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

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

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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](mailto:copyright@iso.org)  
Website: [www.iso.org](http://www.iso.org)

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## 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](http://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](http://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](http://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 1436:2017), which has been technically revised. The main changes compared to the previous edition are as follows:

- R1ATS and R2ATS have been updated to R1AT and R2AT, respectively, throughout the document;
- the temperature of water and water-based fluids has been increased from +60 °C to +70 °C in the Scope;
- the definitions of [Table 1](#), [Table 2](#) and [Table 3](#) have been updated;
- the previous [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 853:1996;
- the maximum working pressure, proof pressure and minimum burst pressure have been updated to standardize to the most common pressures, where needed, in [Table 4](#);
- 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](#) (the old [Clause 8](#), Marking)

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](http://www.iso.org/members.html).

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

## 1 Scope

This document specifies requirements for six types of wire-braid-reinforced hoses and hose assemblies of nominal size from 5 to 51. This document also specifies the hose of nominal size 63 for types 2SN and R2AT, and the hose of nominal size 76 for type 2SN.

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  $-40\text{ °C}$  to  $+100\text{ °C}$ ;
- water-based fluids HFC, HFAE, HFAS and HFB as defined in ISO 6743-4 at temperatures ranging from  $-40\text{ °C}$  to  $+70\text{ °C}$ ;
- water at temperatures ranging from  $0\text{ °C}$  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*

### 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

Six types of hose are specified, distinguished by their construction, working pressure and oil resistance.

- Type 1ST: hoses with a single braid of wire reinforcement and having a thick cover.
- Type 2ST: hoses with two braids of wire reinforcement and having a thick cover.
- Types 1SN and R1AT: hoses with a single braid of wire reinforcement and having a thin cover.
- Types 2SN and R2AT: hoses with two braids of wire reinforcement and having a thin cover.

Types 1ST and 2ST are not recommended for new design.

NOTE Types 1SN and R1AT and types 2SN and R2AT have the same reinforcement dimensions as type 1ST and type 2ST, respectively, except that they have thinner covers designed to assemble with fittings without removal of the cover or a portion of the cover.

### 5 Materials and construction

#### 5.1 Hoses

Hoses shall consist of a rubber lining resistant to oil- or water-based hydraulic fluids or water, 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 that conform 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 diameter and the diameter over reinforcement of hoses shall conform to the values given in [Table 1](#).

When measured in accordance with ISO 4671, the outside diameter of hoses and cover thickness (where appropriate) 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 and diameter over the reinforcement of hoses**

Nominal size <sup>a</sup>	All types		Types R1AT, 1SN, 1ST		Types R2AT, 2SN, 2ST	
	Inside diameter mm		Diameter over the reinforcement mm			
	min.	max.	min.	max.	min.	max.
5	4,6	5,4	9,0	10,0	10,6	11,6
6,3	6,2	7,0	10,6	11,6	12,1	13,3
8	7,7	8,5	12,1	13,3	13,7	14,9
10	9,3	10,1	14,5	15,7	16,1	17,3
12,5	12,3	13,5	17,5	19,1	19,0	20,6
16	15,5	16,7	20,6	22,2	22,2	23,8
19	18,6	19,8	24,6	26,2	26,2	27,8
25	25,0	26,4	32,5	34,1	34,1	35,7
31,5	31,4	33,0	39,3	41,7	43,3	45,7
38	37,7	39,3	45,6	48,0	49,6	52,0
51	50,4	52,0	58,7	61,7	62,3	64,7
63 <sup>b</sup>	62,3	64,7	—	—	72,2	73,8
76 <sup>c</sup>	75,0	77,4	—	—	87,0	88,6

<sup>a</sup> The hose sizes correspond to those given in ISO 1307.

<sup>b</sup> This hose size is for types R2AT and 2SN only.

<sup>c</sup> This hose size is for type 2SN only.

**Table 2 — Outside diameters and cover thickness of hoses**

Nominal size	Type 1ST		Types 1SN, R1AT			Type 2ST		Types 2SN, R2AT		
	Outside diameter mm		Outside diameter mm	Cover thickness mm		Outside diameter mm		Outside diameter mm	Cover thickness mm	
	min.	max.	max.	min.	max.	min.	max.	max.	min.	max.
5	11,9	13,5	12,5	0,8	1,5	15,1	16,7	14,1	0,8	1,5
6,3	15,1	16,7	14,1	0,8	1,5	16,7	18,3	15,7	0,8	1,5
8	16,7	18,3	15,7	0,8	1,5	18,3	19,9	17,3	0,8	1,5
10	19,0	20,6	18,1	0,8	1,5	20,6	22,2	19,7	0,8	1,5
12,5	22,2	23,8	21,4	0,8	1,5	23,8	25,4	23,0	0,8	1,5
16	25,4	27,0	24,5	0,8	1,5	27,0	28,6	26,2	0,8	1,5
19	29,4	31,0	28,5	0,8	1,5	31,0	32,6	30,1	0,8	1,5
25	37,1	39,1	36,6	0,8	1,5	38,5	40,9	38,9	1,0	2,0
31,5	44,4	47,6	44,8	1,0	2,0	49,2	52,4	49,5	1,0	2,0
38	50,8	54,0	52,1	1,5	2,5	55,6	58,8	55,9	1,3	2,5
51	65,1	68,3	65,5	1,5	2,5	68,2	71,4	68,6	1,3	2,5
63 <sup>b</sup>	—	—	—	—	—	—	—	81,8	1,3	2,5
76 <sup>c</sup>	—	—	—	—	—	—	—	?	?	?

<sup>a</sup> The hose sizes correspond to those given in ISO 1307.

<sup>b</sup> This hose size is for types R2AT and 2SN only.

<sup>c</sup> This hose size is for type 2SN only.

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	
	All types	Types 1ST, 1SN and R1AT	Types 2ST, 2SN and R2AT
Up to and including 6,3	0,8	0,4	0,4
Greater than 6,3 and up to and including 19	1,0	0,6	0,7
Greater than 19	1,3	0,8	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](#). The recommendations for production acceptance 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 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 shall not exceed +2 % or -4 %.

Table 4 — Maximum working pressure, proof pressure and minimum burst pressure

Nominal size <sup>a</sup>	Maximum working pressure		Proof pressure		Minimum burst pressure	
	Types 1ST, 1SN and R1AT MPa (bar)	Types 2ST, 2SN and R2AT MPa (bar)	Types 1ST, 1SN and R1AT MPa (bar)	Types 2ST, 2SN and R2AT MPa (bar)	Types 1ST, 1SN and R1AT MPa (bar)	Types 2ST, 2SN and R2AT MPa (bar)
5	25,0 (250)	42 (420)	50,0 (500)	84,0 (840)	100,0 (1 000)	168,0 (1 680)
6,3	22,5 (225)	40,0 (400)	45,0 (450)	80,0 (800)	90,0 (900)	160,0 (1 600)
8	21,0 (210)	35,0 (350)	42,0 (420)	70,0 (700)	84,0 (840)	140,0 (1 400)
10	18,0 (180)	33,0 (330)	36,0 (360)	66,0 (660)	72,0 (720)	132,0 (1 320)
12,5	16,0 (160)	28,0 (280)	32,0 (320)	56,0 (560)	64,0 (640)	112,0 (1 120)
16	13,0 (130)	25,0 (250)	26,0 (260)	50,0 (500)	52,0 (520)	100,0 (1 000)
19	10,5 (105)	21,0 (210)	21,0 (210)	42,0 (420)	42,0 (420)	84,0 (840)
25	8,7 (87)	16,5 (165)	17,5 (175)	33,0 (330)	35,0 (350)	66,0 (660)
31,5	6,3 (63)	12,5 (125)	12,5 (125)	25,0 (250)	25,0 (250)	50,0 (500)

<sup>a</sup> The hose sizes correspond to those given in ISO 1307.

<sup>b</sup> This hose size is for types R2AT and 2SN only.

<sup>c</sup> This hose size is for type 2SN only.

Table 4 (continued)

Nominal size <sup>a</sup>	Maximum working pressure		Proof pressure		Minimum burst pressure	
	Types 1ST, 1SN and R1AT MPa (bar)	Types 2ST, 2SN and R2AT MPa (bar)	Types 1ST, 1SN and R1AT MPa (bar)	Types 2ST, 2SN and R2AT MPa (bar)	Types 1ST, 1SN and R1AT MPa (bar)	Types 2ST, 2SN and R2AT MPa (bar)
38	5,0 (50)	9,0 (90)	10,0 (100)	18,0 (180)	20,0 (200)	36,0 (360)
51	4,0 (40)	8,0 (80)	8,0 (80)	16,0 (160)	16,0 (160)	32,0 (320)
63 <sup>b</sup>	—	7,0 (70)	—	14,0 (140)	—	28,0 (280)
78 <sup>c</sup>	—	5,0 (50)	—	10,0 (100)	—	20,0 (200)

<sup>a</sup> The hose sizes correspond to those given in ISO 1307.

<sup>b</sup> This hose size is for types R2AT and 2SN only.

<sup>c</sup> This hose size is for type 2SN only.

### 7.3 Minimum bend radius

When bent to the minimum bend radius given in [Table 5](#), 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 5 — Minimum bend radius

Nominal size	Minimum bend radius mm
5	90
6,3	100
8	115
10	130
12,5	180
16	200
19	240
25	300
31,5	420
38	500
51	630
63	760
76	900

### 7.4 Resistance to impulse

#### 7.4.1 Oil-based fluid impulse test

The impulse test shall be in accordance with ISO 6803 or ISO 6605. The test fluid temperature shall be 100 °C.

For type 1ST and type 1SN and R1AT hoses, when tested at an impulse pressure equal to 125 % of the maximum working pressure for hoses of nominal size 25 and smaller, and at 100 % of the maximum working pressure for hoses of nominal size 31,5 and above, the hose shall withstand a minimum of 150 000 impulse cycles.

For type 2ST and type 2SN and R2AT hoses, when tested at an impulse pressure equal to 133 % of the maximum working pressure, the hose shall withstand a minimum of 200 000 impulse cycles.

There shall be no leakage or other evidence of failure before reaching the specified number of cycles.

This test shall be considered a destructive test, and the test piece shall be discarded after the test.

#### **7.4.2 Water-based fluid impulse test**

The impulse test shall be in accordance with ISO 6803 or ISO 6605. The test fluid temperature shall be 70 °C. The test fluid used shall be HFC, HFAE, HFAS or HFB as defined in ISO 6743-4.

For type 1ST, 1SN and R1AT hoses, when tested at an impulse pressure equal to 125 % of the maximum working pressure for hoses of nominal size 25 and smaller, and at 100 % of the maximum working pressure for nominal size 31,5 and above, the hoses shall withstand a minimum of 150 000 impulse cycles.

For type 2ST, 2SN and R2AT hoses, when tested at an impulse pressure equal to 133 % of the maximum working pressure, the hoses shall withstand a minimum of 200 000 impulse cycles.

There shall be no leakage or other evidence of failure before reaching the specified number of cycles.

This test shall be considered a destructive test, and the test piece shall be discarded after the test.

The following test can be used as an option to maximize test efficiency by reducing the amount of testing needed:

- a) oven-age assemblies filled with one of the water-based fluids specified in 7.4.2 for 120 h at 70 °C;
- b) impulse-test the aged assemblies using an oil-based hydraulic fluid at a temperature of 100 °C.

For type 1ST, 1SN and R1AT hoses, when tested at an impulse pressure equal to 125 % of the maximum working pressure for hoses of nominal size 25 and smaller, and at 100 % of the maximum working pressure for nominal size 31,5 and above, the hoses shall withstand a minimum of 150 000 impulse cycles.

For type 2ST, 2SN and R2AT hoses, when tested at an impulse pressure equal to 133 % of the maximum working pressure, the hoses shall withstand a minimum of 200 000 impulse cycles.

There shall be no leakage or other evidence of failure before reaching the specified number of cycles.

This test shall be considered a destructive test, and the test piece shall be discarded after the test.

#### **7.5 Leakage of hose assemblies**

When tested in accordance with ISO 1402 or ISO 6605, there shall be no leakage or other evidence of failure. This test shall be considered a destructive test, and the test piece shall be discarded after the test.

#### **7.6 Low temperature flexibility**

When tested in accordance with method B of ISO 10619-2:2017, Clause 6 at a temperature of -40 °C, there shall be no cracking of the lining or cover. The test piece shall not leak or crack when subjected to a proof pressure test in accordance with ISO 1402 or ISO 6605 after regaining ambient temperature.

#### **7.7 Adhesion between components**

When determined in accordance with ISO 8033, the adhesion between lining and reinforcement and between cover and reinforcement shall be no less than 2,5 kN/m for type 1ST, 2ST, 1SN and 2SN hoses and no less than 1,8 kN/m for type R1AT and R2AT hoses.

Test pieces shall be type 5 for lining and reinforcement and type 2 or type 6 or type 8 for cover and reinforcement as described in ISO 8033:2016, 6.1 and 6.3.

## 7.8 Vacuum resistance

When tested in accordance with ISO 7233, hoses and hose assemblies shall conform to the values given in [Table 6](#).

**Table 6 — Degree of vacuum<sup>a</sup>**

Nominal size	Negative gauge pressure	
	Types 1ST and 1SN MPa (bar)	Types 2ST and 2SN MPa (bar)
5	0,080 (0,80)	0,095 (0,95)
6,3	0,080 (0,80)	0,095 (0,95)
8	0,080 (0,80)	0,095 (0,95)
10	0,080 (0,80)	0,095 (0,95)
12,5	0,080 (0,80)	0,095 (0,95)
16	0,080 (0,80)	0,080 (0,80)
19	0,080 (0,80)	0,080 (0,80)
25	0,080 (0,80)	0,080 (0,80)
31,5	0,060 (0,60)	0,080 (0,80)
38	0,060 (0,60)	0,080 (0,80)
51	0,060 (0,60)	0,080 (0,80)
63 <sup>b</sup>	—	0,080 (0,80)
78 <sup>b</sup>	—	0,080 (0,80)

<sup>a</sup> There is no vacuum resistance requirement for hoses of types R1AT and R2AT.  
<sup>b</sup> This hose size is for type 2SN only.

## 7.9 Abrasion resistance

Abrasion resistance test requirements to be added when new abrasion resistance test methods are available.

## 7.10 Fluid resistance

### 7.10.1 General

The fluid resistance tests shall be carried out on moulded sheets of lining and cover compound having a minimum thickness of 2 mm and of cure state equivalent to that of the hose.

### 7.10.2 Oil resistance

When determined in accordance with ISO 1817 by immersion in IRM 903 oil for 168 h at a temperature of 100 °C, the percentage change in volume of the lining shall be between 0 % and +25 % for type 1SN, 1ST, 2SN and 2ST hoses and between 0 % and +100 % for type R1AT and R2AT hoses (i.e. shrinkage is not permissible).

When determined in accordance with ISO 1817 by immersion in IRM 903 oil for 168 h at a temperature of 70 °C, the percentage change in volume of the cover shall be between 0 % and +100 % (i.e. shrinkage is not permissible).

### 7.10.3 Water resistance

For all types of hose, when tested in accordance with ISO 1817 by immersion in distilled water for 168 h at a temperature of 70 °C, the percentage change in volume of the lining shall be between 0 % and +25 %

and the percentage change in volume of the cover shall be between 0 % and +100 % (i.e. shrinkage is not permissible).

### 7.11 Ozone resistance

When tested in accordance with methods 1 or 2 of ISO 7326:2016, depending on the nominal size of the hose, no cracking or other deterioration of the cover shall be visible under ×2 magnifications.

### 7.12 Visual examination

Hoses shall be examined for visible defects in the outer cover and to verify that the hose identification is correct and has been properly marked. Hose assemblies shall, in addition, be inspected to verify that the correct fittings are fitted.

## 8 Frequency of testing

Type testing and routine testing shall be as specified in [Annex A](#).

Type tests are those tests required to confirm that a particular hose design, manufactured by a particular method, meets all the requirements of this document. The tests shall be repeated at a maximum of five-year intervals, or whenever a change in the method of manufacture or materials used occurs. They shall be performed on all sizes, and on all classes and types except those of the same size and construction.

Routine tests are those tests required to be carried out on each length of finished hose prior to dispatch.

Production acceptance tests are those tests, specified in [Annex B](#), which should preferably be carried out to control the quality of manufacture. The frequencies specified in [Annex B](#) are given as a guidance only.

## 9 Marking

### 9.1 Hoses

Hoses meeting the requirements of this document shall be marked at least once every 760 mm with at least the following information:

- a) the manufacturer's name or identification, e.g. XXX;
- b) a reference to this document, i.e. ISO 1436;
- c) the type, e.g. 2SN;
- d) the nominal size, e.g. 16;
- e) the maximum working pressure, in megapascals and in bars, or in either, with the unit indicated, e.g. 25 MPa (250 bar);
- f) the quarter and last two digits of the year of manufacture, e.g. 4Q18 (other date-coding methods indicating, for instance, the day or month and year of manufacture are allowed as long as they are clear to the user).

EXAMPLE     XXX/ISO 1436/2SN/16/25 MPa (250 bar)/4Q18.

For item b), the hose manufacturer shall use the latest publication of this document; otherwise, the year of publication shall be included in the marking.

## 9.2 Hose assemblies

Hose assemblies meeting the requirements of this document shall be permanently marked with at least the following information:

- a) the manufacturer's name or identification, e.g. XXX;
- b) the maximum working pressure of the assembly, in megapascals and in bars, or in either, with the units indicated, e.g. 25 MPa (250 bar);

NOTE 1 The maximum working pressure of a hose assembly is equal to the maximum working pressure of the component having the lowest maximum working pressure.

- c) two digits indicating the last two digits of the year of assembly followed by a slash and the two digits indicating the month of assembly, e.g. 18/11 (monthly, daily and other date coding methods are allowed as long as they are clear to the user).

EXAMPLE XXX/25 MPa (250 bar)/18/11.

NOTE 2 Typical markings include but are not limited to stamping the fitting socket, embossing on a metal or plastic ring.

The sequence of the elements is optional and they do not need to be in one row.

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## Annex A (normative)

### Test frequency for type tests and routine tests

Property / Test	Type tests Frequency (for each hose type and size): at initial product qualification, in the event of product changes after initial qualification and after 5 years	Routine tests Performed on each length of finished hose or hose assembly prior to warehousing or sale
<b>Hose tests</b>		<b>Per length<sup>a</sup></b>
Visual examination	X	X
Measurement of inside diameter	X	X
Measurement of outside diameter	X	X
Measurement of outer cover thickness (if applicable — see <a href="#">Table 2</a> )	X	N/A
Measurement of concentricity	X	N/A
Adhesion test (cover)	X	N/A
Adhesion test (lining)	X	N/A
Proof pressure test	X	X
Change in length test <sup>b</sup>	X	X
Burst pressure test <sup>b</sup>	X	N/A
Low temperature flexibility test <sup>b</sup>	X	N/A
Vacuum resistance test <sup>b</sup>	X	N/A
Minimum bend radius test <sup>b</sup>	X	N/A
Fluid resistance test for cover	X	N/A
Fluid resistance test for lining	X	N/A
Ozone resistance test	X	N/A
Abrasion resistance test	TBD	TBD
<b>Hose assembly tests (to be performed by the hose assembler)</b>		<b>Per assembly</b>
Visual examination	X	X
Proof pressure test	X	X
Change in length test	X	X
Leakage test	X	N/A
Burst pressure test	X	N/A
Impulse test	X	N/A
X = Test required.		
N/A = Test not applicable.		
<sup>a</sup> A length is defined as a continuously produced length up to a maximum of 3 000 m.		
<sup>b</sup> These tests may be carried out with hose assemblies.		