

SLOVENSKI STANDARD

SIST EN 16436-1:2014+A3:2020

01-julij-2020

Nadomešča:

SIST EN 16436-1:2014+A2:2019

Gumeni in plastični priključki, cevovodi in cevi za propan, butan in njune zmesi v plinastem stanju - 1. del: Cevi in cevovodi (vključno z dopolnili do A3)

Rubber and plastics hoses, tubing and assemblies for use with propane and butane and their mixtures in the vapour phase - Part 1: Hoses and tubings

Gummi- und Kunststoff-Schläuche und Schlauchleitungen mit und ohne Einlage zur Verwendung mit Propan, Butan und deren Gemischen in der Gasphase - Teil 1: Schläuche mit und ohne Einlage

Tuyaux, tubes et flexibles en caoutchouc et en plastique pour utilisation avec le propane, le butane et leurs mélanges en phase vapeur - Partie 1: Tuyaux et tubes

Ta slovenski standard je istoveten z: EN 16436-1:2014+A3:2020

ICS:

83.140.40 Gumene cevi Hoses

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EUROPEAN STANDARD
 NORME EUROPÉENNE
 EUROPÄISCHE NORM

EN 16436-1:2014+A3

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Supersedes EN 16436-1:2014+A2:2018

English Version

Rubber and plastics hoses, tubing and assemblies for use with propane and butane and their mixtures in the vapour phase - Part 1: Hoses and tubings

Tuyaux, tubes et flexibles en caoutchouc et en plastique
 pour utilisation avec le propane, le butane et leurs
 mélanges en phase vapeur - Partie 1: Tuyaux et tubes

Gummi- und Kunststoff-Schläuche und -
 Schlauchleitungen mit und ohne Einlage zur
 Verwendung mit Propan, Butan und deren Gemischen
 in der Gasphase - Teil 1: Schläuche mit und ohne
 Einlage

This European Standard was approved by CEN on 12 July 2019.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
 COMITÉ EUROPÉEN DE NORMALISATION
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European foreword

This document (EN 16436-1:2014+A3:2020) has been prepared by Technical Committee CEN/TC 181 “Dedicated liquefied petroleum gas appliances”, the secretariat of which is held by AFNOR.

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of an identical text or by endorsement, at the latest by November 2020, and conflicting national standards shall be withdrawn at the latest by November 2020.

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This document includes Amendment 1, approved by CEN on 2015-10-01, Amendment 2, approved by CEN on 2018-05-13, and Amendment 3, approved by CEN on 2019-07-12.

This document supersedes A3 EN 16436-1:2014+A2:2018 A3.

The start and finish of text introduced or altered by amendment is indicated in the text by tags A1 A1, A2 A2 and A3 A3.

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EN 16436-1:2014+A3:2020 (E)**1 Scope**

This European Standard specifies the characteristics and performance requirements for tubing and hoses made of either rubber or plastics for use with commercial propane and commercial butane and mixtures thereof, in the vapour phase, for connection of appliances, from:

- pressurized gas container to a regulating device,
- pressurized gas container to an appliance,
- regulating device to an appliance, and
- regulating device to installation pipework,

in environments of a temperature range from $-30\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$. Working pressures are from 0 bar to 30 bar.

Three classes are defined in Table 1 according to the maximum working pressures and minimum ambient temperatures.

This European Standard only covers the tubing or hose part of assemblies. The assemblies themselves will be covered by EN 16436-2.

This European Standard does not apply to hoses for:

- welding purposes (see EN ISO 3821, EN 1327);
- propulsion purposes;
- LPG transfer purposes (see EN 1762).

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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 ISO 176, *Plastics - Determination of loss of plasticizers - Activated carbon method (ISO 176:2005)*

EN ISO 1402, *Rubber and plastics hoses and hose assemblies - Hydrostatic testing (ISO 1402:2009)*

EN ISO 4080, *Rubber and plastics hoses and hose assemblies - Determination of permeability to gas (ISO 4080:2009)*

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 4671:2007)*

EN ISO 7326, *Rubber and plastics hoses - Assessment of ozone resistance under static conditions (ISO 7326:2016)*

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

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

EN ISO 10619-2, *Rubber and plastics hoses and tubing - Measurement of flexibility and stiffness - Part 2: Bending tests at sub-ambient temperatures (ISO 10619-2:2017)*

EN ISO 30013, *Rubber and plastics hoses - Methods of exposure to laboratory light sources - Determination of changes in colour, appearance and other physical properties (ISO 30013:2011)*

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

ISO 105-A02, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour*

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

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

commercial butane

hydrocarbon product composed predominantly of butanes and/or butenes

Note 1 to entry: The remaining part can consist mainly of propane/propene and pentane/pentene isomers.

[SOURCE: ISO 9162]

3.2

commercial propane

hydrocarbon product composed predominantly of propane and/or propene

Note 1 to entry: The remaining part can consist mainly of ethane/ethene and butane/butene isomers.

[SOURCE: ISO 9162]

3.3

tubing

single core of plastic or rubber with no reinforcement or cover

3.4

hose

rubber or flexible thermoplastic lining with a reinforcement made of natural or synthetic textile material applied either spirally wound or braided, and a flexible rubber or thermoplastic outer cover

4 Classification of tubing and hose

One class of tubing and two classes of hose are specified in Table 1 depending on the maximum working pressure and minimal ambient temperatures.

Table 1 — Classification of tubings and hoses

Class	Maximum working pressure bar	Minimum ambient temperature °C
1 (tubing) ^a	0,2	-20
2 (hose)	10	-30
3 (hose)	30	

NOTE Classes 1 and 2 are usually used downstream of a pressure regulating device.

5 Materials and construction of tubing and hoses

Class 1 tubing shall be made of rubber or thermoplastic material.

Class 2 and class 3 hoses shall comprise a

- rubber or thermoplastics lining;
- reinforcement of natural or synthetic fibres applied either spirally wound or braided;
- rubber or plastics cover. The outer cover may be pricked to allow any gas trapped between the inner lining and outer cover to be released.

The surface colour of the tubing or hose shall be:

- orange (see Figure 1a); or
- black with the marking above, on, or below a continuous orange line of 5 mm minimum width (see Figure 1b); or
- white for classes 1 and 2 with the marking above, on, or below a continuous orange line of 5 mm minimum width (see Figure 2).

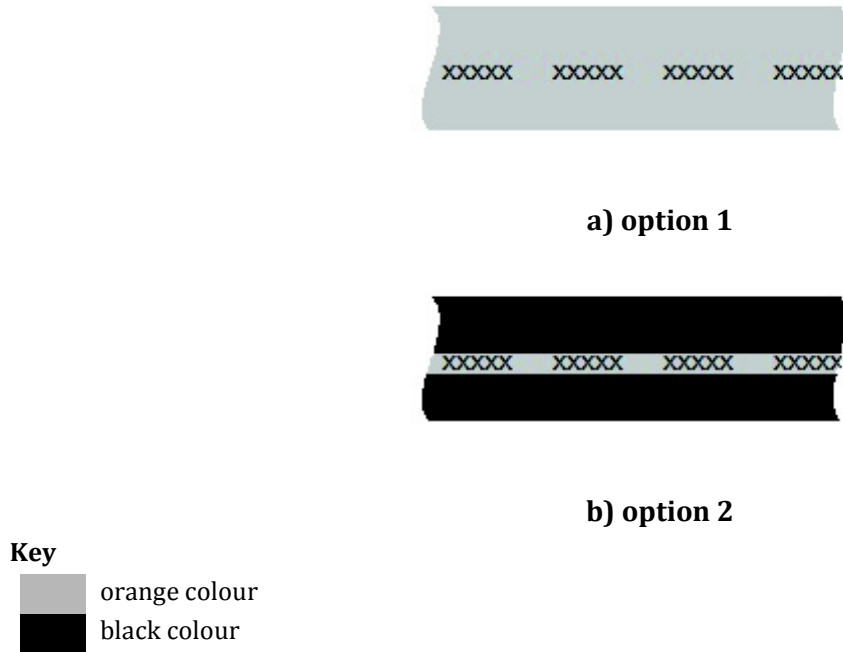


Figure 1 — Possible marking for classes 1, 2 or 3

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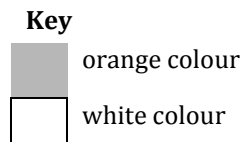


Figure 2 — Possible marking for classes 1 or 2

6 Dimensions of tubing and hoses

6.1 Inside diameters, wall thicknesses and concentricity

When measured in accordance with EN ISO 4671 the inside diameters, tolerances and concentricity shall conform to the values given in Table 2.

Table 2 — Dimensions of hoses or tubing

Dimensions in millimetres

Inside diameters	3,2	4,0	5,0	6,3	8,0	9,0	10,0	10,5	12,5	$\sqrt{A_3}$ 14,0
Tolerance of inside diameter	$\pm 0,3$	$\pm 0,4$	$\pm 0,4$	$\pm 0,5$	$\pm 0,5$	$\pm 0,5$	$\pm 0,6$	$\pm 0,6$	$\pm 0,6$	$\pm 1,0$
Maximum variation in concentricity	0,3	0,4	0,4	0,4	0,5	0,5	0,5	0,5	0,5	0,6
Wall thickness class 1 and class 2	2,5	3,5	3,5	3,5	3,5	3,5	5,0	5,0	5,0	5,0
Wall thickness class 3	3,5	4,0	4,0	5,0	5,0	5,0	5,0	5,0	6,0	6,0
Tolerance of wall thickness	$\pm 0,4$	$\pm 0,4$	$\pm 0,4$	$\pm 0,4$	$\pm 0,5$	$\pm 0,5$	$\pm 0,5$	$\pm 0,5$	$\pm 0,5$	$\pm 0,5$ $\sqrt{A_3}$

6.2 Measurement of ovality

When measuring on a hose cross section, the minimum diameter D_{\min} and the maximum diameter D_{\max} , the ratio D_{\min}/D_{\max} shall not be less than 0,80.

7 Properties of materials for tubing, lining and cover of hoses

7.1 Tensile strength and elongation at break

When tested in accordance with A.2, the materials used for tubing, lining and cover of hoses shall conform to the values given in Table 3.

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Table 3 — Requirements for tensile strength and elongation at break

Class	Component	Tensile strength	Elongation at break
		min. MPa	min. %
1	Tubing	7,0	250
2, 3	Lining and cover		

7.2 Accelerated ageing

After ageing in accordance with ISO 188, using a normal air oven and conditions given in Table 4, materials used for tubing, for the lining and cover of hoses shall conform to the values given in Table 4.

Table 4 — Requirements for accelerated ageing

Class	Test duration days	Test temperature °C	Minimum residual value from origin	Deviation from original values max
			Tensile strength	Elongation at break
1,	14	90 ± 2	75 %	± 50 %
2, 3	28			

7.3 Resistance to n-pentane

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When tested in accordance with A.3, samples of the lining of hoses or tubing shall have absorption of n-pentane (α) not exceeding 10 % and an extraction of material by n-pentane (β) not exceeding 8 %.

8 Performance requirements of tubing and hoses

8.1 Visible defects evaluation

A₂ When evaluated according to A.4 no defect such as cracks, air bubbles or foreign particles shall be observed by normal corrected vision prior to testing on test pieces. **A₂**

8.2 Cleanliness

When tested in accordance with A.5, the bore of the tubing or hose shall be clean and free from loose particles which might be transported by the gas.

8.3 Pressure requirements

When tested in accordance with EN ISO 1402, using as the fluid medium air or water for the working and proof pressure and water for the minimum burst pressure, the tubing or hose shall conform to the values given in Table 5.