



SLOVENSKI STANDARD
oSIST prEN ISO 4641:2023
01-julij-2023

Nadomešča:
SIST EN ISO 4641:2017

Gumene cevi in cevni priključki za dotok in odtok vode - Specifikacija (ISO/DIS 4641:2023)

Rubber hoses and hose assemblies for water suction and discharge - Specification (ISO/DIS 4641:2023)

Saug- und Druck-Gummischläuche und Schlauchleitungen für Wasser - Anforderungen (ISO/DIS 4641:2023)

Tuyaux et flexibles en caoutchouc pour aspiration et refoulement d'eau Spécifications (ISO/DIS 4641:2023)

Ta slovenski standard je istoveten z: prEN ISO 4641

ICS:

23.040.70 Gumene cevi in armature Hoses and hose assemblies

oSIST prEN ISO 4641:2023 **en,fr,de**

DRAFT INTERNATIONAL STANDARD

ISO/DIS 4641

ISO/TC 45/SC 1

Secretariat: DIN

Voting begins on:
2023-05-30Voting terminates on:
2023-08-22

Rubber hoses and hose assemblies for water suction and discharge — Specification

Tuyaux et flexibles en caoutchouc pour aspiration et refoulement d'eau — Spécifications

ICS: 23.040.70

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN ISO 4641:2023](https://standards.iteh.ai/catalog/standards/sist/8f0a6965-8b85-4ec9-8a19-9a101b0531ed/osist-pren-iso-4641-2023)<https://standards.iteh.ai/catalog/standards/sist/8f0a6965-8b85-4ec9-8a19-9a101b0531ed/osist-pren-iso-4641-2023>

This document is circulated as received from the committee secretariat.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.

ISO/CEN PARALLEL PROCESSING



Reference number
ISO/DIS 4641:2023(E)

© ISO 2023

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN ISO 4641:2023](https://standards.iteh.ai/catalog/standards/sist/8f0a6965-8b85-4ec9-8a19-9a101b0531ed/osist-pren-iso-4641-2023)

<https://standards.iteh.ai/catalog/standards/sist/8f0a6965-8b85-4ec9-8a19-9a101b0531ed/osist-pren-iso-4641-2023>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2023

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Classification	2
5 Coupling and fittings	2
6 Materials and construction	2
6.1 Lining.....	2
6.2 Reinforcement.....	2
6.3 Cover.....	2
7 Dimensions and tolerances	2
7.1 Inside diameter.....	2
7.2 Enlarged ends.....	2
7.3 Unit lengths.....	3
7.4 Lining.....	3
7.5 Cover.....	3
8 Physical properties	3
8.1 Rubber compounds.....	3
8.1.1 Rubber compounds.....	3
8.1.2 Tensile strength and elongation at break of rubber lining and cover.....	3
8.1.3 Resistance to ageing.....	3
8.2 Performance requirements for hoses and hose assemblies.....	4
8.2.1 Hydrostatic-pressure requirements (proof pressure test).....	4
8.2.2 Burst test.....	4
8.2.3 Resistance to bending (minimum bend radius as a function of nominal size).....	4
8.2.4 Resistance to suction flattening.....	5
8.2.5 Low-temperature flexibility.....	5
8.2.6 Adhesion.....	5
8.2.7 Ozone resistance of the cover.....	5
9 Frequency of testing	6
10 Marking	6
10.1 Hoses.....	6
10.2 Hose assemblies.....	7
11 Test report/certificate	7
12 Packaging and storage	7
Annex A (normative) Type tests and routine tests	8
Annex B (informative) Production acceptance tests	9
Annex C (informative) Couplings and end fittings	10
Bibliography	11

ISO/DIS 4641:2023(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).

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 World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

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 sixth edition cancels and replaces the fifth edition (ISO 4641:2016), of which it constitutes a minor revision with the following changes:

- the date of normative reference ISO 10619-2 has been updated ([Clause 2](#))
- marking of the hose and assembly has been updated ([Clause 10](#))
- [Annexes A](#) and [B](#): update tests requirements

Rubber hoses and hose assemblies for water suction and discharge — Specification

1 Scope

This document specifies the minimum requirements for textile-reinforced, smooth-bore rubber water-suction and discharge hoses and hose assemblies.

Three types of hoses and hose assemblies are specified according to their operating duty requirements, i.e. their ambient and water temperature ranges:

- ambient temperatures: -25 °C to $+70\text{ °C}$;
- water temperatures during operation: 0 °C to $+70\text{ °C}$.

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, *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 2393, *Rubber test mixes — Preparation, mixing and vulcanization — Equipment and procedures*

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

ISO 7233:2016, *Rubber and plastics hoses and hose assemblies — Determination of resistance to vacuum*

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

ISO 10619-1, *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*

3 Terms and definitions

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

ISO/DIS 4641:2023(E)

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

- IEC Electropedia: available at <https://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp>

4 Classification

Hoses and hose assemblies for this application are classified into three types according to their operating duty requirements.

- Type 1: Light-duty hoses for suction service to $-0,063$ MPa ($-0,63$ bar) and for discharge pressures up to $0,3$ MPa (3 bar).
- Type 2: Medium-duty hoses for suction service to $-0,08$ MPa ($-0,8$ bar) and for discharge pressures up to $0,5$ MPa (5 bar).
- Type 3: Heavy-duty hoses for suction service to $-0,097$ MPa ($-0,97$ bar) and for discharge pressures up to $1,0$ MPa (10 bar).

5 Coupling and fittings

Hoses shall be fitted with end fittings/couplings to form hose assemblies. [Annex C](#) lists types of coupling and end fitting.

6 Materials and construction

6.1 Lining

The lining shall consist of suitably compounded water-resistant natural or synthetic rubber. Its internal surface shall be smooth and free from imperfections which could impair the expected use.

6.2 Reinforcement

The reinforcement shall consist of a suitable textile material and may contain a helix that can be metallic wire or of another suitable material.

6.3 Cover

The cover shall consist of suitably compounded natural or synthetic rubber. Its external surface may be corrugated or fluted. An external helix is optional and can be either metallic wire or of another suitable material.

7 Dimensions and tolerances

7.1 Inside diameter

The nominal size range is 16 to 315 with inside diameters and tolerances in mm as shown in [Table 3](#).

7.2 Enlarged ends

Where enlarged ends are required, the dimensions and tolerances shall be specified by agreement between the purchaser and the manufacturer. The design of the enlarged end shall take into account the hose performance requirements.

7.3 Unit lengths

The unit lengths shall be determined according to the conditions of use as specified by the purchaser. The tolerances on hose, unless otherwise agreed between the purchaser and the manufacturer, shall be those specified in ISO 1307.

7.4 Lining

When measured in accordance with ISO 4671, the minimum thickness of the lining shall be 1,5 mm. See [Table 4](#).

7.5 Cover

When measured in accordance with ISO 4671, the minimum thickness of the cover shall be 2 mm. If the cover is fluted, the depth of the flutes shall be not greater than 50 % of the cover thickness. See [Table 4](#).

8 Physical properties

8.1 Rubber compounds

8.1.1 Rubber compounds

Wherever possible, all tests shall be carried out on test pieces cut from the finished hose. Otherwise, take samples from test sheets prepared in accordance with ISO 2393 and vulcanized to the same degree as the hose.

The physical properties of the rubber compounds used for the lining and cover shall conform to the values given in [Table 1](#).

8.1.2 Tensile strength and elongation at break of rubber lining and cover

When tested in accordance with ISO 37, the lining and cover shall have a tensile strength and elongation at break of not less than the values given in [Table 1](#).

8.1.3 Resistance to ageing

After ageing as specified in ISO 188 for three days at a temperature of $100\text{ °C} \pm 1\text{ °C}$, the tensile strength and elongation at break of the lining and cover, as determined by ISO 37, shall not vary by more than $\pm 25\%$ and $\pm 50\%$, respectively, from the initial values.

ISO/DIS 4641:2023(E)

Table 1 — Physical properties of rubber compounds

Property	Unit	Requirements		Method of test
		Lining	Cover	
Tensile strength, min.	MPa	7	7	ISO 37 (dumb-bell test piece)
Elongation at break, min.	%	200	200	ISO 37 (dumb-bell test piece)
Resistance to ageing				ISO 188 (3 days at 100 °C ± 1 °C); 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	

8.2 Performance requirements for hoses and hose assemblies

8.2.1 Hydrostatic-pressure requirements (proof pressure test)

The proof pressure test shall be carried out on full lengths of finished hose and on hose assemblies. When tested in accordance with ISO 1402, the hose (and the hose assembly) shall meet the requirements of [Table 2](#). The maximum variation in length and outside diameter at maximum working pressure shall be ±7 %, and the hose/hose assembly shall not burst or fail by showing signs of leakage, cracking, abrupt distortion indicating irregularities in material or manufacture or other signs of failure. See [Table 4](#).

Table 2 — Hydrostatic-pressure requirements

Hose type	Maximum working pressure		Proof pressure		Minimum burst pressure	
	MPa	bar	MPa	bar	MPa	bar
1	0,3	3	0,5	5	1,0	10
2	0,5	5	0,8	8	1,6	16
3	1,0	10	1,5	15	3,0	30

8.2.2 Burst test

When tested by the method specified in ISO 1402, hoses shall meet the requirements of [Table 2](#).

8.2.3 Resistance to bending (minimum bend radius as a function of nominal size)

When subjected to the minimum bend radii given in [Table 3](#), in accordance with one of the methods specified in ISO 10619-1 (the method chosen to be the most appropriate one for the size of hose), hoses shall show no kinking, breaking or peeling under visual examination. The value of T/D shall not be lower than 0,95.