

ISO/TC 45/SC 1

Secretariat: DIN

Voting begins on:
2020-03-13

Voting terminates on:
2020-05-08

Rubber hoses and hose assemblies — Textile-reinforced hydraulic types for oil-based or water-based fluids — Specification

*Tuyaux et flexibles en caoutchouc — Types hydrauliques avec
armature de textile pour fluides à base d'huile ou à base d'eau —
Spécifications*

ITeH STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/3550832f-7b91-4084-adf0-122-04ce81c21/iso-4079-2020>

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.

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.



Reference number
ISO/FDIS 4079:2020(E)

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/3550832f-7b91-4084-ad00-12204ce81c21/iso-4079-2020>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2020

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
Fax: +41 22 749 09 47
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	2
4 Classification	2
5 Materials and construction	2
5.1 Hoses	2
5.2 Hose assemblies	2
6 Dimensions	2
6.1 Hose diameters and hose concentricity	2
6.2 Length	3
7 Performance requirements	3
7.1 General	3
7.2 Hydrostatic requirements	3
7.3 Minimum bend radius	5
7.4 Resistance to impulse	6
7.4.1 Oil-based fluid impulse test	6
7.4.2 Water-based fluid impulse test	6
7.5 Leakage of hose assemblies	7
7.6 Low temperature flexibility	7
7.7 Adhesion between components	7
7.8 Vacuum resistance	7
7.9 Abrasion resistance	7
7.10 Fluid resistance	8
7.10.1 General	8
7.10.2 Oil resistance	8
7.10.3 Water resistance	8
7.11 Ozone resistance	8
7.12 Visual examination	8
8 Frequency of testing	8
9 Marking	9
9.1 Hoses	9
9.2 Hose assemblies	9
Annex A (normative) Test frequency for type tests and routine tests	10
Annex B (informative) Production acceptance tests	11
Annex C (informative) Recommendations for lengths of supplied hoses and tolerances on length of hose assemblies	12
Bibliography	13

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 sixth edition cancels and replaces the fifth edition (ISO 4079:2017), which has been technically revised.

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

- the temperature of water and water-based fluids has been increased from +60 °C to +70 °C in [Clause 1](#);
- definitions of [Table 1](#), [Table 2](#) and [Table 3](#) have been updated;
- [Table 1](#) has been split into [Table 1](#) and [Table 2](#); all following tables and references have been renumbered;
- [Table 1](#) and [Table 2](#) have been updated with dimensions from EN 853;
- the proof pressure, the minimum burst pressure and the maximum working pressure have been updated in [Tables 3, 4](#) and [5](#);
- the temperature of water and water-based fluids has been changed from +60 °C to +70 °C in [7.4.2](#) and [7.10.3](#);
- “oil No. 3” has been changed to “IRM 903 oil” in [7.10.2](#);
- some of the marking requirements have been revised in [Clause 9](#).

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 and hose assemblies — Textile-reinforced hydraulic types for oil-based or water-based fluids — Specification

1 Scope

This document specifies requirements for five types of textile-reinforced hydraulic hoses and hose assemblies of nominal size from 5 to 100.

They are suitable for use with:

- oil-based hydraulic fluids HH, HL, HM, HR and HV as defined in ISO 6743-4 at temperatures ranging from -40 °C to $+100\text{ °C}$;
- water-based fluids HFC, HFAE, HFAS and HFB as defined in ISO 6743-4 at temperatures ranging from -40 °C to $+70\text{ °C}$;
- water at temperatures ranging from 0 °C to $+70\text{ °C}$.

This document does not include requirements for end fittings. It is limited to requirements for hoses and hose assemblies.

NOTE It is the responsibility of the user, in consultation with the hose manufacturer, to establish the compatibility of the hose with the fluid to be used.

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

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

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

ISO 6605, *Hydraulic fluid power — Test methods for hoses and hose assemblies*

ISO 6743-4, *Lubricants, industrial oils and related products (class L) — Classification — Part 4: Family H (Hydraulic systems)*

ISO 6803, *Rubber or plastics hoses and hose assemblies — Hydraulic-pressure impulse test without flexing*

ISO 7233, *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 8033:2016, *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

Five types of hose are specified, distinguished by their construction, working pressure and minimum bend radius.

- Type 1TE: hoses with a single braid of textile reinforcement.
- Type 2TE: hoses with one or more braid(s) of textile reinforcement.
- Type 3TE: hoses with one or more braid(s) of textile reinforcement (higher working pressure).
- Type R3: hoses with two braids of textile reinforcement.
- Type R6: hoses with a single braid of textile reinforcement.

NOTE Type 1TE is not subjected to the impulse or vacuum resistance test. Type R3 is not subjected to the vacuum resistance test. Type R6 is not subjected to the impulse or vacuum resistance test.

5 Materials and construction

5.1 Hoses

Hoses shall consist of a rubber lining that is resistant to oil- or water-based hydraulic fluids or water, one or more layers of suitable textile yarn and a weather- and oil-resistant rubber cover.

Hoses shall be designed to enable end fittings to be assembled without removal of the cover.

5.2 Hose assemblies

Hose assemblies shall be manufactured using hoses conforming to the requirements of this document.

Hose assemblies shall be manufactured only with those hose fittings whose correct functioning has been verified in accordance with 7.2, 7.4, 7.5 and 7.6. The manufacturer's instructions shall be followed for the preparation and fabrication of hose assemblies.

6 Dimensions

6.1 Hose diameters and hose concentricity

When measured in accordance with ISO 4671, the inside and outside diameters of hoses shall conform to the values given in Table 1.

When measured in accordance with ISO 4671, the concentricity of hoses shall conform to the values given in Table 2.

Table 1 — Dimensions of hoses

Nominal size ^a	Inside diameter mm						Outside diameter mm									
	Types 1TE, 2TE, 3TE ^b		Type R6		Type R3		Type 1TE		Type 2TE		Type 3TE		Type R6		Type R3	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
5	4,9	5,2	4,2	5,4	4,5	5,4	10,0	11,6	11,0	12,6	12,0	13,6	10,3	11,9	11,9	13,5
6,3	6,4	6,9	5,6	7,2	6,1	7,0	11,6	13,2	12,6	14,2	13,6	15,2	11,9	13,5	13,5	15,1
8	7,9	8,4	7,2	8,8	7,6	8,5	13,1	14,7	14,1	15,7	16,1	17,7	13,5	15,1	16,7	18,3
10	9,5	10,0	8,7	10,3	9,2	10,1	14,7	16,3	15,7	17,3	17,7	19,3	15,1	16,7	18,3	19,8
12,5	12,7	13,3	11,9	13,5	12,4	13,5	17,7	19,7	18,7	20,7	20,7	22,7	19,0	20,6	23,0	24,6
16	15,8	16,5	15,1	16,7	15,6	16,7	21,9	23,9	22,9	24,9	24,9	26,9	22,2	23,8	26,2	27,8
19	18,8	19,8	18,3	19,9	18,7	19,8	—	—	26,0	28,0	28,0	30,0	25,4	27,8	31,0	32,5
25	25,4	26,2	—	—	25,1	26,2	—	—	32,9	35,9	34,4	37,4	—	—	36,9	39,3
31,5	31,8	32,8	—	—	31,4	32,9	—	—	—	—	40,8	43,8	—	—	42,9	46,0
38	38,1	39,1	—	—	—	—	—	—	—	—	47,6	51,6	—	—	—	—
51	50,6	51,8	—	—	—	—	—	—	—	—	60,3	64,3	—	—	—	—
60	59,6	61,2	—	—	—	—	—	—	—	—	70,0	74,0	—	—	—	—
80	79,6	81,2	—	—	—	—	—	—	—	—	91,5	96,5	—	—	—	—
100	99,4	101,4	—	—	—	—	—	—	—	—	113,5	118,5	—	—	—	—

^a The nominal sizes correspond to those given in ISO 1307.

^b Inside diameters apply to type 3TE only for hose sizes larger than 25.

Table 2 — Concentricity of hoses

Nominal size	Maximum variation in wall thickness between internal diameter and outside diameter
	mm
Up to and including 6,3	0,8
Greater than 6,3 and up to and including 25	1,0
Greater than 25	1,3

6.2 Length

The length of supplied hoses and hose assemblies shall be the subject of agreement between the manufacturer and the purchaser.

NOTE Recommendations for supplied lengths of hoses and hose assemblies are given in [Annex C](#).

7 Performance requirements

7.1 General

The requirements for type and routine testing are given in [Annex A](#). The recommendations for periodic testing are given in [Annex B](#).

7.2 Hydrostatic requirements

When tested in accordance with ISO 1402 or ISO 6605 at the relevant proof pressure given in [Table 3](#) and the relevant minimum burst pressure given in [Table 4](#), the hoses and hose assemblies shall not fail.

When tested in accordance with ISO 1402 or ISO 6605, the change in length of hoses at the maximum working pressure (see Table 5) shall not exceed +2 % or –4 % for hoses up to and including nominal size 31,5 and +5 % or 0 % for hoses above nominal size 31,5.

Table 3 — Proof pressure

Nominal size	Type 1TE MPa (bar)	Type 2TE MPa (bar)	Type 3TE MPa (bar)	Type R6 MPa (bar)	Type R3 MPa (bar)
5	5,0 (50)	16,0 (160)	32,0 (320)	7,0 (70)	21,0 (210)
6,3	5,0 (50)	15,0 (150)	29,0 (290)	5,6 (56)	17,5 (175)
8	4,0 (40)	13,6 (136)	26,0 (260)	5,6 (56)	16,8 (168)
10	4,0 (40)	12,6 (126)	22,0 (220)	5,6 (56)	15,6 (156)
12,5	3,2 (32)	11,6 (116)	18,6 (186)	5,6 (56)	14,0 (140)
16	3,2 (32)	10,0 (100)	16,0 (160)	4,8 (48)	12,2 (122)
19	—	9,0 (90)	14,0 (140)	4,2 (42)	10,5 (105)
25	—	8,0 (80)	11,0 (110)	—	7,8 (78)
31,5	—	—	9,0 (90)	—	5,2 (52)
38	—	—	8,0 (80)	—	—
51	—	—	6,6 (66)	—	—
60	—	—	5,0 (50)	—	—
80	—	—	3,6 (36)	—	—
100	—	—	2,0 (20)	—	—

Table 4 — Minimum burst pressure

Nominal size	Type 1TE MPa (bar)	Type 2TE MPa (bar)	Type 3TE MPa (bar)	Type R6 MPa (bar)	Type R3 MPa (bar)
5	10,0 (100)	32,0 (320)	64,0 (640)	14,0 (140)	42,0 (420)
6,3	10,0 (100)	30,0 (300)	58,0 (580)	11,2 (112)	35,0 (350)
8	8,0 (80)	27,2 (272)	52,0 (520)	11,2 (112)	33,6 (336)
10	8,0 (80)	25,2 (252)	44,0 (440)	11,2 (112)	31,2 (312)
12,5	6,4 (64)	23,2 (232)	37,2 (372)	11,2 (112)	28,0 (280)
16	6,4 (64)	20,0 (200)	32,0 (320)	9,6 (96)	24,4 (244)
19	—	18,0 (180)	28,0 (280)	8,4 (84)	21,0 (210)
25	—	16,0 (160)	22,0 (220)	—	15,6 (156)
31,5	—	—	18,0 (180)	—	10,5 (105)
38	—	—	16,0 (160)	—	—
51	—	—	13,2 (132)	—	—
60	—	—	10,0 (100)	—	—
80	—	—	7,2 (72)	—	—
100	—	—	4,0 (40)	—	—

Table 5 — Maximum working pressure

Nominal size	Type 1TE MPa (bar)	Type 2TE MPa (bar)	Type 3TE MPa (bar)	Type R6 MPa (bar)	Type R3 MPa (bar)
5	2,5 (25)		16,0 (160)	3,5 (35)	10,5 (105)
6,3	2,5 (25)		14,5 (145)	2,8 (28)	8,7 (87)
8	2,0 (20)		13,0 (130)	2,8 (28)	8,4 (84)

Table 5 (continued)

Nominal size	Type 1TE MPa (bar)	Type 2TE MPa (bar)	Type 3TE MPa (bar)	Type R6 MPa (bar)	Type R3 MPa (bar)
10	2,0 (20)	8,0 (80)	11,0 (110)	2,8 (28)	7,8 (78)
12,5	1,6 (16)	7,5 (75)	9,3 (93)	2,8 (28)	7,0 (70)
16	1,6 (16)	6,8 (68)	8,0 (80)	2,4 (24)	6,1 (61)
19	—	6,3 (63)	7,0 (70)	2,1 (21)	5,2 (52)
25	—	5,8 (58)	5,5 (55)	—	3,9 (39)
31,5	—	5,0 (50)	4,5 (45)	—	2,6 (26)
38	—	4,5 (45)	4,0 (40)	—	—
51	—	4,0 (40)	3,3 (33)	—	—
60	—	—	2,5 (25)	—	—
80	—	—	1,8 (18)	—	—
100	—	—	1,0 (10)	—	—

7.3 Minimum bend radius

For hose types 1TE and R6, use test pieces having a length at least four times the minimum bend radius. Measure the hose outside diameter with callipers in the straight-lay position before bending the hose. Bend the hose through 180° to the minimum bend radius (see Table 6) and measure the flatness with the callipers.

When the hose is bent to the minimum bend radius given in Table 6, measured in accordance with method A1 of ISO 10619-1:2017, Clause 4 the flatness shall not exceed 10 % of the original outside diameter.

For all other hose types, when bent to the minimum bend radius given in Table 6, measured in accordance with method A1 of ISO 10619-1:2017, Clause 4 the hose shall conform, in the bent state, to the impulse and low temperature flexibility requirements of 7.4 and 7.6.

Table 6 — Minimum bend radius

Nominal size	Minimum bend radius mm				
	Type 1TE	Type 2TE	Type 3TE	Type R6	Type R3
5	35	35	40	50	75
6,3	45	40	45	65	75
8	65	50	55	75	100
10	75	60	70	75	100
12,5	90	70	85	100	125
16	115	90	105	125	140
19	—	110	130	150	150
25	—	150	150	—	205
31,5	—	—	190	—	250
38	—	—	240	—	—
51	—	—	300	—	—
60	—	—	400	—	—
80	—	—	500	—	—
100	—	—	600	—	—