



SLOVENSKI STANDARD
oSIST prEN ISO 6224:2023
01-julij-2023

S tekstilom ojačene plastomerne cevi za splošno uporabo vode - Specifikacija (ISO/DIS 6224:2023)

Thermoplastics hoses, textile-reinforced, for general-purpose water applications - Specification (ISO/DIS 6224:2023)

Kunststoffschläuche mit Textileinlage für allgemeine Anwendungen mit Wasser - Anforderungen (ISO/DIS 6224:2023)

Tuyaux en matières thermoplastiques à armature textile d'usage général pour l'eau - Spécifications (ISO/DIS 6224:2023)

Ta slovenski standard je istoveten z: prEN ISO 6224

ICS:

23.040.70	Gumene cevi in armature	Hoses and hose assemblies
83.120	Ojačani polimeri	Reinforced plastics

oSIST prEN ISO 6224:2023

en,fr,de

DRAFT INTERNATIONAL STANDARD

ISO/DIS 6224

ISO/TC 45/SC 1

Secretariat: DIN

Voting begins on:
2023-05-12Voting terminates on:
2023-08-04

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

Tuyaux en matières thermoplastiques à armature textile d'usage général pour l'eau — Spécifications

ICS: 23.040.70

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Reference number
ISO/DIS 6224:2023(E)

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Published in Switzerland

Contents

	Page
Foreword.....	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Classification	2
5 Materials and construction	2
6 Dimensions	2
6.1 Inside diameters and tolerances on inside diameter.....	2
6.2 Concentricity.....	3
6.3 Tolerance on length.....	3
6.4 Minimum wall thickness.....	3
7 Physical properties	3
7.1 Thermoplastic materials.....	3
7.2 Finished hoses.....	4
8 Type, routine and production testing	4
9 Test certificate/report	5
10 Marking	5
11 Recommendations for packaging and storage	5
Annex A (normative) Type testing and routine testing	6
Annex B (informative) Recommended tests for production testing	7
Bibliography	8

ISO/DIS 6224:2023(E)

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).

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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.

ISO 6224 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Hoses (rubber and plastics)*.

This fifth edition cancels and replaces the fourth edition (ISO 6224:2011), which has been technically revised. The main changes are as follows:

- Normative references updated;
- [Table 3](#) relocated to [Clause 7](#);
- Explanation of type, routine and production tests updated in [Clause 8](#);
- Marking in [Clause 10](#) updated.

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.

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

WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This standard does not purport to address all 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 document specifies the requirements for general-purpose textile-reinforced thermoplastics water-discharge hoses.

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

ISO 188:2023, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics*

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 8033, *Rubber and plastics hoses — 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*

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

ISO 10619-2:2021, *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 2: Bending tests at sub-ambient temperatures*

ISO 30013:2011, *Rubber and plastics hoses — Methods of exposure to laboratory light sources — Determination of changes in colour, appearance and other physical properties*

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/DIS 6224:2023(E)

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://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) at 23 °C and 0,36 MPa (3,6 bar) at 60 °C.
- Type 2: Medium pressure — Designed for a maximum working pressure of 1,0 MPa (10 bar) at 23 °C and 0,65 MPa (6,5 bar) at 60 °C.
- Type 3: High pressure — Designed for a maximum working pressure of 2,5 MPa (25 bar) at 23 °C and 1,6 MPa (16 bar) at 60 °C.

These hoses are not intended to be used for conveyance of potable (drinking) water, for washing-machine inlets, as fire-fighting hoses, for special agricultural machines or as gardening hoses for the consumer market.

5 Materials and construction

The hose shall consist of:

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

The lining and the cover shall be of uniform thickness, concentric, fully gelled and free from visible cracks, porosity, foreign inclusions and other defects. The cover may have a smooth or fluted finish.

6 Dimensions

6.1 Inside diameters and tolerances on inside diameter

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

Table 1 — Inside diameters, tolerances and minimum wall thicknesses

Inside diameter	Tolerance on inside diameter	Minimum wall thickness		
		mm		
mm	mm	Type 1	Type 2	Type 3
4	±0,50	2,00	2,00	2,50
6	±0,50	2,00	2,00	2,50
8	±0,60	2,00	2,00	2,80
9	±0,60	2,00	2,00	2,80
10	±0,75	2,00	2,00	2,80

NOTE 1 For smaller or larger diameters, it is recommended that values be chosen from the R10 series of preferred numbers (see ISO 3), with tolerances as specified in ISO 1307.

NOTE 2 For intermediate diameters, it is recommended that values be chosen from the R20 series of preferred numbers (see ISO 3).

Table 1 (continued)

Inside diameter	Tolerance on inside diameter	Minimum wall thickness		
		mm		
mm	mm	Type 1	Type 2	Type 3
12,5	±0,75	2,00	2,50	3,00
16	±0,75	2,00	2,80	3,00
19	±0,75	2,20	3,00	3,50
25	±1,25	2,70	3,50	4,00
32	±1,25	3,40	4,00	—
38	±1,50	4,00	4,50	—
50	±1,50	5,00	5,50	—

NOTE 1 For smaller or larger diameters, it is recommended that values be chosen from the R10 series of preferred numbers (see ISO 3), with tolerances as specified in ISO 1307.

NOTE 2 For intermediate diameters, it is recommended that values be chosen from the R20 series of preferred numbers (see ISO 3).

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.

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 wall thickness

When measured in accordance with ISO 4671, the minimum wall thickness of the hose shall conform to the values specified in [Table 1](#). If the cover is fluted, the depth of the flutes shall not be greater than 50 % of the cover thickness.

7 Physical properties

7.1 Thermoplastic materials

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

Tests shall be carried out on test pieces taken either from the hose or from separately gelled sheets, 2 mm in thickness.

Table 2 — Physical properties of thermoplastic materials

Property	Requirements		Test method
	Lining	Cover	
Minimum tensile strength	10,0 MPa	10,0 MPa	ISO 527-2 (dumb-bell test piece)
Minimum elongation at break	250 %	250 %	ISO 527-2 (dumb-bell test piece)

ISO/DIS 6224:2023(E)

Table 2 (continued)

Property	Requirements		Test method
	Lining	Cover	
Resistance to ageing:			ISO 188:2023 (3 days at 70 °C ± 1 °C), method A or B; ISO 527-2 (dumb-bell test piece)
Change in tensile strength from original value (max.)	±15 %	±15 %	
Change in elongation at break from original value (max.)	±25 %	±25 %	
Loss in mass on heating (max.)	4 %	4 %	ISO 176:2005, method B

7.2 Finished hoses

When tested at 23 °C (standard laboratory temperature) and at 60 °C by the appropriate method specified in ISO 1402, 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
	Type 1		Type 2		Type 3		
	MPa	bar	MPa	bar	MPa	bar	
Proof pressure at 23 °C	0,9	9	1,5	15	5,0	50	ISO 1402
Minimum burst pressure at 23 °C	1,8	18	3,0	30	10,0	100	ISO 1402
Proof pressure at 60 °C	0,55	5,5	0,975	9,75	2,5	25	ISO 1402
Minimum burst pressure at 60 °C	1,1	11	1,95	19,5	5,0	50	ISO 1402
Change in length at maximum working pressure at 23 °C	±8 %						ISO 1402
Adhesion between components	2,0 kN/m (min.)						ISO 8033
UV resistance (xenon-arc lamp)	The cover shall show no cracking or change in colour which would cause the hose to be unserviceable. When comparing the test pieces with the grey scale, the minimum acceptable degree of contrast shall be as determined between the interested parties.						ISO 30013:2011, method A
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 pressure test specified above at 23 °C.						ISO 10619-2:2021, method B, at -10 °C ± 2 °C

8 Type, routine and production testing

Type testing and routine testing shall be as specified in [Annex A](#).

Type tests are those tests required to confirm that a particular hose design, manufactured by a particular method, meets all the requirements of this document. The tests shall be repeated at a maximum of five-year intervals, or whenever a change in the method of manufacture or materials used occurs. They shall be performed on all sizes, and on all classes and types except those of the same size and construction.

Routine tests are those tests required to be carried out on each length of finished hose prior to dispatch.