



SLOVENSKI STANDARD
SIST EN 12115:2000

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**Gumene in plastomerne cevi ter cevni priključki za tekoče in plinaste kemikalije -
Specifikacija**

Rubber and thermoplastics hoses and hose assemblies for liquid or gaseous chemicals -
Specification

Gummi- und Kunststoffschläuche und -schlauchleitungen für flüssige oder gasförmige
Chemikalien - Spezifikation

Tuyaux et flexibles en caoutchouc et en matériaux thermoplastiques pour substances
chimiques liquides ou gazeuses - Spécification

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EUROPEAN STANDARD
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Rubber and thermoplastics hoses and hose assemblies for liquid or gaseous chemicals - Specification

Tuyaux et flexibles en caoutchouc et en matériaux thermoplastiques pour substances chimiques liquides ou gazeuses - Spécification

Gummi- und Kunststoffschläuche und -schlauchleitungen für flüssige oder gasförmige Chemikalien - Spezifikation

This European Standard was approved by CEN on 16 April 1999.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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 Central Secretariat has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

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

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Foreword

This European Standard 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 1999, and conflicting national standards shall be withdrawn at the latest by December 1999.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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1 Scope

This European standard specifies requirements for two types of hose assemblies (Types D and SD) with hoses made of rubber or thermoplastics and hose fittings made of metal designed to convey liquid or gaseous substances, hereinafter termed the chemicals conveyed.

For all hose assemblies, the maximum working pressure is 10 bar¹⁾ Hose assemblies can be operated safely with a conveyed chemical temperature in the range of -20 °C to + 65 °C.

NOTE 1 This standard sets out requirements for these hose assemblies to ensure that users are not exposed to danger from fire or explosion and that the environment is protected against contamination or damage.

NOTE 2 Other temperatures and pressures than those given above can be agreed with the manufacturer.

NOTE 3 Other diameters than those given in this standard can be agreed with the manufacturer. Typical masses and vacuum stability are listed in annex A.

NOTE 4 This standard also provides guidance on the storage of hose assemblies (see annex B).

NOTE 5 The attention of users is drawn to annex C concerning the selection of lining material related to the chemical(s) to be conveyed by the hoses and/or hose assembly.

This standard does not apply to hose assemblies for:

- aircraft refuelling (EN 1361);
- fuel dispensing (EN 1360);
- oil burners (EN ISO 6806);
- refrigerant circuits;
- fuel truck delivery (EN 1761);
- liquid petroleum gases (LPG) (EN 1762);
- fire fighting (EN ISO 14775).

¹⁾ 1 bar = 0,1 MPa.

2 Normative references

This European standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

EN 21746, *Rubber or plastics hoses and tubing — Bending tests* (ISO 1746:1983)

EN 24671, *Rubber and plastics hoses and hose assemblies — Methods of measurements of dimensions* (ISO 4671:1984)

EN 24672, *Rubber and plastics hoses — Sub-ambient temperature flexibility tests* (ISO 4672:1988)

EN ISO 7233, *Rubber and plastic hoses and assemblies — Determination of suction resistance* (ISO 7233:1991)

EN 27326, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions* (ISO 7326:1991)

EN ISO 8031, *Rubber and plastics hoses and hose assemblies — Determination of electrical resistance* (ISO 8031:1993)

EN 28033, *Rubber and plastics hose — Determination of adhesion between components* (ISO 8033:1991)

EN ISO 1402, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing* (ISO 1402:1994)

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

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

ISO 1629, *Rubber and latices, Nomenclature*

ISO 1817, *Rubber, vulcanized - Determination of the effects of liquids*

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

ISO TR 8330, *Rubber and plastics - Glossary of terms used by the hose industry*

ISO 8331, *Rubber and plastics hoses and hose assemblies — Guide to selection, storage, use and maintenance*

3 Definitions

For the purposes of this standard, the definitions given in ISO TR 8330 apply.

NOTE In this European standard the word “fitting” has been used and is interchangeable with the word “coupling”.

4 Types of hoses

4.1 Delivery pressure hoses, type D

Pressure hoses shall consist of a lining, reinforcement and a cover.

The lining shall be resistant to the chemical substances conveyed. The lining shall be uniform in quality and free from porosity, air holes, foreign inclusions and other defects.

The cover shall be resistant to mechanical damage, wear and environmental effects due to weather and short-term chemical exposure.

4.2 Suction and delivery pressure hoses, type SD

Suction and delivery pressure hoses shall incorporate one or more helixes in addition to the components of type D.

5 Dimensions

5.1 Diameters, thicknesses, and bend radii

The internal and external diameters of the hoses shall conform to the values given in table 1 or table 2, depending on the type; the minimum thickness of lining and cover shall conform to the values given in table 1 or table 2, depending on the type; the minimum bend radius shall conform to the values given in table 1 or table 2, depending on the type.

Table 1 — Dimension requirements, type D hoses

Nominal bore	Internal diameter mm	Tolerance mm	Outside diameter mm	Tolerance mm	Minimum thickness mm		Bend radius mm min. ²⁾
					lining ¹⁾	cover	
19	19,0	± 0,5	31,0	± 1,0	2,0	1,6	125
25	25,0		37,0				150
32	32,0		44,0				175
38	38,0		51,0				225
50	50,0	± 0,7	66,0	± 1,2	2,0	2,0	275
51	51,0		67,0				275
63	63,0	± 0,8	79,0	± 1,6	2,0	2,0	300
75	75,0		91,0				350 ³⁾
76	76,0		92,0				350 ³⁾
100	100,0		116,0				450 ³⁾
101,5	101,5		118,0				450 ³⁾

¹⁾ The dimensions for the minimum lining thickness do not apply to hoses made from materials PE-X/UPE and fluoro plastics. The thickness for these materials shall be 0,4 mm.

²⁾ The bend radii stated do not apply to hoses made from PE-X/UPE and fluoro plastics where the value shall be 1,5 × the values shown above.

³⁾ Only applies to operation at not less than 1 bar, otherwise the hose will kink.

Table 2 — Dimension requirements, type SD hoses

Nominal bore	Internal diameter mm	Tolerance mm	Outside diameter mm	Tolerance mm	Minimum thickness mm		Bend radius mm min. ²⁾	Vacuum stability ³⁾ bar
					lining ¹⁾	cover		
19	19,0	± 0,5	31,0	± 1,0	1,6	1,6	125	- 0,9
25	25,0		37,0				150	
32	32,0		44,0				175	
38	38,0		51,0				225	
50	50,0	± 0,7	66,0	± 1,2	1,7	1,7	275	- 0,8
51	51,0		67,0				275	
63	63,0	± 0,8	79,0	± 1,2	1,8	1,7	300	
75	75,0		91,0				350	
76	76,0		92,0				350	
100	100,0		116,0	450				
101,5	101,5		118,0	± 1,6	2,0	450		

¹⁾ The dimensions for the minimum lining thickness do not apply to hoses made from materials PE-X/UPE and fluoro plastics. The thickness for these materials shall be 0,4 mm.

²⁾ The bend radii stated do not apply to hoses made from PE-X/UPE and fluoro plastics where the value shall be 1,5 × the values shown above.

³⁾ These pressures do not apply to aggressive oxidizing chemicals; in this case consultation with the manufacturer is recommended.

5.2 Concentricity

When determined in accordance with EN 24671, the concentricity, based on a total indicator reading between the internal diameter and the outside surface of the cover, shall be less than or equal to 1,0 mm for hoses up to 51 nominal bore, and less than or equal to 1,5 mm for hoses greater than 51 nominal bore.

5.3 Length of hose assemblies

The length of the hose assembly shall be the intended installed length measured from sealing surfaces of the end fittings.

For hose assembly lengths less than or equal to 1000 mm the tolerance shall be (+15/-10) mm.

For hose assembly lengths greater than 1000 mm the tolerance shall be (+1,5/-1,0) %.

6 Admissible operating working pressure and temperatures

6.1 Maximum working pressure

For all hose assemblies, the maximum working pressure shall be 10 bar.

Details of admissible working pressures < 0 bar (vacuum) for type SD are given in table 2.

NOTE For type D, vacuum stability is indicated in annex A.

6.2 Admissible operating temperatures

Hose assemblies shall be capable of operating safely with a conveyed chemical temperature range of -20 °C to +65 °C.

7 Material requirements

7.1 General

The physical properties of the compounds used for the lining and cover shall conform to the values given in table 3, when tested in accordance with the methods listed in table 3. Tests shall be carried out either on samples taken from the hose or from separately vulcanized sheets.

NOTE The cover is not intended to be in contact with the chemical conveyed. Whenever such contact occurs the cover of the hose should be examined for harmful effects.

7.2 Material used for the lining

The lining shall be made from the range of materials given in table 4.

NOTE The characteristics within a material group may vary, e.g. dependent upon the type of polymer, ratio of mixture and vulcanization method.

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Table 3 — Physical properties of compounds

Property	Unit	Requirements		Test methods
		Lining	Cover	
1. Tensile strength, min.	MPa	8,0	8,0	ISO 37 (dumb-bell test pieces)
2. Elongation at break,	%			
Fluoro rubber min.		150	150	ISO 37 (dumb-bell test pieces)
Others min.		250	250	
3. Ageing	%			
Tensile strength change, max.	from the unaged value	----	15	ISO 188 (7 days at 70 °C, air-oven method)
Elongation at break change, max.		----	20	
4. Abrasion resistance				
black filled compound max.	mm ³	----	200	ISO 4649, method A
non black filled compound, coloured		----	350	

7.3 Material of the helix

The helix or helixes shall consist of galvanized hard steel.

NOTE Any semi-embedded helix is not intended to be in contact with the chemical conveyed. Whenever such contact occurs the helix of the hose should be examined for harmful effects.

Table 4 — Material groups for hose lining

Polymer ¹⁾ reference	Material for hose lining and typical applications		Recommended colour coding on hose cover
NBR 1	Acrylonitrile butadiene rubbers	Hoses for mineral oil products of all types less than 50 % aromatic	Yellow
NBR 2		Hoses for aromatic and chlorinated hydrocarbons and solvents	Blue
NBR 3		Hoses for oily foodstuffs	White
NR	Isoprene rubber (natural rubber), e.g. for potable alcohol		No recommended colour
IIR	Isobutene / isoprene rubber (butyl rubber)		Lilac
EPDM	Terpolymers made from ethylene, propylene and a diene with an unsaturated part portion of the diene in the side chain		
CSM	Chlorosulfonated polyethylene		Green
FKM	Rubbers with fluoro, fluoroalkyl or fluoroalkoxy groups on the polymer chain (fluoro rubber)		Green and white
PE-X/UPE	Cross-linked polyethylene / ultra-high molecular polyethylene		Blue and white
²⁾	Fluoro-plastics (e.g. PTFE, PFA, FEP, ...)		Blue and white and a third colour
¹⁾ For alphabetic abbreviations see ISO 1629. ²⁾ No reference is given. Details of materials and their resistance against the chemical conveyed shall be agreed from manufacturer's information (see annex C). NOTE Other materials may be agreed between the manufacturer and user, but all requirements of this standard should be met.			