
**Rubber and plastics hoses,
non-collapsible, for fire-fighting
service —**

**Part 1:
Semi-rigid hoses for fixed systems**

iTeh STANDARD PREVIEW
*Tuyaux en caoutchouc et en plastique, non aplatissables, pour la lutte
contre l'incendie —*
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Partie 1. Tuyaux semi-rigides pour systèmes fixes

ISO 4642-1:2009

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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 2.

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 document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 4642-1 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Hoses (rubber and plastics)*.

This first edition, together with ISO 4642-2, cancels and replaces ISO 4642:1978 which has been technically revised.

ISO 4642 consists of the following parts, under the general title *Rubber and plastics hoses, non-collapsible, for fire-fighting service*:

- *Part 1: Semi-rigid hoses for fixed systems*
- *Part 2: Semi-rigid hoses (and hose assemblies) for pumps and vehicles*

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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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Rubber and plastics hoses, non-collapsible, for fire-fighting service —

Part 1: Semi-rigid hoses for fixed systems

1 Scope

This part of ISO 4642 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 part of ISO 4642 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.

This part of ISO 4642 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 $-20\text{ }^{\circ}\text{C}$ to $+60\text{ }^{\circ}\text{C}$.

NOTE 1 Hoses for use at temperatures lower than $-20\text{ }^{\circ}\text{C}$ can be supplied at the request of the purchaser.

NOTE 2 All pressures are expressed in megapascals where $1\text{ MPa} = 10\text{ bar}$.

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.

ISO 176:2005, *Plastics — Determination of loss of plasticizers — Activated carbon method*

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

ISO 1307, *Rubber and plastics hoses — Hose sizes, minimum and maximum inside diameters, and tolerances on cut-to-length hoses*

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

ISO 4671, *Rubber and plastics hoses and hose assemblies — Methods of measurement of the dimensions of hoses and the lengths of hose assemblies*

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

ISO 7326:2006, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions*

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

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

ISO 8331, *Rubber and plastics hoses and hose assemblies — Guidelines for selection, storage, use and maintenance*

3 Terms and definitions

For the purposes of this document, the definitions given in ISO 8330 and the following apply.

3.1

semi-rigid hose

hose that maintains its round cross-section even when unpressurized

4 Classification

4.1 General

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

4.2.1 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.

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4.2.2 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 their 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 ISO 1307.

6 Performance requirements of finished hose

6.1 Hydrostatic requirements

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6.1.1 Deformation under maximum working pressure

The dimensional stability of the hose, when tested in accordance with 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 no greater than 30° m^{-1} for type A. For type B, the twist may be greater than 30° m^{-1} 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

	Tolerances for type A	Tolerances for type 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 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.

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

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

6.1.3 Minimum burst pressure

A burst pressure test shall be carried out in accordance with ISO 1402 on the three test pieces used for the deformation under proof pressure test, until the hose bursts.

None of the test pieces shall 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

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When tested in accordance with ISO 8033, 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 ISO 8033.

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6.3 Accelerated ageing

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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 ISO 4672:1997, using a mandrel of outside diameter equal to 12 × the inside diameter of the hose. After bending the hose round the mandrel through 180° for (10 ± 2) s at a temperature of (−20 ± 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

For all types and classes, when tested in accordance with Annex C at a test temperature of (200 ± 2) °C, in none of the four tests shall leakage occur less than 60 s after application of the filament rod.

6.6 Ozone resistance

After carrying out an ozone resistance test in accordance with 8.1, Method 1 of ISO 7326:2006 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 ± 2) °C, the ratio $T:D$ shall not exceed 1,20.

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 part of ISO 4642, when more experience has been acquired.

6.9 Loss in mass on heating

When tested in accordance with 6.2, Method B of ISO 176:2005, the lining and cover materials shall not show a loss in mass greater than 4 %.

7 Frequency of testing

The minimum frequency of testing shall conform to the schedule given in Annex E.

Routine tests are hose tests carried out on every manufactured length of finished hose.

Production tests are those carried out per batch per the schedule in Annex F.

8 Type tests

Type testing is carried out in order to confirm that all the materials, construction and test requirements of this part of ISO 4642 have been met by the method of manufacture and hose design.

Type testing shall be repeated at a minimum of every five years or whenever there is a change in the method of manufacture of materials.

9 Test report

A test report shall be supplied if requested by the customer.

10 Recommendation for packaging and storage

Details of packaging and storage are given in ISO 8331.

11 Marking

Each length of hose shall be legibly and permanently marked with the following minimum information, at least twice per length, at both ends, for type B hoses and along the whole length at minimum intervals of 2 m for type A hoses:

- a) manufacturer's name or trademark;
- b) number of this part of ISO 4642, i.e., ISO 4642-1;
- c) hose type, class and inside diameter in millimetres;
- d) maximum working pressure in bar;