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**Fire-fighting hoses — Rubber and  
plastics suction hoses and hose  
assemblies**

*Tuyaux de lutte contre l'incendie — Tuyaux d'aspiration et flexibles en  
caoutchouc et en plastique*

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## Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14557 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Hoses (rubber and plastics)*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read "...this European Standard..." to mean "...this International Standard...".

Annexes A, B, C, D and E form a normative part of this International Standard. Annex F is for information only.

For the purposes of this International Standard, the CEN annex regarding fulfilment of European Council Directives has been removed.

## Contents

	page
Foreword.....	vi
Introduction .....	vi
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions .....	2
4 Classification .....	2
4.1 Type (hose construction) .....	2
4.2 Hose ends .....	2
5 Dimensions, tolerances and maximum mass .....	2
5.1 Inside diameter and maximum mass .....	2
5.2 Length and tolerances on length.....	3
6 Performance requirements of finished hose.....	3
6.1 Hydrostatic requirements.....	3
6.1.1 Deformation under proof pressure.....	3
6.1.2 Burst pressure.....	4
6.2 Adhesion (type A hoses only).....	4
6.3 Low temperature flexibility.....	4
6.4 Ozone resistance (type A hoses only) .....	4
6.5 Bending resistance .....	4
6.6 UV-resistance (xenon arc lamp) (type B hoses only) .....	4
6.7 Loss in mass on heating (type B hoses only) .....	4
6.8 Vacuum resistance.....	5
6.9 Pressure impulse resistance (type B hoses only) .....	5
6.10 Reinforcement fracture resistance (type B hoses only) .....	5
6.11 Flexibility at ambient temperature.....	5
6.12 Vacuum resistance with flexing.....	5
7 Marking.....	6
8 Hose assemblies .....	6
Annex A (normative) Pressure impulse test.....	7
A.1 Test pieces .....	7
A.2 Apparatus.....	7
A.3 Test fluid.....	7
A.4 Conditioning .....	7
A.5 Procedure.....	7
A.6 Test report.....	8
Annex B (normative) Reinforcement fracture resistance test (type B hoses only).....	10
B.1 Test pieces .....	10
B.2 Apparatus.....	10
B.3 Conditioning .....	10
B.4 Procedure.....	10
B.5 Test report.....	11
Annex C (normative) Test for flexibility at ambient temperature .....	13
C.1 Test piece .....	13
C.2 Apparatus.....	13
C.2.1 Vertical slings .....	13
C.2.2 Straight edge.....	13

C.2.3	Weight or force .....	13
C.2.4	Rule or steel measuring tape .....	13
C.3	Procedure.....	13
C.4	Test report.....	13
Annex D	(normative) Test for vacuum resistance with flexing .....	15
D.1	Test piece.....	15
D.2	Apparatus.....	15
D.2.1	Flat table.....	15
D.2.2	Weight or force .....	15
D.2.3	Vacuum source.....	15
D.3	Procedure.....	15
D.4	Test report.....	15
Annex E	(normative) Test for hose assemblies .....	16
E.1	Test piece.....	16
E.2	Procedure.....	16
Annex F	(informative) Recommended minimum frequencies of testing .....	17
Bibliography	.....	18

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ISO 14557:2002

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## Foreword

This document EN ISO 14557:2002 has been prepared by Technical Committee CEN/TC 192 "Fire service equipment", the secretariat of which is held by BSI, in collaboration with Technical Committee ISO/TC 45 "Equipment for fire protection and fire fighting".

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 June 2003, and conflicting national standards shall be withdrawn at the latest by June 2003.

Recommendations on the frequency at which tests specified in this standard should be carried out are given in annex F.

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

The annexes A to E and Z are normative. Annex F is informative.

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, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

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## Introduction

This European Standard is mainly concerned with fire service suction hoses for fire-fighting, used manually to supply unpressurized water to the pump.

## 1 Scope

This European Standard gives requirements and test methods for rubber and plastics suction hoses for fire-fighting purposes.

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

Additional requirements are specified for hose assemblies, that is, hoses with couplings already fitted, where this is carried out by the hose manufacturer (see clause 8).

Type A (Rubber) hoses are intended for use at a minimum temperature of -20 °C and Type B (Thermoplastics) hoses are intended for use at a minimum temperature of -10 °C.

NOTE 2 Hoses for use at temperatures lower than those specified above can be supplied by agreement between the manufacturer and purchaser. In this case, the low temperature flexibility test (see 6.3) should be carried out at the specified temperature.

## 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).

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

<https://standards.iteh.ai/catalog/standards/sist/1ba8a63d-3ad0-4b4e-96a8-81e721-6f7d05-industry/iso-176-1976>

ISO 1307, *Rubber and plastics hoses for general-purpose industrial applications — Bore diameters and tolerances, and tolerances on length*.

ISO 1402, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing*.

ISO 1746, *Rubber or plastics hoses and tubing — Bending tests*.

ISO 4672:1997, *Rubber and plastics hoses — Sub-ambient temperature flexibility tests*.

ISO 7233, *Rubber and plastics hoses and hose assemblies — Determination of suction resistance*.

ISO 7326:1991, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions*.

ISO 8330, *Rubber and plastics hoses and hose assemblies — Vocabulary*.

ISO 8033, *Rubber and plastics hoses — Determination of adhesion between components*.

ISO 11758, *Rubber and plastics hoses — Exposure to a xenon arc lamp — Determination of changes in colour and appearance*.

### 3 Terms and definitions

For the purposes of this European Standard, the terms and definitions for working pressure, proof pressure and burst pressure given in ISO 8330 apply.

### 4 Classification

#### 4.1 Type (hose construction)

Type A hoses shall consist of:

- a) a rubber lining uniform in thickness, reasonably concentric and free from holes, porosity and other defects;
- b) a textile reinforcement applied uniformly by any suitable method;
- c) an embedded wire helix or helices evenly and uniformly applied and made from metallic material that allows the hose to meet the specification requirements;
- d) a rubber cover, ozone resistant, uniform in quality and thickness and free from defects.

Type B hoses shall consist of a flexible, thermoplastics material supported in its mass by a helix of rigid polymeric material. The reinforcement and flexible components of the hose wall shall be fixed and free from cracks, porosity, foreign inclusions or other defects.

#### 4.2 Hose ends

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The hose ends shall be compatible with suction hose couplings conforming to the relevant national standards.

NOTE Where soft ends or wire-free ends are used for type A hoses, they should have an additional rubberized textile reinforcement applied as a cuff over the wire-free portion and the first turn of the embedded wire helix.

The hose ends should be capped or sealed to prevent ingress of water.

Specifying the dimensions of the soft or wire-free ends may be the subject of an agreement between the manufacturer and the purchaser.

### 5 Dimensions, tolerances and maximum mass

#### 5.1 Inside diameter and maximum mass

The dimensions of the hose and tolerances, when measured in accordance with ISO 4671, shall conform to the requirements given in Table 1. The mass per metre length of the hose shall be in accordance with Table 1.



Table 1 — 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	Type B
45	−0,2 to +1,0	2,0	1,0
50	−0,2 to +1,0	2,3	1,6
52	−0,2 to +1,0	2,3	1,6
65	−0,2 to +1,5	3,2	2,0
70	−0,2 to +1,5	3,7	2,6
75	−0,2 to +1,5	4,1	3,0
76	−0,2 to +1,5	4,1	3,0
90	−0,2 to +1,5	6,0	4,0
100	−0,2 to +1,5	6,7	4,5
102	−0,2 to +1,5	6,7	4,5
110	−0,2 to +1,5	7,0	4,7
125	−0,5 to +2,0	7,8	5,0
140	−0,5 to +2,0	8,9	6,0
150	−0,5 to +2,0	11,0	8,0

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## 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. Tolerances on length shall be in accordance with ISO 1307. Tolerances for fixed hose lengths shall be specified by agreement between the purchaser and the manufacturer.

## 6 Performance requirements of finished hose

### 6.1 Hydrostatic requirements

NOTE The hydrostatic requirements given below are for suction hoses only. Hoses intended for use in discharge duties as well, require higher burst and proof pressures to be specified by agreement between the purchaser and the manufacturer.

#### 6.1.1 Deformation under proof pressure

When tested in accordance with ISO 1402 at temperatures and pressures shown in Table 2, the hose shall not burst or show any evidence of leakage, cracking, abrupt distortion or other signs of failure.

Table 2 — Proof pressure and minimum burst pressure

	Test temperature (23 ± 2) °C		Test temperature (55 ± 2) °C	
	Type A	Type B	Type A	Type B
Proof pressure MPa	0,3	0,3	-	0,15
Minimum burst pressure MPa	0,6	0,6	-	0,3

### 6.1.2 Burst pressure

When tested in accordance with ISO 1402 at temperatures and pressures given in Table 2, the hose shall not burst. Three hose lengths each of 1 m shall be tested.

### 6.2 Adhesion (type A hoses only)

When tested in accordance with ISO 8033 the adhesion between lining and reinforcement and between cover and reinforcement shall be not less than 2,0 kN/m.

### 6.3 Low temperature flexibility

The test shall be carried out in accordance with clause 4 method B of ISO 4672:1997 at a temperature of –10 °C for thermoplastics hoses and –20 °C for rubber hoses.

NOTE Hoses supplied for use at temperatures lower than those specified above should be tested at the specified temperature.

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### 6.4 Ozone resistance (type A hoses only)

When tested in accordance with method 3 of ISO 7326:1991 under ×2 magnification, the hose cover shall not show any signs of cracking.

### 6.5 Bending resistance

When tested in accordance with ISO 1746 using a minimum radius of curvature of 10 times the inside diameter, the hose shall not show any permanent deformation or any visible signs of cracking.

### 6.6 UV-resistance (xenon arc lamp) (type B hoses only)

NOTE A test for resistance to UV and requirements based on ISO 11578 will be added at the first revision of this standard, when more experience has been acquired.

### 6.7 Loss in mass on heating (type B hoses only)

When tested in accordance with method B of ISO 176:1976 the flexible thermoplastics material used in the construction shall show a loss in mass not greater than 4 %.

## 6.8 Vacuum resistance

When tested in accordance with ISO 7233, the hose shall show no visible evidence of delamination, indentation or collapse. The test piece shall be conditioned for 4 h prior to testing. During the test, the test piece shall be placed in a water bath at  $(23 \pm 2) ^\circ\text{C}$  for all classes of hoses and also at  $(55 \pm 2) ^\circ\text{C}$  for class 2 hoses. The internal pressure of the hose shall be reduced to 0,004 MPa absolute pressure (0,097 MPa below atmospheric pressure) and the vacuum shall be maintained for 10 min.

## 6.9 Pressure impulse resistance (type B hoses only)

When tested in accordance with annex A, the test piece shall not leak or rupture before a minimum of 10 000 cycles. In the event of a failure within one diameter's length from either end of the test piece, the test shall be disregarded and a further test piece tested.

## 6.10 Reinforcement fracture resistance (type B hoses only)

When tested in accordance with annex B the polymer reinforcement shall undergo reverse bending without visible cracking.

## 6.11 Flexibility at ambient temperature

When tested in accordance with annex C the deflection at the centre of the hose assembly shall be not less than the appropriate value given in Table 3.

Table 3 — Minimum deflection for flexibility test

Inside diameter mm	Minimum deflection mm
45	450
50	450
52	450
65	400
70	380
75	380
76	380
90	380
100	380
102	380
110	380
125	330
140	330
150	330

## 6.12 Vacuum resistance with flexing

When tested in accordance with annex D the hose assembly shall have no visible damage or have any permanent distortion.