SLOVENSKI STANDARD
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Elastomeric packed metallic stripwound safety gas hose assemblies for the connection of domestic appliances using gaseous fuels

Gewickelte, metallene Sicherheits-Gasschlauchlauchleitungen mit Elastomerdichtung für den Anschluss von Haushaltsgasgeräten

Tuyaux flexibles caoutchouc agrafés pour le raccordement des appareils à usage domestique utilisant des combustibles gazeux

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This draft European Standard is submitted to CEN members for second enquiry. It has been drawn up by the Technical Committee CEN/TC 236.

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
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Foreword

This document (prEN 15070:2007) has been prepared by Technical Committee CEN/TC 236 “Non industrial manually operated shut-off valves for gas and particular combinations valves-other products”, the secretariat of which is held by UNI.

This document is currently submitted to the second CEN Enquiry.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive 89/106/EEC.

For relationship with EU Directive 89/106/EEC, see informative Annex ZA, which is an integral part of this document.

Introduction

This European Standard contains product characteristics relating to the safety of persons, animals and property and the protection of their environment.

The objective of this European Standard is to achieve safe operation of elastomeric packed metallic stripwound safety gas hose assemblies by specifying the requirements of performance, materials and test methods.

These assemblies are designed for use with fixed applications; they may also be used for the connection of movable applications.

This European Standard is based on a balance of requirements given by the major national European Gas Authorities for elastomeric packed metallic stripwound safety gas hose assemblies for the connection of domestic gas appliances.

It reflects the recognised practise and technology of products approved today as well as the present culture of usage by the consumer.

The introduction of new technologies supported by National Gas Authorities can require the adoption of this European Standard regarding individual requirements and tests.

Attention is drawn to the need for careful quality control as given in EN ISO 9001.

1 Scope

This European Standard specifies the requirements of performance, the material and the test methods of elastomeric packed metallic stripwound safety gas hose assemblies for the connection of domestic appliances, in order to achieve save operation.

The elastomeric packed metallic stripwound safety gas hose assemblies according to this European Standard are suitable for the connection of domestic appliances inside or outside a dwelling, using gas at a pressure lower than 0,5 bar.

2 Normative references

The following referenced documents are indispensable for the application 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 437:2003, *Test gases — Test pressures — Appliance categories.*

EN 549, *Rubber materials for seals and diaphragms for gas appliances and gas equipment.*

EN 1418, *Welding personnel — Approval testing of welding operators for fusion welding and resistance weld setters for fully mechanized and automatic welding of metallic materials.*

EN 1775:1998, *Gas supply — Gas pipework for buildings — Maximum operating pressure ≤5 bar — Functional recommendations.*

EN 10028-7, *Flat products made of steels for pressure purposes – Part 7: Stainless steels.*

EN 10139, *Cold rolled uncoated mild steel narrow strip for cold forming – Technical delivery conditions.*

EN 10152, *Electrolytically zinc coated cold rolled steel flat products for cold forming - Technical delivery conditions.*

EN 13133, *Brazing — Brazer approval.*

EN 13134, *Brazing — Procedure approval.*

EN 13501-1:2007, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests.*

EN 13823, *Reaction to fire tests for building products — Building products excluding floorings exposed to the thermal attack by a single burning item.*

prEN 15069:2004, *Safety gas connection valves for metal hose assemblies used for the connection of domestic appliances using gaseous fuel.*

EN ISO 9001:2000, *Quality management systems — Requirements (ISO 9001:2000).*

EN ISO 9227, *Corrosion tests in artificial atmospheres — Salt spray tests (ISO 9227:2006).*

EN ISO 11925-2, *Reaction to fire tests — Ignitability of building products subjected to direct impingement of flame — Part 2: Single-flame source test (ISO 11925-2:2002).*

EN ISO 15465, *Pipework – Stripwound metal hoses and hose assemblies (ISO 15465:2004).*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
domestic appliance
appliance intended for use by individual householders inside or outside a dwelling

3.2
elastomeric packed metallic stripwound safety gas hose assembly
element of flexible pipe-work to be fitted between the gas supply valve or the socket of a quick disconnect device and the appliance inlet connection, consisting of an elastomeric packed metallic stripwound hose, its end fittings with appropriate gaskets and, if required, an armouring and/or an external protection

3.3
EPMS hose assembly
abbreviation used in this European Standard to denote an elastomeric packed metallic stripwound safety gas hose assembly as defined in 3.2

3.4
elastomeric packed metallic stripwound hose
hose manufactured from a helically wound preformed strip, generally with a right-hand lead where the turns, with packing, are connected together by single or double overlapping and flexibility is obtained by sliding adjacent turns over each other

3.5
end fittings
components attached to an elastomeric packed metallic stripwound hose so as to constitute an EPMS hose assembly

3.6
screwed connection
leak-tight threaded connection, which can only be assembled and disassembled with an appropriate tool

3.7
integrated non-detachable fitting
end fitting, permanently attached to the elastomeric packed metallic stripwound hose by such a method as swaging, welding or brazing, so as to ensure that it can not be detached without destruction or alteration

3.8
safety quick connection device
end fitting consisting of two parts that is designed to permit quick connection and disconnection without tools, leak-tight so that it prevents the release of gas from the upstream pipe work when disconnected and designed to prevent accidental disconnection and incorrect operation

3.9
armouring
external reinforcement, partly or wholly covering the elastomeric packed metallic stripwound hose, which is designed to improve the mechanical characteristics of the hose

3.10
external protection
outer cover used to protect the elastomeric packed metallic stripwound hose from environmental and other outside influences

3.11
nominal length
length of an EPMS hose assembly measured along its axis, including its end fittings, but excluding any swivel nuts.

EPMS hose assemblies incorporating the plug of a quick connection device are measured to the point where the plug enters the socket in the working position

3.12
restricted bending radius
bending radius, which by adjacent turns of the elastomeric packed metallic stripwound hose coming into contact with each other is limited to a minimum value measured to the centre line of the hose.

A lower value can only be reached by permanently deforming or destroying the adjacent turns

3.13
rated flow-rate
flow rate, under standard reference conditions, at a given pressure drop

3.14
seal
gasket
packing
non metallic element assuring leak-tightness between two adjacent elements, be they fixed or moveable in respect to each other

3.15
swivel joint
rotary joint
element or device that enables a continuous axial rotation of the hose with respect to the gas inlet or the appliance, and which functions without reducing the leak-tightness of the flexible connection

3.16
gas
first, second and third family gas as referred to in EN 437:2003, Table 1.

These gases are commonly referred to as manufactured gases, natural gases or liquefied petroleum gases (LPG)

4 Construction requirements

4.1 General

These requirements shall ensure that the construction of an EPMS hose assembly which, when properly installed and correctly used, under normal chemical, mechanical and thermal conditions will provide long term safe operation without degradation.

4.2 Nominal size

The nominal size of EPMS hose assemblies shall be designated either DN 8 or DN 12 and shall be determined by the flow rate requirements given in Table 2. For the purpose of this European Standard, DN 10 and DN 15 fittings shown in Annex A are considered as DN 8 and DN 12 respectively.

4.3 Materials

The EPMS hose assembly described by this European Standard shall be manufactured from materials which shall withstand the performance and test requirements given in Clause 5. The elastomeric packed metallic stripwound hose shall be manufactured from metal(s) no less durable and robust than stainless steel strip conforming to EN 10028-7 or mild steel strip conforming to EN 10139 and electroplated according to EN 10152 and fulfil in addition to the requirements of this European Standard the requirements of EN ISO 15465. Any seal, gasket or packing shall conform to EN 549. End fittings and non-permanently attached parts, whether surface finished or not, shall be manufactured from stainless steel, or from copper alloys containing at least 57 % copper and up to 3,5 % lead.

Where there may be risk of stress corrosion cracking, any threaded parts manufactured from the above copper alloys shall be stress relieved.

4.4 Requirements for the connection between hose and fittings

The connection between the elastomeric packed metallic stripwound hose and the end fitting of an EPMS hose assembly as defined by this European Standard shall be made by a method such as swaging, welding or brazing, resulting in an integrated non-detachable connection, which can only be detached by irreparably damaging the hose or the end fitting. The connection shall ensure leak-tightness and shall withstand all tests requested in Clause 5. Welding and brazing processes shall conform to EN 1418, EN 13134 and EN 13133.

It shall be possible to withdraw swivel nuts in order to free the sealing surface.

4.5 End fittings design requirements

End fittings shall be manufactured from materials that permit the EPMS hose assembly to comply with the performance requirements of this European Standard for a reasonable economic working life when tested according to Table 1.

The design of end fittings shall be in accordance with 5.19.

An EPMS hose assembly shall be fitted either with a swivel nut on one end or a swivel joint.

The design of swivel nuts shall ensure that when used in conjunction with its seal/gasket and its matching part, tightness is achieved at a maximum torque of (10 ± 0,5) N · m and that when further tightened to a torque of (50 ± 2,5) N · m there shall be no visible deformation or cracking and the connection shall remain gas tight.

Fittings used in conjunction with swivel nuts shall incorporate a means to hold the fitting during the tightening of the swivel nut without applying torsion to the hose or damage to the fitting.

Where threads are used at both ends of an assembly and there is a possibility of the assembly being installed the wrong way round, the fittings shall be identified by different colours and the flow direction shall be marked by the use of an arrow.

Seals/gaskets shall be from material suitable for their intended application. They shall be designed to be reusable and shall be retained on the fitting or held in place by caps and shall comply with the requirements of EN 549.

Screwed connections shall be capable of being assembled and disassembled only by using an appropriate tool without visible damage to the fitting.

4.6 EPMS hose assembly lengths

The normal nominal lengths of the EPMS hose assemblies shall be 0,5 m, 0,75 m, 1,0 m, 1,25 m, 1,5 m and 2,0 m. The admissible length tolerance shall be ± 20 mm. The maximum nominal length of an EPMS hose assembly shall be 2,0 m.

NOTE EPMS hose assemblies according to this European Standard are not designed to be joined together to form a hose string.

4.7 Corrosion requirements

EPMS hose assemblies shall be resistant to any corrosive agents reasonably foreseen in a domestic environment.

NOTE If required the corrosion resistance of an EPMS hose assembly can be increased by some form of external protection.

4.8 Insulation requirements

The elastomeric packed metallic stripwound hose part of an EPMS hose assembly shall be electrically insulated externally by the use of an appropriate synthetic material at potential points of contact with metallic elements where cathodic corrosion can take place.

4.9 Electric conductivity requirements

EPMS hose assemblies shall be electrically continuous along their length.

4.10 Hygiene

EPMS hose assemblies shall have an outer surface, which can be readily cleaned by normal household means.

4.11 Cover materials

If the materials of a synthetic cover contain corrosive agents as ingredients, such as sulphur or chlorine, care shall be taken to ensure that such agents are not released during the manufacturing process.

4.12 Dangerous substances

Materials used in EPMS hose assemblies shall not release any dangerous substances in excess of the maximum permitted levels specified in a relevant European Standard for the material or permitted in the national regulations of the member state of destination.

5 Performance requirements and tests

5.1 General

If any sample fails one of the tests within the test sequence schedule given in Table 1 then all samples shall be deemed to have failed to meet the type test requirements of this European Standard. The tests are performed under ambient conditions. If not otherwise indicated the following tolerances shall apply:

atmospheric pressure:	(± 0,1) mbar	air pressure:	(± 5) %
flow rate:	(± 5) %	ambient temperature:	(± 1) °C
temperature above 125 °C:	(± 10) °C	time:	(± 0,1) %
dimensions:	(± 0,1) mm		

5.2 Test sequence schedule

For each DN, nine EPMS hose assemblies of 1 m length, three of 1,5 m length and five of 0,5 m length shall be tested in the sequence given in Table 1.

Table 1 — Test sequence schedule

Hose assembly	**No**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10 to 15**	**16**	**17**	**No of samples**
Hose length in metres		**1,0**	**1,0**	**1,0**	**1,0**	**1,0**	**1,0**	**1,0**	**1,0**	**1,0**	**0,5 + 1,5**	**0,5**	**0,5**	
Initial leak-tightness test	5.3.2.2	X	X	X	X	X	X	X	X	X	X	X	X	17
Structural strength test	5.4.2		X											1
Flow rate test	5.5.2	X												1
Electrical continuity test	5.6.2	X												1
Tension test	5.7.2											X		1
Durability of marking test	5.8.2	X												1
Working temperature test	5.9.2	X	X											2
Salt spray test	5.10.2.1	X												1
Hydrochloric acid test	5.10.2.2	X												1
Household cleaning agent test	5.10.2.3		X											1
Reaction to fire	5.11.2										X			3 +3
Fire resistance test	5.12.2												X	1
Suppleness test	5.13.2						X							1
Bending performance test	5.14.2			X	X	X								3
Flexing test	5.15.2							X	X	X				3
Torsion test	5.16.2						X							1
Impact resistance test	5.17.2						X							1
Penetration test	5.18.2	X												
Fitting tests where requested	5.19													
Drop test	5.19.2.1		X											1
Crush test	5.19.2.2		X											1
Torque test	5.19.3.2		X											1
Final leak-tightness test	5.3.2.3	X	X	X	X	X	X	X	X	X		X		10

5.3 Leak-tightness

5.3.1 Requirements

The EPMS hose assembly shall be leak-tight when tested in accordance with the methods given in 5.3.2.

In the initial leak-tightness test any external protection shall remain in place. In the final leak-tightness test for type testing only it shall be demonstrated that any external protection does not contribute to the achievement of the given leakage rate.

The verification of gas leak-tightness after installation of the EPMS hose assembly and its connecting parts shall be in accordance with the manufacturer's installation instructions.

Leak-tightness requirements between an EPMS hose assembly and its safety quick connection device shall be as prEN 15069:2004, 5.4.

5.3.2 Test procedure

5.3.2.1 General

The EPMS hose assembly shall be tested by the following methods.

5.3.2.2 Initial leak-tightness test

When held under water and containing air at a pressure of 3 bar the leakage rate of the EPMS hose assembly shall not exceed 10 cm^3/h.

NOTE A leakage rate not exceeding (7×10^{-3}) mbar l/s is equivalent to the above requirement.

5.3.2.3 Final leak-tightness test

When held under water and containing air at a pressure of 50 mbar the leakage rate of the EPMS hose assembly shall not exceed 10 cm^3/h.

In the final leak-tightness test for type testing it shall be verified that any external protection has not contributed to the achievement of the above leakage rate by removing a cover to within not less than 25 mm from each end fitting.

5.4 Structural strength

5.4.1 Requirements

An EPMS hose assembly shall have a structural strength capable of resisting any environmental mechanical influence reasonably foreseen. This shall be regarded as being equivalent to withstanding an internal pressure of 6 bar.

5.4.2 Test procedure

The length of the EPMS hose assembly shall be measured on a flat surface and recorded. The EPMS hose assembly, one of its ends being free to move, shall be gradually pressurised up to 6 bar. This pressure shall be maintained for at least 5 min.

The permanent elongation of the EPMS hose assembly after release of pressure shall not exceed 3 % of its length before pressurisation. With the exception of the permanent elongation, no visual deformation of the elastomeric packed metallic stripwound hose or any other part of the assembly shall be permitted.

Following the test the EPMS hose assembly shall be subjected to the leak-tightness test given in 5.3.2.3.

5.5 Flow rate

5.5.1 Requirements

The minimum flow rate through an EPMS hose assembly without the valve and when tested as follows shall be as given in Table 2.

The flow rate shall be determined using dry air at a pressure of 20 mbar at the given pressure drop in Table 2. Measurement shall be converted to standard conditions of a pressure of 1 013,25 mbar and a temperature of 15 °C.

Table 2 — Flow rate requirements

Nominal size of hose assembly	Overall length of hose assembly	Minimum air flow rate for gases other than Type L with a pressure drop of 1 mbar	Minimum air flow rate for gas Type L with a pressure drop of 0,5 mbar
DN 8	1,0 m	0,5 m^3/h	0,55 m^3/h
DN 12	1,0 m	1,5 m^3/h	1,2 m^3/h

The power equivalent of the gas flowing through an EPMS hose assembly is also influenced by the hose length and the type of the gas family. The manufacturer shall indicate for each length the minimum power rating relating to the individual gas family.

NOTE Type L gas is a low calorific gas as defined in EN 437:2003, Table 1.

5.5.2 Test procedure

Air shall be supplied at constant pressure to a positive displacement differential meter of suitable range, having an error not greater than 5 % of the rate to be measured. The air shall be passed at a pressure of 20 mbar, through a straight length of pipe connected directly to the inlet of the EPMS hose assembly, see Figure 1a. Any additional pressure drop created by adapters fitted to the EPMS hose assembly shall be deducted from the measured value.

The pipe shall have a bore size as given in Figure 1b, detail A, and is to be at least 10 pipe diameters in length with a pressure tapping five diameters upstream of the EPMS hose assembly. Another pressure tapping is positioned five pipe diameters downstream of the EPMS hose assembly on a similar pipe, which is also of at least 10 diameters in length. A differential pressure gauge capable of being read directly to 0,05 mbar or less is connected as shown in Figure 1a.

The air flow rate is adjusted by means of a control valve on the outlet of the pipe to give the required differential pressure across the EPMS hose assembly and the air temperature is maintained to ± 0,5 °C. The flow rate shall be recorded and corrected to standard conditions of 1 013,25 mbar and 15 °C.

If the EPMS hose assembly has an end fitting which incorporates features that are part of a quick connection device, and those features impair the flow, they may be eliminated for the purposes of this test.

NOTE The flow rate of an end fitting which forms part of a safety quick connection device is tested as part of the quick connection device under the requirements of prEN 15069.