of resistance to vacuum (ISO 7233)*

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

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

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EN ISO 8033, *Rubber and plastics hoses — Determination of adhesion between components (ISO 8033:2016)*

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)*

EN ISO 10619-2, *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 2: Bending tests at sub-ambient temperatures (ISO 10619-2)*

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

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

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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:

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

— ISO Online browsing platform: available at http://www.iso.org/obp

3.1
electrically bonded hose/hose assembly
hose/hose assembly that uses a metallic wire connection to conduct static electricity

3.2
electrically conductive hose/hose assembly
hose/hose assembly that is capable of conducting static electrical charges, using a conductive rubber layer, without the use of a metallic wire

3.3
electrically discontinuous hose/hose assembly
hose/hose assembly that incorporates a metallic wire connection to one end coupling of the assembly only or is electrically insulated from both end-couplings

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4 Classification

Hoses/hose assemblies for this application are classified into 5 types and 3 grades according to their use, construction, and electrical properties. The maximum working pressure for all hoses/hose assemblies is 25 bar.

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The 5 types are as follows:

Type	Application
D	delivery hose
D-LT	delivery hose, low temperature;
SD	suction and delivery hose, helix reinforced
SD-LTS	suction and delivery hose “smooth hose”, helix reinforced, low temperature
SD-LTR	suction and delivery hose, rough bore (having an internal, non-embedded helical wire of stainless steel), low temperature

Hoses for this application are divided into 3 grades according to their electrical properties:

Grade designation	Electrical property
M	Electrically bonded
Ω	Electrically conductive using a conductive rubber layer
Discontinuous	Electrically discontinuous

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5 Materials and construction

5.1 Hose

The hose shall consist of the following:

— a lining of synthetic rubber resistant to *n*-pentane;

— a reinforcement of layers of woven, braided or spirally wound textile material or braided or spirally wound stainless steel wire,

— an embedded stainless steel metallic helix reinforcement (types SD, SD-LTS and SD-LTR only);

— two or more low resistance electrical bonding wires (grade “M” only);

— an outer cover of black or coloured synthetic rubber, resistant to abrasion and outdoor exposure; the cover may be pricked to allow gas permeation. If the cover is not pricked a comparative measurement of permeation between the rubber materials of cover and lining shall be carried out, see Table 3, item 6;

— an internal, non-embedded stainless steel helical wire, suitable for use at −50 °C (type SD-LTR only).

5.2 Hose assemblies

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Hose assemblies shall incorporate metallic couplings attached to the hose by the assembler or built in by the manufacturer. In order to produce the required electrical properties, the couplings should be attached in accordance with Clause 8.

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Chlorinated materials shall not be used in contact with any stainless steel materials.

6 Dimensions

6.1 Nominal bore, internal diameters, outside diameters, tolerances, and minimum bend radius

For hoses without built-in couplings, and when measured in accordance with method A of EN ISO 4671, the internal diameter and outside diameter and their tolerances shall conform to Table 1 or Table 2, depending on the type.

For hoses with built-in couplings, the outside diameters in Tables 1 and 2 do not apply.

When tested by the method described in EN ISO 10619-1, the value of the minimum bend radius shall be as given in Table 1 or Table 2, depending on the type.

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Table 1 — Dimensions and tolerances of hoses of types D and D-LT

Nominal bore	Internal diameter mm	Tolerance mm	Outside diameter mm	Tolerance mm	Design min. bend radius[a] mm
12	12,7	±0,5	22,7	±1,0	100
15	15	±0,5	25	±1,0	120
16	15,9	±0,5	25,9	±1,0	125
19	19	±0,5	31	±1,0	160
25	25	±0,5	38	±1,0	200
32	32	±0,5	45	±1,0	250
38	38	±0,5	52	±1,0	320
50	50	±0,6	66	±1,2	400
51	51	±0,6	67	±1,2	400
63	63	±0,6	81	±1,2	550
75	75	±0,6	93	±1,2	650
76	76	±0,6	94	±1,2	650
80	80	±0,6	98	±1,2	725
100	100	±1,6	120	±1,6	800
150	150	±2,0	174	±2,0	1200
200	200	±2,0	224	±2,0	1600
250	254	±2,0	—	—	2000
300	305	±2,0	—	—	2500

[a] The design minimum bend radius is measured to the surface of the hose on the inside of the bend.

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Table 2 — Dimensions and tolerances of hoses of types SD, SD-LTS and SD-LTR

Nominal bore	Internal diameter mm	Tolerance mm	Outside diameter mm	Tolerance mm	Design min. bend radius[a] mm
12	12,7	±0,5	22,7	±1,0	90
15	15	±0,5	25	±1,0	95
16	15,9	±0,5	25,9	±1,0	95
19	19	±0,5	31	±1,0	100
25	25	±0,5	38	±1,0	150
32	32	±0,5	45	±1,0	200
38	38	±0,5	52	±1,0	280
50	50	±0,6	66	±1,2	350
51	51	±0,6	67	±1,2	350
63	63	±0,6	81	±1,2	480
75	75	±0,6	93	±1,2	550
76	76	±0,6	94	±1,2	550
80	80	±0,6	98	±1,2	680
100	100	±1,6	120	±1,6	720
150	150	±2,0	174	±2,0	1000
200	200	±2,0	224	±2,0	1400
250	254	±2,0	—	—	1750
300	305	±2,0	—	—	2100

[a] The design minimum bend radius is measured to the surface of the hose on the inside of the bend.

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NOTE Nominal bores 250 and 300 apply to hoses with built-in couplings only.

6.2 Minimum thickness of lining and cover

When measured in accordance with EN ISO 4671, the minimum thickness of both the lining and cover of all hoses shall be 1,6 mm.

Not applicable to hose assemblies with built-in couplings.

6.3 Concentricity

When measured in accordance with EN ISO 4671, the concentricity based on a total indicator reading shall be 1,0 mm for hoses of nominal bore 12 to 76 and 1,5 mm for hoses of nominal bore 80 to 200.

Not applicable to hose assemblies with built-in couplings.

6.4 Tolerances on length

The tolerances on the measured length of hoses and hose assemblies shall be ± 1 %.

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7 Physical properties

7.1 Rubber compounds

The physical properties of the rubber compounds used for the lining and cover shall comply with the values given in Table 3, when tested by the methods listed in Table 3.

Tests shall be carried out either on samples taken from the hose or from separately vulcanized sheets, vulcanized to the same state as the hose.

Table 3 — Physical properties of compounds

Item	Property	Unit	Requirement(s)		Method of test
			Lining	Cover	
1	min. tensile strength	MPa	10	10	ISO 37 (dumb-bell test piece)
2	min. elongation at break	%	250	250	ISO 37 (dumb-bell test piece)
3	max. abrasion resistance — for black hoses — for coloured hoses	 mm^3 mm^3	 — —	 170 500[a]	ISO 4649, Method A
4	ageing — max. hardness change from original value — max. tensile strength change from original value — max. change in elongation at break from original value	 IRHD % %	 +10 ±30 −35	 +10 ±30 −35	ISO 188 (air-oven method at (+70 ± 1) °C); duration: 14 days
5	resistance to *n*-pentane				
5.1	immersion in *n*-pentane — max. mass increase	 %	 10	 —	ISO 1817 (7 days ± 2 h immersion in *n*-pentane at (+23 ± 2) °C)
5.2	drying after immersion — variation of hardness — max. hardness value — max. mass reduction	 IRHD IRHD % %	 +10/−3 85 −5 −10[b]	 — — — —	ISO 1817 (drying at (+40 ± 1) °C); duration: 70 h
6	Permeation ratio between lining and cover (only for hoses which are not pricked)	—	minimum 1 : 15		EN ISO 6179, Method B; test liquid: *n*-pentane

a only for hoses with a nominal bore of 13, 16 and 19 for LPG gas dispensers in accordance with EN 1360.

b for LT-types

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