FINAL DRAFT INTERNATIONAL STANDARD ISO/FDIS

3862

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

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

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Foreword

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~~International Standards~~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 ~~given in~~of the ISO/IEC Directives, Part 2 (see www.iso.org/directives~~.~~).

~~The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.~~

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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 WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information~~ISO 3862 was prepared by Technical Committee~~

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 fourth edition cancels and replaces the third edition (ISO 3862:2009), of which it constitutes a minor revision. The following changes have been made:

— ISO 4672:1997 has been updated to ISO 10619-2:2011 in Clause 2 and in 7.6;

— a requirement to provide the maximum working pressure in bar has been added in 8.1 and 8.2.

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

1 Scope

This International Standard specifies requirements for five types of spiral-wire-reinforced hydraulic hose and hose assembly of nominal size from 6,3 to 51. They are suitable for use with water-based hydraulic fluids HFC, HFAE, HFAS and HFB as defined in ISO 6743-4 at temperatures ranging from −−40 °C to ++60 °C and 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 4SP and 4SH and −−40 °C to ++120 °C for types R12, R13 and R15.

NOTE 1 This temperature rating is related to the water-based hydraulic fluids defined in ISO 6743-4.

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

NOTE 2 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, in whole or in part, are normatively referenced in this document and are indispensable for its application. 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 — Hoses and hose assemblies — Test methods*

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 7326:2006, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions*

ISO 8033:2006, *Rubber and plastics hoses — Determination of adhesion between components*

ISO 8330, *Rubber and plastics hoses and hose assemblies — Vocabulary*

ISO 10619-2:2011, *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.

4 Classification

Five types of hose are specified, distinguished by their construction, working pressure and oil resistance:

— Type 4SP: medium-pressure hoses with four plies of steel wire spiral.

— Type 4SH: high-pressure hoses with four plies of steel wire spiral.

— Type R12: heavy-duty high-temperature hoses with a medium-pressure rating having four plies of steel wire spiral.

— Type R13: heavy-duty high-temperature hoses with a high-pressure rating having a multiple-steel-wire spiral.

— Type R15: heavy-duty high-temperature hoses with an extra-high-pressure rating having a multiple-steel-wire spiral.

5 Materials and construction

5.1 Hoses

Hoses shall consist of a rubber lining resistant to oil- or water-based hydraulic fluids, spiral plies of steel wire wrapped in alternating directions, and an oil- and weather-resistant rubber cover. Each spiral wire ply shall be separated by an insulating layer.

5.2 Hose assemblies

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

Hose assemblies shall be manufactured only with those hose fittings whose correct functioning has been verified in accordance with ~~Subclauses~~ 7.2, 7.4, 7.5 and 7.6 of this International Standard. 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 diameter of hoses shall conform to the values given in Table 1.

When measured in accordance with ISO 4671, the diameter over reinforcement and outside diameter of hoses shall conform to the values given in Table 2.

When measured in accordance with ISO 4671, the concentricity of hoses shall conform to the values given in Table 3.

Table 1 — Inside diameters of hoses

Nominal size	Inside diameter ~~Mm~~mm									
	Type 4SP		Type 4SH		Type R12		Type R13		Type R15	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
6,3	6,2	7,0	—	—	—	—	—	—	—	—
10	9,3	10,1	—	—	9,3	10,1	—	—	9,3	10,1
12,5	12,3	13,5	—	—	12,3	13,5	—	—	12,3	13,5
16	15,5	16,7	—	—	15,5	16,7	—	—	—	—
19	18,6	19,8	18,6	19,8	18,6	19,8	18,6	19,8	18,6	19,8
25	25,0	26,4	25,0	26,4	25,0	26,4	25,0	26,4	25,0	26,4
31,5	31,4	33,0	31,4	33,0	31,4	33,0	31,4	33,0	31,4	33,0
38	37,7	39,3	37,7	39,3	37,7	39,3	37,7	39,3	37,7	39,3
51	50,4	52,0	50,4	52,0	50,4	52,0	50,4	52,0	—	—

Table 2 — Diameter over reinforcement and outside diameter

Nominal size[a]	Type 4SP				Type 4SH				Type R12				Type R13				Type R15			
	Diameter over outside reinforcement mm		Outside diameter of hose mm		Diameter over outside reinforcement mm		Outside diameter of hose mm		Diameter over outside reinforcement Mmmm		Outside diameter of hose mm		Diameter over outsidereinforcementoutside reinforcement mm		Outside diameter of hose mm		Diameter over outside reinforcement mm		Outside diameter of hose mm	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
6,3	14,1	15,3	17,1	18,7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
10	16,9	18,1	20,6	22,2	—	—	—	—	16,6	17,8	19,5	21,0	—	—	—	—	—	20,3	—	23,3
12,5	19,4	21,0	23,8	25,4	—	—	—	—	19,9	21,5	23,0	24,6	—	—	—	—	—	24,0	—	26,8
16	23,0	24,6	27,4	29,0	—	—	—	—	23,8	25,4	26,6	28,2	—	—	—	—	—	—	—	—
19	27,4	29,0	31,4	33,0	27,6	29,2	31,4	33,0	26,9	28,7	29,9	31,7	28,2	29,8	31,0	33,2	—	32,9	—	36,1
25	34,5	36,1	38,5	40,9	34,4	36,0	37,5	39,9	34,1	36,0	36,8	39,4	34,9	36,4	37,6	39,8	—	38,9	—	42,9
31,5	45,0	47,0	49,2	52,4	40,9	42,9	43,9	47,1	42,7	45,1	45,4	48,6	45,6	48,0	48,3	51,3	—	48,4	—	51,5
38	51,4	53,4	55,6	58,8	47,8	49,8	51,9	55,1	49,2	51,6	51,9	55,0	53,1	55,5	55,8	58,8	—	56,3	—	59,6
51	64,3	66,3	68,2	71,4	62,2	64,2	66,5	69,7	62,5	64,8	65,1	68,3	66,9	69,3	69,5	72,7	—	—	—	—

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

Table 3 — Concentricity of hoses

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

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 and recommendations for production acceptance testing in Annex B.

7.2 Hydrostatic requirements

7.2.1 When tested in accordance with ISO 1402 or ISO 6605 at the relevant proof pressure given in Table 4 and the relevant minimum burst pressure given in Table 5, the hoses and hose assemblies shall not leak.

7.2.2 When determined in accordance with ISO 1402 or ISO 6605, the change in length of hoses at the maximum working pressure (see Table 6) shall not exceed +2 % or −4 % for types 4SP and 4SH, or +2 % or −2 % for types R12, R13 and R15.

Table 4 — Proof pressure

Nominal size	Type				
	4SP	4SH	R12	R13	R15
	MPa (bar)	MPa (bar)	MPa (bar)	MPa (bar)	MPa (bar)
6,3	90,0 (900)	—	—	—	—
10	89,0 (890)	—	56,0 (560)	—	84,0 (840)
12,5	83,0 (830)	—	56,0 (560)	—	84,0 (840)
16	70,0 (700)	—	56,0 (560)	—	—
19	70,0 (700)	84,0 (840)	56,0 (560)	70,0 (700)	84,0 (840)
25	56,0 (560)	76,0 (760)	56,0 (560)	70,0 (700)	84,0 (840)