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Rubber hoses and hose assemblies — Wire- or textile-reinforced single-pressure types for hydraulic applications — Specification

Tuyaux et flexibles en caoutchouc — Types hydrauliques à pression unique, avec armature de fils métalliques ou textiles tressés — Spécifications

FDIS stage

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Foreword

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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 document 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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This document was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Rubber and plastics hoses and hose assemblies*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 218, *Rubber and plastics hoses and hose assemblies,* in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This fifth edition cancels and replaces the fourth edition (ISO 18752:2022), which has been technically revised.

The main changes are as follows:

— addition of Subclause 7.1.2~~ Subclause 7.1.2 has been added~~ in order to align the document with ~~ISO 1817~~the fluid immersion requirements of ISO 1817;

— ~~—~~revision of Clause 8~~Clause 8~~;;

— ~~—~~deletion of Annex B~~previous Annex B~~..

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 — Wire- or textile-reinforced single-pressure types for hydraulic applications — Specification

1 Scope

This document specifies requirements for ten classes, four grades and seven types of wire- or textile-reinforced hydraulic hoses and hose assemblies, of nominal sizes ranging from 5 to 102. Each class has a single maximum working pressure for all sizes.

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 °C for types AS, AC, BS and BC hoses and from −40 °C to +120 °C for types CS, CC and DC hoses;

— water-based fluids HFC, HFAE, HFAS and HFB, as defined in ISO 6743-4, at temperatures ranging from −40 °C to +70 °C;

— water at temperatures ranging from 0 °C to +70 °C.

This document does not specify requirements for the connection ends. It is limited to the performance of hoses and hose assemblies. The hose assembly maximum working pressure is governed by the lowest maximum working pressure of the components.

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 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, *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, *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 terminology databases for use in standardization at the following addresses:

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

— ~~—~~—IEC Electropedia: available at https://www.electropedia.org/

4 Classification

4.1 Classes

Ten classes of hose are specified, distinguished by their maximum working pressure, as shown in Table 1~~Table 1~~.. Each class may be manufactured in up to 14 nominal sizes.

Table 1 — Classes and nominal sizes

Class	**35**	**70**	**140**	**210**	**250**	**280**	**350**	**420**	**490**	**560**
MWP[a] (MPa)	3,5	7	14	21	25	28	35	42	49	56
MWP[a] (bar)	35	70	140	210	250	280	350	420	490	560
Nominal size										
5	X	X	X	X	X	X	X	X	N/A	N/A
6,3	X	X	X	X	X	X	X	X	N/A	N/A
8	X	X	X	X	X	X	X	X	N/A	N/A
10	X	X	X	X	X	X	X	X	N/A	N/A
12,5	X	X	X	X	X	X	X	X	N/A	N/A
16	X	X	X	X	X	X	X	X	X	X
19	X	X	X	X	X	X	X	X	X	X
25	X	X	X	X	X	X	X	X	X	X
31,5	X	X	X	X	X	X	X	X	X	X
38	X	X	X	X	X	X	X	X	N/A	N/A
51	X	X	X	X	X	X	X	X	N/A	N/A
63	X	X	X	X	X	X	X	N/A	N/A	N/A
76	X	X	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A
102	X	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

X = Applicable;
N/A = Not applicable.
[a] Maximum working pressure.

4.2 Grades and types

Hoses are classified into four grades according to their resistance to impulse: A, B, C and D. Each grade is classified by outside diameter into standard types (AS, BS and CS) and compact types (AC, BC, CC and DC), as shown in Table 2~~Table 2~~..

Table 2 — Grades and types

Grade	Type[a]	Resistance to impulse		
		Temperature °C	Impulse pressure (% of MWP[b])	Minimum number of cycles
A	AS	100	133 %	200 000
	AC			
B	BS	100	133 %	500 000
	BC			
C	CS	120	133 % and 120 %[c]	500 000
	CC			
D	DC	120	133 %	1 000 000

[a] Standard or compact, e.g. CS is grade C and standard type. As shown in Table 4~~Table 4~~ and Table 8~~Table 8~~,, standard types have larger outside diameters and larger bend radii, whereas compact types have smaller outside diameters and smaller bend radii.

[b] Maximum working pressure.

[c] 120 % of the MWP shall be used for classes 350, 420, 490 and 560 instead of 133 %.

Each class includes one of each type or both as shown in Table 3~~Table 3~~..

Table 3 — Type and maximum working pressure

Class		35	70	140	210	250	280	350	420	490	560
MWP[a] (MPa)		3,5	7	14	21	25	28	35	42	49	56
MWP[a] (bar)		35	70	140	210	250	280	350	420	490	560
Grade	**Type**										
A	AS	X	X	X	X	X	X	X	X	N/A	N/A
	AC	X	X	X	X	X	X	X	X	N/A	N/A
B	BS	X	X	X	X	X	X	X	X	N/A	N/A
	BC	X	X	X	X	X	X	X	X	N/A	N/A
C	CS	N/A	N/A	N/A	X	X	X	X	X	N/A	N/A
	CC	N/A	N/A	N/A	X	X	X	X	X	X	X
D	DC	N/A	N/A	N/A	X	X	X	X	X	N/A	N/A

X = Applicable;

N/A = Not applicable.

[a] Maximum working pressure.

5 Materials and construction

5.1 Hoses

Hoses shall consist of a hydraulic-fluid-resistant rubber lining, one or multiple layers of steel wire or textile and an oil-, abrasion- and weather-resistant rubber cover. The rubber cover may consist of a layer of other materials, for improved resistance to abrasion or other.

5.2 Hose assemblies

Hose assemblies shall only be manufactured using hose fittings which conform to the requirements of 7.2.1~~7.2.1, 7.2.4~~, 7.2.4 and 7.2.5~~7.2.5~~.

Follow the manufacturer's instructions for the proper preparation and fabrication of hose assemblies.

6 Dimensions and tolerances

6.1 Diameters

The test shall be carried out in accordance with ISO 4671. The diameters of hoses shall conform to the values given in Table 4~~Table 4~~.

Table 4 — Diameters of hoses

Nom-inal size	Inside diameter (all classes)		Maximum outside diameter of hose mm																			
	mm		Class 35		Class 70		Class 140		Class 210		Class 250		Class 280		Class 350		Class 420		Class 490		Class 560	
	min.	max.	Stan-dard	Com-pact	Stan-dard	Com-pact	Stan-dard	Com-pact	Stan-dard	Com-pact	Stan-dard	Com-pact	Stan-dard	Com-pact	Stan-dard	Com-pact	Stan-dard	Com-pact	Stan-dard	Com-pact	Stan-dard	Com-pact
5	4,6	5,4	14	11	14	11	14	11	14	11	17	15	17	15	17	15	17	15	—	—	—	—
6,3	6,1	7	17	14	17	14	17	14	17	14	19	15	19	15	19	15	19	15	—	—	—	—
8	7,7	8,5	19	15	19	15	19	15	19	16	20	16	20	16	20	16	20	18	—	—	—	—
10	9,3	10,1	21	17	21	18	21	17	23	19	23	19	23	19	23	21	24	22	—	—	—	—
12,5	12,3	13,5	24	21	24	22	24	22	26	22	26	22	26	23	27	24	27	25	—	—	—	—
16	15,5	16,7	27	25	27	25	29	25	29	26	29	27	29	27	29	28	37	34	—	30	—	30
19	18,6	19,8	31	28	31	29	33	29	33	31	34	32	34	32	38	36	50	46	—	36	—	36
25	25	26,4	40	36	40	38	41	38	41	39	41	39	41	39	50	45	54	50	—	45	—	45
31,5	31,4	33	53	45	53	45	54	49	53	49	54	49	54	49	54	52	60	56	—	52	—	52
38	37,7	39,3	59	56	59	56	59	56	59	56	59	56	59	56	60	59	75	72	—	—	—	—
51	50,4	52	72	69	72	69	73	70	72	70	73	70	73	70	75	73	80	77	—	—	—	—
63	63,1	65,1	84	—	84	—	84	—	85	—	90	—	90	—	90	—	—	—	—	—	—	—
76	74,6	77,8	100	—	100	—	100	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
102	100	103,2	130	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

6.2 Cover thickness

The test shall be carried out in accordance with ISO 4671. The outer cover thickness of hoses shall conform to the values given in Table 5Table 5. Standard types may be produced with either thick or thin covers, the tolerance limits for thin-cover standard types being the same as the tolerance limits for compact types.

Table 5 — Cover thickness

Nominal size	Cover thickness mm					
	Standard (thick cover)		Standard (thin cover)		Compact	
	min.	max.	min.	max.	min.	max.
5	1,5	3,2	0,8	1,5	0,8	1,5
6,3	1,5	3,2	0,8	1,5	0,8	1,5
8	1,5	3,2	0,8	1,5	0,8	1,5
10	1,5	3,2	0,8	1,5	0,8	1,5
12,5	1,5	3,2	0,8	1,5	0,8	1,5
16	1,5	3,2	0,8	1,5	0,8	1,5
19	1,5	3,2	0,8	1,5	0,8	1,5
25	1,5	4,6	1,0	2,0	1,0	2,0
31,5	1,8	4,6	1,0	2,0	1,0	2,0
38	1,8	4,6	1,3	2,5	1,3	2,5
51	1,8	4,6	1,3	2,5	1,3	2,5
63	1,8	5,0	—	—	—	—
76	1,8	5,0	—	—	—	—
102	1,8	5,0	—	—	—	—

6.3 Concentricity

The test shall be carried out in accordance with ISO 4671. The concentricity of hoses shall conform to the values given in Table 6Table 6.

Table 6 — Concentricity of hoses

Nominal size	Maximum variation in wall thickness	
	between internal diameter and outside diameter	between internal diameter and reinforcement diameter
	mm	mm
5 and 6,3	0,8	0,5
Over 6,3 and up to and including 19	1,0	0,7
Over 19 and up to and including 63	1,3	0,9
Over 63	1,5	1,1