SLOVENSKI STANDARD
SIST EN 15266:2007

01-junij-2007

Upogljivi valoviti cevni kompleti iz nerjavnega jekla za plin v stavbah z delovnim tlakom do 0,5 bara

Stainless steel pliable corrugated tubing kits in buildings for gas with an operating pressure up to 0,5 bar

Nichtrostende biegbare Wellrohrbausätze in Gebäuden für Gas mit einem Arbeitsdruck bis 0,5 bar

Kits de tuyaux onduleux pliables en acier inoxydable pour le gaz dans les bâtiments avec une pression de service inférieure ou égale a 0,5 bar

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77.140.75	Jeklene cevi in cevni profili za posebne namene	Steel pipes and tubes for specific use
91.140.40	Sistemi za oskrbo s plinom	Gas supply systems

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Foreword

This document (EN 15266:2007) has been prepared by Technical Committee CEN/TC 342 “Metal hoses, hose assemblies, bellows and expansion joints”, the secretariat of which is held by UNI.

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of an identical text or by endorsement, at the latest by November 2007, and conflicting national standards shall be withdrawn at the latest by February 2009.

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(s).

For relationship with EU Directive(s), see informative Annex ZA, which is an integral part of this document.

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

Introduction

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

The requirements of this standard concern designers, manufacturers, suppliers and importers of stainless steel pliable corrugated gas tubing kits for buildings.

Installation and mandatory strength and tightness tests before commissioning should consider the local application regulations where they exist.

This document is applicable to:

— new installation pipework;

— replacements of existing installations; or

— extensions to existing installations.

Stainless steel pliable corrugated gas tubing kits can be used in conjunction with other approved gas pipework.

1 Scope

This European Standard specifies the requirements for material, design, manufacture, testing, marking and documentation of stainless steel pliable corrugated gas tubing kits for buildings with a maximum operating pressure (MOP) less than or equal to 0,5 bar and a nominal size range from DN 10 to DN 50.

This document applies to stainless steel pliable corrugated gas tubing kits used for 1st, 2nd and 3rd family gases in residential, commercial and industrial gas installations.

This document does not apply to:

— pliable tubing without cover;

— corrugated safety metal hose assemblies for connection to moveable appliances.

This document does not cover the installation aspects of stainless steel pliable corrugated gas tubing kits.

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, *Tests gases - Test pressures – Appliance categories*

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

EN 682, *Elastomeric seals – Materials requirements for seals used in pipes and fittings carrying gas and hydrocarbon fluids*

EN 751-1, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water - Part 1: Anaerobic jointing compounds*

EN 751-2, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water - Part 2: Non-hardening jointing compounds*

EN 751-3, *Sealing materials for metallic threaded joints in contact with 1st, 2nd and 3rd family gases and hot water - Part 3: Unsintered PTFE tapes*

EN 1363-1:1999, *Fire resistance tests – Part 1: General requirements*

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 10088-3, *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 10226-1, *Pipe threads where pressure tight joints are made on the threads - Part 1: Taper external threads and parallel internal threads - Dimensions, tolerances and designation*

EN 10242, *Threaded pipe fitting in malleable cast iron*

EN 12164, *Copper and copper alloys – Rod for free machining purposes*

EN 12165, *Copper and copper alloys – Wrought and unwrought forging stock*

EN 13501-1:2002, *Fire classification of construction products and building elements - Part 1: Classification using test 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*

EN ISO 6509, *Corrosion of metals and alloys - Determination of dezincification resistance of brass (ISO 6509:1981)*

EN ISO 7369:2004, *Pipework - Metal hoses and hose assemblies - Vocabulary (ISO 7369:2004)*

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 10380:2003, *Pipework - Corrugated metal hoses and hose assemblies (ISO 10380:2003)*

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)*

ISO 6957, *Copper alloys - Ammonia test for stress corrosion resistance*

3 Terms, definitions and abbreviations

For the purposes of this document, the terms and definitions listed in EN ISO 7369:2004, EN 1775:1998 and the following apply.

3.1
pliable tubing (PLT)
corrugated tubing capable of being bent easily by hand a limited number of times, covered with a tubular outer sheath by the manufacturer at the time of production

3.2
PLT kit
pliable tubing with its related components obtained or specified from one manufacturing source having design and performance responsibility for the kit

3.3
bend radius
radius measured to the centre line of the pliable tubing

3.4
PLT fitting
unique fitting using mechanical attachment methods, in which tightness is achieved with or without seals, excluding other joining methods such as welding, brazing, soldering or gluing

3.4.1
end fitting
PLT fitting intended to join pliable tubing to an external component

3.4.2
coupling
PLT fitting intended to join two sections of pliable tubing

3.4.3
tee
PLT fitting to join three sections of pliable tubing

3.4.4
manifold
PLT fitting designed to join 4 or more sections of pliable tubing

3.5
seal
any part intended to provide tightness within a PLT fitting

3.6
sleeve
tubular outer sheath intended to protect the connection between the pliable tubing and a PLT fitting from corrosion or mechanical damage

3.7
PLT support
element used to attach the PLT kit to the structure of the building

3.8
rated flow rate
flow rate at a given pressure drop, under standard reference conditions

3.9
family
group of products produced by one manufacturer for which test results for one product of that group are representative of the characteristics for the whole group

3.10
gas
1st, 2nd and 3rd family gases as defined in EN 437

NOTE These gases are commonly referred to as manufactured gases, natural gas and liquefied petroleum gases.

4 Design requirements

4.1 General

Where additional components are required to complete the PLT kit, these components shall be provided or specified by the kit manufacturer.

4.2 Materials

Materials for the manufacture of a PLT kit shall be selected from Table 1 and on the basis of their related suitability for fabrication, e.g. welding, cold forming, etc. as appropriate, and the conditions under which they will be used.

Table 1 — Materials

Component	Material
Pliable tubing	Stainless steel according to EN 10028-7: 1.4306, 1.4541, 1.4404, 1.4401, 1.4571
Cover	Synthetic material [a]
PLT fittings	Stainless steel according to EN 10088-3, copper alloys according to EN 12164 and EN 12165
PLT manifold/tees	Stainless steel according to EN 10088-3, copper alloys according to EN 12164 and EN 12165 Malleable cast iron according to EN 10242 types W 400-05; W 350-04; B 350-10 or B 300-06
Supports	Metallic corrosion resistant material
[a] see 4.10	

4.3 Nominal size DN and pressure drop

The nominal size of a PLT kit shall be selected from the DNs given in EN ISO 10380:2003, Table 2.

The nominal size range shall be from DN 10 to DN 50.

The minimum bore size of the pliable tubing shall be at least 98 % of the nominal size DN in mm.

The manufacturer shall declare the related pressure drop (see 5.18) for each nominal size DN (see 6.4).

4.4 Threads

End fittings shall have terminating threads according to EN 10226-1.

Integrated threads within the mechanical attachment of the PLT fittings shall not be compatible with EN 10226-1.

4.5 PLT fittings

4.5.1 General

PLT fittings shall provide a tight connection to the pliable tubing. PLT fittings, whether surface finished or not, shall be manufactured from materials listed in Table 1. Copper alloys shall be selected from EN 12164 and/or EN 12165 and shall contain at least 57 % copper and not more than 3,5 % lead.

4.5.2 Stress corrosion

All fittings and components of copper alloy shall be resistant to stress corrosion.

Stress corrosion resistance shall be determined in accordance with ISO 6957 (pH 9,5).

4.5.3 Dezincification

All copper alloys components shall resist dezincification.

If an alloy contains more than 10 % of zinc, its corrosion behaviour shall be assessed according to EN ISO 6509.

4.6 Seals and sealing agents

Where seals or sealing agents are used in the PLT kit and are exposed to gas, they shall be selected from the appropriate European Standards (EN 549, EN 682, EN 751-1, EN 751-2 and EN 751-3).

4.7 Environment

PLT kit components shall be resistant to any corrosive agent reasonably foreseen in the conditions of the declared intended use.

They shall be durable to climatic conditions according to 5.14 for a reasonably economic working life.

They shall withstand a temperature range of – 40 °C to 60 °C.

NOTE The manufacturer should advise in his installation instructions that where exposed, sections of PLT kits can be protected against excessive mechanical force that can cause damage. Casing/trunking can be used to fulfil this requirement.

4.8 Supports

Supports shall be made of materials mechanically and chemically non aggressive with the other components of the PLT kit with which they are in contact.

Supports shall be designed to carry the system load for a minimum of 30 min in case of fire. The standard temperature/time curve shall be as given in EN 1363-1:1999, Figure 7.

The manufacturer shall supply installations instructions that give the correct support design for the kit supplied. The instructions shall also emphasize the need to design the support fixings to the structure in such a way that maintains the integrity of the system in case of fire for a period not less than the period for which the supports are designed to carry the system load.

4.9 Electrical conductivity requirements

PLT kit components shall be electrically conductive, see 5.17.

NOTE The manufacturer should advise in his installation instructions that equipotential bonding should be in accordance with local application regulations.

4.10 Cover

The cover shall satisfy the tests according to 5.4, 5.7, 5.12, 5.13, 5.14 and 5.16.

If the materials of the cover contain corrosive agents or ingredients such as sulphur or chlorine, such agents shall not be released during manufacturing process or during intended service conditions.

For the purpose of safety, the prevailing colour of the cover shall be yellow, e.g. RAL 1004, 1016, 1018.

5 Performance and test requirements

5.1 General

5.1.1 Introduction

The number and the type of PLT kit samples to be tested, the tests and the compliance criteria shall be as given in 6.2.2, Table 11.

If any nominal size fails one of the tests within the test sequence schedule given in 5.1.3, Table 3, then all samples of that nominal size will be deemed to have failed to meet the type test requirements of this standard.

Unless otherwise specified in this document:

— all dimensions shall be in mm.

— the tests shall be carried out with the cover in place.

— the tests performed will qualify the other sizes in the same family as specified in Table 2.

Tests results shall only apply to components of the same design and same material.

Table 2 — Test requirements

Nominal size to be tested [a]	Family	Qualified diameters DN
DN 12	X	DN 10 - DN 12 - DN 15
DN 25	Y	DN 20 - DN 25 - DN 32
DN 50	Z	DN 40 - DN 50
[a] If these sizes are not available, the largest DN in the relevant family shall be tested.		

The tests shall be performed under ambient conditions. If not otherwise indicated the following tolerances shall apply:

— atmospheric pressure: (+/- 0,1) mbar;

— flow rate: (+/- 5)%;

— temperature above 125°C: (+/- 10)°C;

— dimensions: (+/- 0,1) mm;

— air pressure: (+/- 5)%;

— ambient temperature: (+/- 1)°C;

— time: (+/- 0,1)%;

— sample length: (-1/+3)%.

5.1.2 Type of PLT kit samples

The PLT kit samples used in the following tests shall be assembled in accordance with the manufacturers' instructions. Prior to assembling, each length of the pliable tubing shall be tested according to 5.3. Depending on the test, Type 1 samples (see Figure 1) or Type 2 samples (see Figure 2) shall be used.

Type 1:

End fitting – pliable tubing – end fitting

Dimensions in millimetres

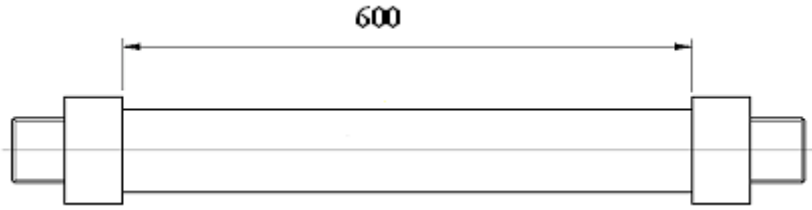

Figure 1 — PLT sample Type 1

Type 2:

End fitting – pliable tubing – coupling – pliable tubing – end fitting

Dimensions in millimetres

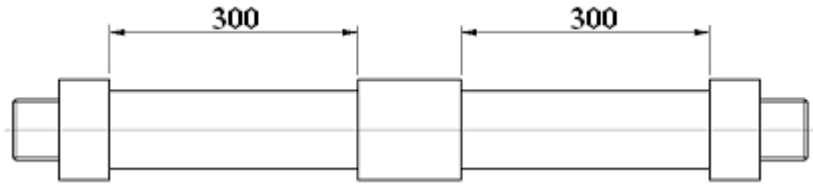

Figure 2 — PLT sample Type 2

5.1.3 Test sequence schedule

Table 3 gives the sequence to be followed for each test.

Table 3 — System test sequence schedule

Test	Tests to verify the characteristics	Test sequence					Clause of this standard
		1	2	3	4	5	
A	Tightness test	A	-	-	-	-	5.2
B	Dimensional check	B	-	-	-	-	5.3
C	Bending performance	B	A	C	A	-	5.4
D	Crushing resistance	B	A	D	A	B	5.5
E	Stability under pressure	B	A	E	A	-	5.6
F	Wear resistance of outer cover	F	-	-	-	-	5.7
G	Structural strength	B	A	G	A	-	5.8
H	Impact resistance	B	A	H	A	-	5.9
I	Penetration resistance	B	A	I	A	-	5.10
J	Resistance to pull out	B	A	J	A	-	5.11
K	Chemical resistance	A	K	A	-	-	5.12
L	Low temperature resistance	A	L	A	-	-	5.13
M	Ageing	A	M	A	-	-	5.14
N	Tightness in case of fire	A	N	A	-	-	5.15
O	Reaction to fire	O	-	-	-	-	5.16
P	Electrical conductivity	P	-	-	-	-	5.17
Q	Pressure drop	A	Q	-	-	-	5.18
R	Maximum load for admissible deformation	R	-	-	-	-	5.19
Example Test H is preceded by tests B and A and followed by test A.							

5.2 Tightness

5.2.1 Tightness for test samples

5.2.1.1 Requirements

The PLT kit shall be tight when tested in accordance with the method given in 5.2.1.2.

The initial tightness test shall be performed with the cover in place. For the final tightness test, the cover shall be removed in order that it does not contribute to the achievement of the tightness.

5.2.1.2 Test method

When held under water and containing air at a pressure of 2 bar the leakage rate of a test sample shall not exceed 10 cm^3/h.

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