



**SLOVENSKI STANDARD**  
**SIST EN 694:2002+A1:2007**

**01-julij-2007**

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**Gasilske cevi - Poltoge cevi za vgrajene sisteme**

Fire-fighting hoses - Semi-rigid hoses for fixed systems

Feuerlöschschläuche - Formstabile Schläuche für Wandhydranten

Tuyaux de lutte contre l'incendie - Tuyaux semi-rigides pour systemes fixes

**Ta slovenski standard je istoveten z: EN 694:2001+A1:2007**

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**ICS:**

13.220.10	Gašenje požara	Fire-fighting
23.040.70	Gumene cevi in armature	Hoses and hose assemblies

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English Version

## Fire-fighting hoses - Semi-rigid hoses for fixed systems

Tuyaux de lutte contre l'incendie - Tuyaux semi-rigides pour  
systèmes fixesFeuerlöschschläuche - Formstabile Schläuche für  
Wandhydranten

This European Standard was approved by CEN on 31 August 2000 and includes Amendment 1 approved by CEN on 12 March 2007 and Corrigendum 2 issued in 2003.

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 CEN Management Centre 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 CEN Management Centre has the same status as the official versions.

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
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EUROPEAN COMMITTEE FOR STANDARDIZATION  
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## Foreword

This document (EN 694:2001+A1:2007) has been prepared by Technical Committee CEN/TC 192 "Fire service equipment", 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of an identical text or by endorsement, at the latest by October 2007 and conflicting national standards shall be withdrawn at the latest by October 2007.

This document includes Amendment 1, approved by CEN on 2007-03-12.

This document supersedes EN 694:2001.

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

The modifications of the related CEN Corrigenda have been implemented at the appropriate places in the text and are indicated by the tags AC AC.

The standard is based on recommendations from CEN/TC 191 "Fixed fire-fighting systems" and should be read in conjunction with EN 671-1.

At present there is no existing ISO Standard on the same subject but ISO 4642:1978 "Rubber products - Hoses, non-collapsible, for fire-fighting service" is under revision by ISO/TC 45. Requirements for semi-rigid hoses for use with fire-fighting pumps and vehicles are given in EN 1947; those for non-percolating layflat hoses are given in EN 1924-1 (pumps and vehicles) and EN 1924-2 (fixed systems).

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A1 *deleted text* A1

Users of this European Standard are advised to consider the desirability of independent certification of product conformity with this European Standard based on testing and continuing surveillance, which may be coupled with assessment of a supplier's quality system against EN ISO 9001.

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

A fixed system is a manually operated unit installed in a building in order to make it possible for the occupants to control and extinguish a small fire. The system consists of fixed units mounted on walls or in cabinets permanently connected to a water supply. The fixed units are composed of a coupling, a valve, a semi-rigid water filled hose with its support and a nozzle.

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## 1 Scope

This European Standard specifies the requirements and test methods for semi-rigid reel hoses for fire-fighting purposes for use with fixed systems. The hoses are intended for use at a maximum working pressure of 1,2 MPa for hoses of 19 mm and 25 mm inside diameter and 0,7 MPa for hoses of 33 mm inside diameter.

Hoses conforming to this standard are intended for applications where long intervals can occur between the occasions of use, for example on fixed fire hose reels in buildings and other construction works.

The standard applies exclusively to hoses for fire-fighting purposes intended for use at ambient conditions in non-aggressive or non-corrosive atmospheres within the temperature range -20 °C to +60 °C.

NOTE 1 Hoses for use at temperatures lower than -20 °C may be supplied at the request of the purchaser.

NOTE 2 All pressures are expressed in megapascals. 1 MPa = 10 bar.

## 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 (including amendments).

EN 24672:1993, *Rubber and plastics hoses - Sub-ambient temperature flexibility tests (ISO 4672:1988)*

EN 27326:1993, *Rubber and plastics hoses - Assessment of ozone resistance under static conditions (ISO 7326:1991)*

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

EN ISO 1307, *Rubber and plastics hoses for general-purpose industrial applications - Bore diameters and tolerances, and tolerances on length (ISO 1307:1992)*

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

ISO 176:1976, *Plastics - Determination of loss of plasticizers - Activated carbon method*

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

ISO 4671:1984, *Rubber and plastics hose and hose assemblies - Methods of measurement of dimensions*

ISO 8330:1998, *Rubber and plastics hoses and hose assemblies - Vocabulary*

### 3 Definitions

For the purposes of this standard the following definition applies, together with those for working pressure, proof pressure and burst pressure given in ISO 8330:1998.

#### 3.1

##### **semi-rigid hose**

hose which maintains its round cross-section even when unpressurized

### 4 Classification

#### 4.1 General

All types and classes of hoses shall be so flexible that they can be rolled and kept on a drum of minimum diameter 200 mm for 19 mm and 25 mm inside diameter hose and of minimum diameter 280 mm for 33 mm inside diameter hose.

Hoses shall be one of two types distinguished by their construction. Each hose type shall be further divided into classes distinguished by the materials used for lining and cover.

#### 4.2 Classification by types (hose construction)

Type A hoses shall consist of:

- a) a seamless rubber or plastics lining;
- b) a textile reinforcement with or without a rigid spiral helix;
- c) a rubber or plastics cover.

Type B hoses shall consist of:

- a) a seamless rubber or plastics lining;
- b) a circular woven textile reinforcement with a rigid spiral helix;
- c) an uncovered or rubber or plastics cover.

#### 4.3 Classification by class (materials for lining and cover)

The hose types shall be further subdivided into six classes dependent on the materials used in the construction in accordance with Table 1.



Table 1 — Classes and materials

Class	Lining material	Cover material
1	rubber	rubber
2	plastics	plastics
3	rubber	plastics
4	plastics	rubber
5	rubber	no cover
6	plastics	no cover

## 5 Dimensions, tolerances and maximum mass

### 5.1 Inside diameter and maximum mass

The inside diameter of the hose, when measured in accordance with ISO 4671, shall conform to the requirements given in Table 2. The mass per metre length of the hose shall be in accordance with Table 2.

Table 2 — Inside diameter, tolerances on inside diameter and maximum mass per unit length

Inside diameter mm	Tolerances for inside diameter mm	Mass per unit length kg/m	
		Type A max.	Type B max.
19	-0,5 to +1,0	0,75	0,25
25	±1,0	0,90	0,35
33	-1,0 to +1,5	1,00	0,50

### 5.2 Length and tolerances on length

The total length of hose supplied shall be in accordance with the purchaser's requirements and shall be stated in metres. Tolerance on length shall be in accordance with EN ISO 1307.

## 6 Performance requirements of finished hose

### 6.1 Hydrostatic requirements

#### 6.1.1 Deformation under maximum working pressure

The dimensional stability of the hose, when tested in accordance with EN ISO 1402, shall conform to the requirements given in Table 3. The length of the test piece shall be 1 m.

For 19 mm and 25 mm inside diameter hoses the initial test pressure shall be 0,07 MPa and the final test pressure shall be 1,2 MPa. For 33 mm inside diameter hose the initial test pressure shall be 0,07 MPa and the final test pressure shall be 0,7 MPa.

The twist shall be not greater than 30°/m for type A. For type B the twist may be greater than 30°/m but in this case it shall only be in a direction which closes the coupling and shall be stated in the test report.

**Table 3 — Change in length and external diameter**

	<b>Tolerances for type A</b>	<b>Tolerances for type B</b>
	%	%
Change in length	0 to +7,5	0 to +5,0
Change in external diameter	0 to +7,5	0 to +5,0

### 6.1.2 Deformation under proof pressure

A proof pressure hold test shall be carried out on three hose lengths each of 1 m in accordance with EN ISO 1402. The proof pressure shall be as given in Table 4 and on examination during the test, the test pieces shall not show any evidence of leakage, cracking, abrupt distortion or other signs of failure.

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**Table 4 — Maximum working pressure, proof pressure and minimum burst pressure**

Pressure MPa	Inside diameter	
	19 mm and 25 mm	33 mm
Maximum working pressure	1,2	0,7
Proof pressure	2,4	1,4
Minimum burst pressure	4,2	2,45

### 6.1.3 Minimum burst pressure

**[A1]** A burst pressure test shall be carried out in accordance with EN ISO 1402 on the three test pieces used for the deformation under proof pressure test.

**NOTE** It is not necessary to increase the pressure above the minimum burst value to burst the hose. It is sufficient to increase the pressure to the required minimum burst pressure stated in Table 4 in order to pass this test requirement. This should be stated in the Test Report. **[A1]**

Each of the test pieces shall not burst at a pressure less than that given in Table 4.

### 6.1.4 Kink pressure

When tested in accordance with annex A, the test piece shall neither burst nor show any visible signs of defect before or after pressurizing at 1,2 MPa for 19 mm and 25 mm inside diameter hoses and at 0,7 MPa for 33 mm inside diameter hose.

## 6.2 Adhesion

When tested in accordance with EN 28033 the adhesion between all components shall be not less than 1,5 kN/m for type A hoses and 1,0 kN/m for type B hoses. Dependant on the construction of the hose, the test piece in either case shall be decided by the test laboratory in accordance with EN 28033.

## 6.3 Accelerated ageing

When tested in accordance with annex B, the three test pieces subjected to the burst pressure test shall conform to the requirements of 6.1.3. The mean of the burst pressure test results shall not decrease by more than 25 % from the initial mean burst value determined from the results obtained in 6.1.3.

The resultant adhesion of the fourth test piece shall be in accordance with the requirements of 6.2.

NOTE There is no limitation on the increase in the values of these properties.

## 6.4 Low temperature flexibility

The test shall be carried out in accordance with clause 4 Method B of EN 24672:1993 using a mandrel of outside diameter equal to 12 times the inside diameter of the hose. After bending the hose round the mandrel through 180° for  $(10 \pm 2)$  s at a temperature of  $(-20 \pm 2)$  °C or lower if requested, it shall not show any signs of breaking or cracking and shall meet the proof pressure requirement given in Table 4.

## 6.5 Hot surface resistance

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☒ For all types and classes, when tested in accordance with Annex C at a test temperature of  $(200 \pm 2)$  °C, in none of the four tests shall leakage occur less than 60 s from the application of the filament rod or on removal of this filament rod after the specified period. ☒

## 6.6 Ozone resistance

After carrying out an ozone resistance test in accordance with 7.1 Method 1 of EN 27326:1993 for all inside diameter sizes and types, the hose lining and cover shall not show any signs of cracking. The lining shall be examined by slitting the hose wall.

## 6.7 Bending and crush resistance

When tested in accordance with annex D at a temperature of  $(23 \pm 2)$  °C, the ratio  $T/D$  shall not exceed 1,20 and there shall be no visible signs of kinking.

## 6.8 UV-resistance (xenon arc lamp)

NOTE A test for resistance to UV and requirements based on ISO 11758 will be added at the first revision of this standard, when more experience has been acquired.