
**Rubber hoses, textile-reinforced, for
general-purpose water applications —
Specification**

*Tuyaux en caoutchouc à armature textile d'usage général pour
l'eau — Spécifications*

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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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Rubber and plastics hoses and hose assemblies*.

This fifth edition cancels and replaces the fourth edition (ISO 1403:2005), of which it constitutes a minor revision.

The main changes compared to the previous edition are as follows:

- In [Clause 2](#), normative references have been updated.
- The unit MPa has been added for all the pressures accordingly.
- In [Clause 8](#), the year of publication has been deleted.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Rubber hoses, textile-reinforced, for general-purpose water applications — Specification

WARNING — Persons using this document should be familiar with normal laboratory practice. This document does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices.

1 Scope

This document specifies the requirements for three types of general-purpose textile-reinforced rubber water hose with an operating temperature range of $-25\text{ }^{\circ}\text{C}$ to $+70\text{ }^{\circ}\text{C}$ and a maximum working pressure of up to 2,5 MPa (25 bar).

These hoses are not intended to be used for conveyance of potable (drinking) water, for washing-machine inlets, as firefighting hoses, for special agricultural machines or as collapsible water hoses.

These hoses can be used with additives which lower the freezing point of water.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 37, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties*

ISO 188:2011, *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 7326:2016, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions*

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

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

ISO 10619-1:2017, *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 1: Bending tests at ambient temperature*

ISO 10619-2:2017, *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 2: Bending tests at sub-ambient temperatures*

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at <https://www.iso.org/obp>

- IEC Electropedia: available at <http://www.electropedia.org/>

4 Classification

Hoses are designated as one of the following types depending on their pressure rating:

- Type 1: Low pressure — Designed for a maximum working pressure of 0,6 MPa (6 bar).
- Type 2: Medium pressure — Designed for a maximum working pressure of 1,0 MPa (10 bar).
- Type 3: High pressure — Designed for a maximum working pressure of 2,5 MPa (25 bar).

5 Materials and construction

The hose shall consist of:

- a rubber lining;
- a reinforcement of natural or synthetic textile, applied by any suitable technique;
- a rubber cover.

The lining and cover shall be of uniform thickness, concentric to comply with the minimum thickness specified, and free from holes, porosity and other defects. The cover finish may be smooth, fluted or fabric-marked.

6 Dimensions

6.1 Inside diameters and tolerances

When measured in accordance with ISO 4671, the inside diameters and their tolerances shall conform to the values specified in [Table 1](#).

6.2 Concentricity

When determined in accordance with ISO 4671, the concentricity, based on a total indicator reading between the inside diameter and the outside surface of the cover, shall be no greater than 1,0 mm for hoses of inside diameter up to and including 76 mm, and no greater than 1,5 mm for hoses of inside diameter greater than 76 mm.

6.3 Tolerance on length

When measured in accordance with ISO 4671, the tolerance on cut lengths shall be as specified in ISO 1307.

6.4 Minimum thickness of lining and cover

When measured in accordance with ISO 4671, the minimum thickness of the lining plus cover shall be 1,5 mm. If the cover is fluted, the depth of the flutes shall not be greater than 50 % of the cover thickness.

Table 1 — Inside diameters and tolerances

Inside diameter mm	Tolerance mm
10	±0,75
12,5	±0,75
16	±0,75
19	±0,75
25	±1,25
32	±1,25
38	±1,50
50	±1,50
63	±1,50
76	±1,50
100	±2,00

7 Physical properties

7.1 Rubber compounds

When measured by the methods listed in [Table 2](#), the physical properties of the compounds used for the lining and cover shall conform to the values specified in [Table 2](#).

Tests shall be carried out either on samples taken from the hose or from separately vulcanized sheets 2 mm in thickness and vulcanized to the same cure state as production hoses.

Table 2 — Physical properties of rubber compounds

Property	Requirements		Test method
	Lining	Cover	
Minimum tensile strength	5,0 MPa (50 bar) (types 1 and 2) 7,0 MPa (70 bar) (type 3)	5,0 MPa (50 bar) (types 1 and 2) 7,0 MPa (70 bar) (type 3)	ISO 37 (dumb-bell test piece)
Minimum elongation at break	200 %	200 %	ISO 37 (dumb-bell test piece)
Resistance to ageing:			ISO 188:2011 (3 days at 100 °C ± 1 °C), air-oven method; ISO 37 (dumb-bell test piece)
— Change in tensile strength from original value (max.)	±25 %	±25 %	
— Change in elongation at break from original value (max.)	±50 %	±50 %	

7.2 Finished hose

When measured by the methods listed in [Table 3](#), the physical properties of finished hoses shall conform to the values specified in [Table 3](#).

Table 3 — Physical properties of finished hoses

Property	Requirements	Test method
Proof pressure at 23 °C	0,9 MPa (9 bar) (type 1) 1,5 MPa (15 bar) (type 2) 5,0 MPa (50 bar) (type 3)	ISO 1402
Change in length at proof pressure	±7 %	ISO 1402
Minimum burst pressure	1,8 MPa (18 bar) (type 1) 3,0 MPa (30 bar) (type 2) 10,0 MPa (100 bar) (type 3)	ISO 1402
Adhesion between components	1,5 kN/m (min.)	ISO 8033
Ozone resistance	No cracking observed under × 2 magnification	ISO 7326:2016, method 1 up to 25 mm ID method 2 or 3 for other sizes
Flexibility at 23 °C	T/D not less than 0,8	ISO 10619-1:2017, method A1
Low-temperature flexibility	No cracks shall be detected and the hose shall pass the proof test specified above.	ISO 10619-2:2017, method B, at -25 °C ± 2 °C

8 Marking

The hose shall be continuously and durably marked with the following minimum information:

- the manufacturer's name or identification, e.g. XXX;
- a reference to this document, i.e. ISO 1403;
- the hose type number, e.g. Type 2;
- the inside diameter, in millimetres, e.g. 25;
- the maximum working pressure, in megapascals or in bars, e.g. 1,0 MPa (10 bar);
- the quarter and year of manufacture, e.g. 1QXX.

EXAMPLE XXX / ISO 1403/Type 2/25/1,0 MPa (10 bar)/1QXX.

For b), hose manufacturer shall use the latest publication of this document, otherwise the year of publication shall be included in the marking.