SLOVENSKI STANDARD
oSIST prEN 13766:2017

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Plastomerne večslojne (nevulkanizirane) cevi in cevni priključki za pretok utekočinjenega naftnega plina in utekočinjenega zemeljskega plina - Specifikacija

Thermoplastic multi-layer (non-vulcanized) hoses and hose assemblies for the transfer of liquid petroleum gas and liquefied natural gas - Specification

Thermoplastische, mehrlagige (nicht vulkanisierte) Schläuche und Schlauchleitungen für die Förderung von Flüssiggas und verflüssigtem Erdgas - Spezifikation

Tuyaux et flexibles en thermoplastique multicouches (non vulcanisés) utilisés pour le dépotage de gaz pétrolier liquide et gaz naturel liquifié - Spécification

Ta slovenski standard je istoveten z: prEN 13766

ICS:

75.200	Oprema za skladiščenje nafte, naftnih proizvodov in zemeljskega plina	Petroleum products and natural gas handling equipment
83.140.30	Polimerne cevi in fitingi za snovi, ki niso tekočine	Plastics pipes and fittings for non fluid use

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EUROPEAN STANDARD

NORME EUROPÉENNE

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English Version

Thermoplastic multi-layer (non-vulcanized) hoses and hose assemblies for the transfer of liquid petroleum gas and liquefied natural gas - Specification

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This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 218.

If this draft becomes a European Standard, 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.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 13766:2016) 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 document is currently submitted to the CEN Enquiry.

This document will supersede EN 13766:2010.

1 Scope

This European Standard specifies requirements for two types of thermoplastic multi-layer (non-vulcanized) transfer hoses and hose assemblies for carrying liquefied petroleum gas and liquefied natural gas. Each type is subdivided into two classes, one for onshore duties, and the other for offshore.

This European Standard is applicable for hose sizes from 25 mm to 250 mm, working pressures from 10,5 bar to 25 bar and operating temperatures from - 196 °C to + 45 °C.

NOTE Offshore LNG hose assemblies are also specified in EN 1474–2.

WARNING — Persons using this European Standard should be familiar with normal laboratory practice. This standard does not purport to address all the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate health and safety practices and to ensure compliance with any national regulatory conditions.

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 10088-3:2014, *Stainless steels - Part 3: Technical delivery conditions for semi-finished products, bars, rods, wire, sections and bright products of corrosion resisting steels for general purposes*

EN ISO 148-1, *Metallic materials - Charpy pendulum impact test - Part 1: Test method (ISO 148-1)*

EN ISO 527-1, *Plastics - Determination of tensile properties - Part 1: General principles (ISO 527-1)*

EN ISO 1043-1, *Plastics - Symbols and abbreviated terms - Part 1: Basic polymers and their special characteristics (ISO 1043-1)*

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

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)*

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 8330:2014, *Rubber and plastics hoses and hose assemblies - Vocabulary (ISO 8330:2014)*

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)*

EN ISO 13934-1, *Textiles - Tensile properties of fabrics - Part 1: Determination of maximum force and elongation at maximum force using the strip method (ISO 13934-1)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 8330:2014 apply.

4 Classification

Hoses shall be classified according to their usage, working pressure and working temperature range as given in Table 1.

Table 1 — Pressure and temperature range

Pressure/temperature	Class A[a]	Class B[b]	Class A	Class B
	Type 1	Type 1	Type 2	Type 2
Maximum working pressure (bar)	25	20	13	10,5
Proof pressure (bar)	37,5	30	19,5	15,8
Minimum burst pressure (bar)	100	100	52	52,5
Working temperature range (°C)	– 50 to + 45	– 50 to + 45	– 196 to + 45	– 196 to + 45
NOTE 1 1 bar = 0,1 MPa NOTE 2 Due to pressurization during test and operations the temperature of the fluid could increase. The indicated temperatures are measured at atmospheric pressure;				
a Class A is for use onshore. b Class B is for use offshore.				

Upon agreement with the manufacturer, lower min and/or higher max temperature are allowed depending on the materials used and the compatibility at those temperatures with the fluid conveyed. Other properties and requirements mentioned in the standard still shall be met.

5 Materials and construction

Hoses shall be constructed as shown in Figure 1 and shall consist of the following:

a) Class A:

1) An internal wire helix of stainless steel conforming to EN 10088-3:2014, numbers 1.4306, 1.4401, 1.4404 or 1.4436;

2) A multi-ply wall of layers of films and fabrics made of thermoplastics that in combination give the required properties specified in Table 1 and provide a complete seal;

3) An external wire helix of stainless steel conforming to EN 10088-3:2014, numbers 1.4306, 1.4401, 1.4404 or 1.4436.

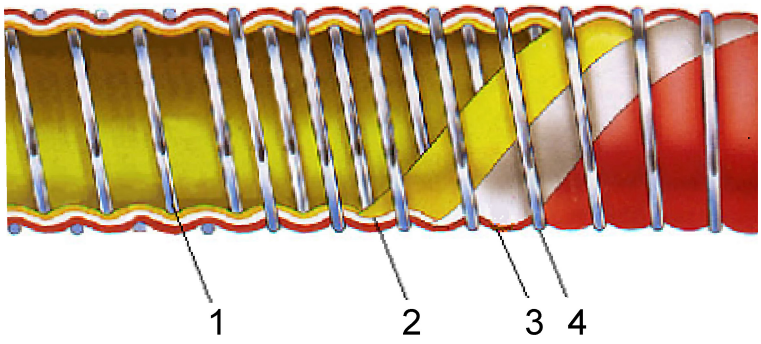
b) Class B:

1) An internal wire helix of stainless steel conforming to EN 10088-3:2014, numbers 1.4401, 1.4404 or 1.4436;

2) A multi-ply wall of layers of films and fabrics made of thermoplastics that in combination give the required properties specified in Table 1 and provide a complete seal;

3) An external wire helix of stainless steel conforming to EN 10088-3:2014, numbers 1.4401, 1.4404 or 1.4436.

By agreement between manufacturer and purchaser, the outer layer may have colour identification.



Key

1 internal wire
2 film
3 fabric
4 external wire

Figure 1 — Section of a typical thermoplastic multilayer hose

6 Dimensions

6.1 Internal diameters, with tolerances and minimum bend radii

When measured in accordance with EN ISO 4671, the values of the internal diameter of the hose shall conform to Table 2. When tested by the method described in EN ISO 10619-1 the value of the minimum bend radius shall be as given in Table 2. The hose shall show no sign of permanent deformation of the cross section i.e. kinking.

Table 2 — Dimensions and minimum bend radius

Dimensions in millimetres

Internal diameter	Tolerance	Minimum bend radius
25	±1	150
32	±1	175
38	±1	175
40	±1	200
50	±1	200
65	±2	200
75	±2	250
80	±2	250
100	±2	500
150	±2	660
200	±3	910
250	±3	2 500

6.2 Tolerance on length

When tested in accordance with EN ISO 4671 the tolerance on the measured length of delivered hose assemblies shall be $^{+2}_{-1}$ % .

7 Performance requirements of hoses and hose assemblies

7.1 Film and fabric

When tested at the minimum temperature, Type 1: – 50 ± 3 °C and Type 2: – 196 ± 5 °C (and in accordance with EN ISO 13934-1 or equivalent for fabric testing and EN ISO 527-1 or equivalent for film testing) samples of film and fabric shall have an elongation at break of not less than 10 %.

7.2 Hoses

When tested in accordance with the methods given in Table 3, the physical properties of the hoses shall conform to Table 3.

Table 3 — Physical properties of hoses

Property	Unit	Requirement	Method
Proof pressure	Bar	No leakage or other signs of damage at pressure given in Table 1	EN ISO 1402 with pressure increase not less than 1,7 bar/min
Change in length at proof pressure (max)	%	10	EN ISO 1402:2009, 8.2 initial length measured when the hose is pressurized to 0,7 bar
Twist at proof pressure (max)	°/m	10	EN ISO 1402:2009, 8.2 initial reading taken when hose is pressurized to 0,7 bar
Burst pressure	Bar	≥ Values in Table 1	EN ISO 1402
Bend	—	No leakage or visible damage when the hose is bent to radius given in Table 2 and subjected to the proof pressure.	EN ISO 10619-1
Crush recovery (max)	%	3	Annex A
Ozone resistance 72 h at 40 °C	—	No cracking observed at × 2 magnification	EN ISO 7326
Thermal ageing	—	No leakage at proof pressure given in Table 1	Annex B
Low temperature flexibility	—	Test at minimum temperature given in Table 1	EN ISO 10619-2

7.3 End fittings

End fittings and metallic ferrules shall be made from the following materials depending on the type of hose to be used in the assembly:

— Type 1 hose: LT (low temperature) grade carbon steel or stainless steel;

— Type 2 hose: austenitic stainless steel tested in accordance with Annex C.

For all types of end fittings, that part of the fitting that enters the hose and forms the means by which the fitting is connected to the hose shall be provided with scrolls or protrusions on the surface that correspond to the pitch of the internal helix wire of the hose.

7.4 Hose assemblies

Hose assemblies shall be fitted with end fittings as described in 7.3.

End fittings shall be attached to the hose by one of the following methods:

a) by the use of a seal and a metal ferrule which is swaged or crimped;

b) by the use of a thermoset resin e.g. epoxy and a metal ferrule which is swaged or crimped.

Hoses should be assembled by the hose manufacturer.

When tested by the methods given in Table 4, hose assembly shall conform to Table 4.

When assembled to a hose there shall be electrical continuity between the end fitting and the internal and external wires.

Table 4 — Physical properties of hose assemblies

Property	Unit	Requirements	Method(s)
Proof pressure	Bar	No leakage or other signs of weakness at pressure given in Table 1	EN ISO 1402 with a pressure increase not less than 1,7 bar/min
Bend	—	No leakage or visible damage when the hose is bent to the radius given in Table 2 and is subjected to the proof pressure	EN ISO 10619-1
Series of hydrostatic tests	Bar % °/m	≥ burst pressure given in Table 1 Change in length as in Table 3 Twist as given in Table 3	Annex D
Security of end fitting	Bar	No leakage at proof pressure given in Table 1	Annex E and EN ISO 1402
Electrical resistance between end fittings	Ω	≤ 100 ohm/assembly	EN ISO 8031:2009, 4.8
Burst pressure	Bar	≥ value given in Table 1	EN ISO 1402
Leak tightness	—	No leakage of air when subjected to 3,5 bar for 5 min	Annex F

7.5 Electrical continuity

There shall be electrical continuity between both internal and external wires and the end fittings. Where a wire is sheathed in polymeric material the sheath shall be stripped back for some of the length that engages with the fittings or the ferrule to ensure continuity.

Manufacturers shall demonstrate by testing or calculation that the measured overall electrical resistance of the hose assembly incorporates both internal and external wires being part of the circuit.

For the transfer of non conductive fluids the use of a hose with a non polymeric coated internal wire should be considered.

8 Test frequency

Routine tests shall be carried out on each hose assembly and in accordance with Annex G.

It is recommended that batch tests are carried out for every 10 000 m of manufacture or once a year, varying the sizes and types and in accordance with Annex H.

9 Type tests

Type tests shall be carried out to confirm that the hose assembly design, materials and method of manufacture meets the requirements of this standard.

Type tests shall be carried out on at least three sizes of hose including the smallest and largest for each type in the manufacturer's range.

Type tests shall be repeated, and the results recorded, at least every five years or whenever a change in the materials and/or method of manufacture is made.

10 Marking

10.1 Hose marking

Each hose shall be permanently marked at an interval of not greater than 1 m with lettering of a minimum height of 10 mm with at least the following information:

a) Manufacturer's name or identification mark, e.g. MAN Ltd;

b) number and year of this European Standard, i.e. EN 13766:xxxx;

c) Hose identification (class and type) e.g. Class B — Type 1;

d) Internal diameter, e.g. 40 mm;

e) Maximum working pressure;

f) Working temperature range, e.g −50 to 45°C;

g) Material of the hose inner liquid barrier layer as referenced in EN ISO 1043-1 e.g. PP (polypropylene);

h) Quarter and year of hose manufacture.

EXAMPLE

MAN Ltd — EN 13766:xxxx —Class B — Type 1 — 40 — 20 bar — – 50 to +45 °C — PP — 4Q/xx

10.2 Hose assembly marking

Each hose assembly shall be permanently marked on the ferrule at one end with the following information:

a) assembler's identification, e.g. MAN Ltd;

b) the hose assembly serial number;

c) maximum allowable working pressure for the assembly if different from the hose;

d) the test date of the hose assembly;

e) Quarter and year of hose assembly manufacture, e.g. 4Q/xx.