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

Tuyaux et flexibles en caoutchouc — Types hydrauliques compacts avec armature de fils métalliques tressés pour fluides à base d'huile ou à base d'eau — 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 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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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 third edition cancels and replaces the second edition (ISO 11237:2017), which has been technically revised.

The main changes are as follows:

— ~~—~~the scope has been revised to align the water based and water temperatures with ISO 1436, ISO 3862 and ISO 18752;

— ~~—~~subclauses 7.5.2 and 7.5.3 on water based and optional impulse tests have been deleted;

— ~~—~~a new ~~subclause 7.10.3,~~subclause 7.10.3, on water based fluid resistance, has been added;

— ~~—~~new hose sizes have been added to type 2SC in ~~Tables 1, 3, 4, 5, 6~~Tables 1, 3, 4, 5, 6 and ~~7;~~7;

— ~~—~~ ~~Clause 8~~Clause 8 has been revised to cite ~~Annex A;~~Annex A;

— ~~—~~ ~~Clause 9~~Clause 9 has been revised;

— ~~—~~ ~~Annex A~~Annex A has been revised to align the document with ISO 1436 and ~~Annex B~~Annex B has been deleted.

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~~www.iso.org/members.html.

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

1 Scope

This document specifies requirements for five types of compact, wire-braid-reinforced hoses and hose assemblies of nominal size from 5 to 76.

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;

— water-based fluids HFC, HFAE, HFAS and HFB as defined in ISO 6743-4 at temperatures ranging from 0 °C to +70 °C;

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

This document does not include requirements for end fittings. It is limited to requirements for 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 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 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 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, *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

Five types of hose are specified, distinguished by their construction, working pressure and minimum bend radius. These hoses have thin covers designed to permit fitting assembly without the removal of the cover or a portion of the cover.

a) Type 1SC: Hoses with a single braid of wire reinforcement.

b) Type 2SC: Hoses with two braids of wire reinforcement.

c) Type R16S: Hoses with one or two braids of wire reinforcement.

d) Type R17: 21 MPa (210 bar) constant pressure hoses with one or two braids of wire reinforcement.

e) Type R19: 28 MPa (280 bar) constant pressure hoses with one or two braids of wire reinforcement.

NOTE Types R16S, R17 and R19 are not subjected to the vacuum resistance tests.

5 Materials and construction

5.1 Hoses

Hoses shall consist of a rubber lining resistant to oil- or water-based hydraulic fluids, one or two layers of high-tensile steel wire and a weather- and oil-resistant rubber 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, 7.3, 7.5, 7.6 and 7.7. The manufacturer's instructions shall be followed for the preparation and fabrication of hose assemblies.

6 Dimensions

6.1 Hose diameters and cover thickness

The test shall be carried out in accordance with ISO 4671. The hose diameters shall conform to the values given in Table 1 and the cover thickness to 6.3.

Table 1 — Dimensions of hoses

Nominal size[a]	All types		Type 1SC			Type 2SC			Type R16S		Type R17		Type R19	
	Inside diameter mm		Diameter over wire mm		Outside diameter of hose mm	Diameter over wire mm		Outside diameter of hose mm	Diameter over wire mm	Outside diameter of hose mm	Diameter over wire mm	Outside diameter of hose mm	Diameter over wire mm	Outside diameter of hose mm
	min.	max.	min.	max.	max.	min.	max.	max.	max.	max.	max.	max.	max.	max.
5	4,6	5,4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	10,1	11,6	10,8	12,7
6,3	6,1	6,9	9,6	10,8	13,5	10,6	11,7	14,2	12,3	14,5	11,0	13,2	12,4	14,4
8	7,7	8,5	10,9	12,1	14,5	12,1	13,3	16,0	13,3	15,8	13,0	15,0	14,2	16,3
10	9,3	10,1	12,7	14,5	16,9	14,4	15,6	18,3	15,9	18,8	15,0	17,0	16,0	18,0
12,5	12,3	13,5	15,9	18,1	20,4	17,5	19,1	21,5	19,1	22,0	18,8	21,1	20,4	22,6
16	15,5	16,7	19,8	21,0	23,0	20,5	22,3	24,7	22,5	25,4	23,6	25,9	25,9	27,5
19	18,6	19,8	23,2	24,4	26,7	24,6	26,4	28,6	26,3	29,0	27,7	30,3	29,7	32,5
25	25,0	26,4	30,7	31,9	34,9	32,5	34,3	36,6	34,0	36,6	35,6	38,6	N/A	N/A
31,5	31,4	33,0	37,8	39,0	42,2	39,3	41,7	44,3	41,9	44,3	N/A	N/A	N/A	N/A
38	37,7	39,3	–	–	–	45,6	48,7	52,6	–	–	–	–	–	–
51	50,4	52,0	–	–	–	58,7	61,6	65,2	–	–	–	–	–	–
63	62,3	64,7	–	–	–	70,5	74,0	77,5	–	–	–	–	–	–
76	74,6	77,4	–	–	–	82,5	88,0	91,5	–	–	–	–	–	–

N/A = Not available.

[a] Nominal sizes are in accordance with ISO 1307.

6.2 Concentricity

The test shall be carried out in accordance with ISO 4671. The concentricity of hoses shall conform to the values given in ~~Table 2.~~Table 2.

Table 2 — Concentricity of hoses (all types)

Nominal size	Maximum variation in wall thickness mm	
	Between inside diameter and outside diameter	Between inside diameter and reinforcement diameter
Up to and including 6,3	0,8	0,5
Over 6,3 and up to and including 19	1,0	0,6
Over 19	1,3	0,8

6.3 Hose cover thickness

The test shall be carried out in accordance with ISO 4671. The cover thickness of all types of hose shall lie in the range 0,8 mm to 1,5 mm.

7 Performance requirements

7.1 General

The requirements for type and routine testing ~~are given in Annex A.~~shall in accordance with Annex A.

7.2 Change in length requirements

The test shall be carried out in accordance with ISO 1402 or ISO 6605. The change in length of hoses at the maximum working pressure shall not exceed +2 % to −4 %. Maximum working pressure values are given in ~~Table 3.~~Table 3.

Table 3 — Maximum working pressure

Nominal size	Type							
	1SC		2SC/R16S		R17		R19	
	Maximum working pressure							
	MPa	bar	MPa	bar	MPa	bar	MPa	bar
5	N/A		N/A		21	210	28	280
6,3	22,5	225	40	400	21	210	28	280
8	21,5	215	35	350	21	210	28	280
10	18	180	33	330	21	210	28	280
12,5	16	160	27,5	275	21	210	28	280
16	13	130	25	250	21	210	28	280
19	10,5	105	21,5	215	21	210	28	280
25	8,8	88	16,5	165	21	210	N/A	
31,5	6,3	63	12,5	125	N/A		N/A	