
**Plastics hoses — Helical-
thermoplastic-reinforced
thermoplastics hoses for suction and
discharge of aqueous materials —
Specification**

*Tuyaux en plastiques — Tuyaux thermoplastiques à renforcement
thermoplastique en spirale pour aspiration et refoulement de
matières aqueuses — Spécifications*

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Rubber and plastics hoses and hose assemblies*.

This fourth edition cancels and replaces the third edition (ISO 3994:2007), which has been technically revised.

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Introduction

This International Standard has been prepared to provide minimum acceptable requirements for the satisfactory performance of polymer-reinforced thermoplastics hoses for suction and discharge applications, conveying water, weak aqueous chemical solutions and abrasive solids and slurries.

If there is a special requirement for resistance to deleterious chemicals, this is a matter for agreement between the supplier and the purchaser.

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Plastics hoses — Helical-thermoplastic-reinforced thermoplastics hoses for suction and discharge of aqueous materials — Specification

WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This International Standard 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 health and safety practices and to ensure compliance with any national regulatory conditions.

1 Scope

This International Standard specifies the requirements for three types of helical-thermoplastic-reinforced thermoplastics hoses for suction and discharge of water, weak aqueous chemical solutions and abrasive solids and slurries, for use in the ambient temperature range from $-10\text{ }^{\circ}\text{C}$ to $55\text{ }^{\circ}\text{C}$.

The three types of hose are for light-, medium- and heavy-duty applications.

The types of hoses covered in this International Standard are not intended for use with flammable or combustible materials, nor with aromatic solvents.

NOTE Hoses of a similar construction for suction and discharge for fire-fighting are specified in ISO 14557.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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* - 2014
- ISO 176:2005, *Plastics — Determination of loss of plasticizers — Activated carbon method*
- 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 8330, *Rubber and plastics hoses and hose assemblies — Vocabulary*
- ISO 10619-1, *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 1: Bending tests at ambient temperature*
- ISO 10619-2, *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 2: Bending tests at sub-ambient temperatures*
- ISO 30013, *Rubber and plastics hoses — Methods of exposure to laboratory light sources — Determination of changes in colour, appearance and other physical properties*
- ISO 23529, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

3 Terms and definitions

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

4 Classification

Three types of hoses are specified, related to the maximum working pressure and suction pressure (see [Tables 4](#) and [5](#)):

- type 1: light-duty service;
- type 2: medium-duty service;
- type 3: heavy-duty service.

All types are designed to operate in the ambient temperature range -10 °C to 55 °C .

5 Materials and construction

The hoses shall be as uniform as commercially practicable in colour and other physical properties. They shall consist of a flexible thermoplastics material supported within the material by a helix of thermoplastic material of a similar compatible property. The reinforcing and flexible components of the wall shall be fused together and free from visible cracks, porosity, foreign inclusions or other defects such as are liable to cause failure of the hose in service.

6 Dimensions and tolerances

6.1 Nominal bores, inside diameters and tolerances

The inside diameters and tolerances of hoses of different nominal bores shall meet the requirements given in [Table 1](#).

6.2 Length tolerances

The tolerances on cut lengths shall be in accordance with ISO 1307.

[ISO 3994:2014](#)

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Table 1 — Nominal bores, inside diameters and tolerances

Nominal bore	Inside diameter	Tolerances for types 1 and 2	Tolerances for type 3
	mm	mm	mm
12,5	12,5	±0,75	—
16	16	±0,75	—
19	19	±0,75	—
20	20	±0,75	—
25	25	±1,25	±1,25
32	32	±1,25	±1,25
38	38	±1,25	±1,50
40	40	±1,25	±1,50
50	50	±1,50	±1,50
63	63	±1,50	±1,50
76	76	±1,50	±2,00
80	80	±1,50	±2,00
90	90	±2,00	±2,00
100	100	±2,00	±2,00
102	102	±2,00	±2,00
125	125	±2,00	±2,00
127	127	±2,00	±2,00
152	152	±2,00	±2,00
160	160	±2,00	±2,00
200	200	—	±2,00
250	250	—	±3,00
300	300	—	±3,00
315	315	—	±3,00

7 Performance requirements

7.1 Hydrostatic testing at 23 °C ± 2 °C

When subjected to the proof pressure test and the burst pressure test specified in ISO 1402 at 23 °C ± 2 °C, hoses shall meet the following requirements:

- at the proof pressure specified in [Table 2](#) (i.e. 40 % of the minimum burst pressure), the hoses shall show no evidence of leakage, cracking, abrupt distortion (indicating irregularity in materials or manufacture) or other signs of failure;
- the minimum burst pressure shall be as specified in [Table 2](#).

Table 2 — Hydrostatic testing at 23 °C ± 2 °C

Nominal bore	Type 1				Type 2				Type 3			
	Proof pressure		Minimum burst pressure		Proof pressure		Minimum burst pressure		Proof pressure		Minimum burst pressure	
	MPa	bar	MPa	bar	MPa	bar	MPa	bar	MPa	bar	MPa	bar
12,5 up to and including 25	0,68	6,8	1,7	17	0,88	8,8	2,2	22	1,12	11,2	2,8	28
32 up to and including 63	0,48	4,8	1,2	12	0,6	6	1,5	15	0,72	7,2	1,8	18
76 up to and including 90	0,36	3,6	0,9	9	0,48	4,8	1,2	12	0,6	6	1,5	15
100 up to and including 127	0,28	2,8	0,7	7	0,36	3,6	0,9	9	0,48	4,8	1,2	12
152 up to and including 250	0,24	2,4	0,6	6	0,32	3,2	0,8	8	0,36	3,6	0,9	9
300 and 315	—	—	—	—	—	—	—	—	0,32	3,2	0,8	8

7.2 Hydrostatic testing at 55 °C ± 2 °C

When subjected to the burst pressure test specified in ISO 1402 at 55 °C ± 2 °C, hoses shall meet the requirements given in [Table 3](#).

Table 3 — Hydrostatic testing at 55 °C ± 2 °C

Nominal bore	Minimum burst pressure					
	Type 1		Type 2		Type 3	
	MPa	bar	MPa	bar	MPa	bar
12,5 up to and including 25	0,5	5	0,65	6,5	0,8	8
32 up to and including 63	0,4	4	0,45	4,5	0,6	6
76 up to and including 90	0,3	3	0,4	4	0,5	5
100 up to and including 127	0,25	2,5	0,3	3	0,4	4
152 up to and including 250	0,2	2	0,25	2,5	0,3	3
300 and 315	—	—	—	—	0,25	2,5

7.3 Maximum working pressure

The maximum working pressure shall be as specified in [Table 4](#).