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Rubber and plastics inlet hoses and hose assemblies for washing-machines and dishwashers — Specification

Tuyaux et flexibles en caoutchouc et en plastique pour l'alimentation des machines à laver et lave-vaisselle — Spécifications

Reference number
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Foreword

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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 fifth edition cancels and replaces the fourth edition (ISO 6804:2016), which has been technically revised:

The main changes are as follows:

— the dates of some references have been updated (i.e. ISO 7326:2016, ISO 10619-1:2017);

— subclause 8.6 has been updated and corrected from 3,15 MPa (31,5 bar) to 2,1 MPa (21 bar);

— the mention of the publication year has been removed from Clause 11.

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 and plastics inlet hoses and hose assemblies for washing-machines and dishwashers — Specification

1 Scope

This document specifies the requirements for three types of rubber or plastics inlet hoses and hose assemblies for washing-machines and dishwashers connected to the domestic water supply at a pressure not exceeding 1 MPa (10 bar).

This document is applicable to the following types of hose:

— type 1: rubber hoses for unheated water supply (maximum temperature 70 °C);

— type 2: rubber hoses for heated water supply (maximum temperature 90 °C);

— type 3: plastics hoses for unheated water supply (maximum temperature 60 °C).

NOTE National requirements for hose fittings and hoses conveying drinking water can apply.

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 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

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

ISO 4892 (all parts), *Plastics — Methods of exposure to laboratory light sources*

ISO 7326:2016, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions*

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

ISO 10619-1:2017, *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 1: Bending tests at ambient temperature*

ISO 23529, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 10619 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

Hoses are designated as one of the following three types, depending on the hose material and the temperature of the water supply:

— type 1: rubber hoses for a medium-temperature water supply (up to 70 °C) – for a maximum working pressure of 1 MPa (10 bar);

— type 2: rubber hoses for a high-temperature water supply (up to 90 °C) – for a maximum working pressure of 1 MPa (10 bar);

— type 3: plastics hoses for low temperature (up to 60 °C) water supply – for a maximum working pressure of 0,8 MPa (8 bar).

5 Couplings and fittings

Hoses may be fitted with the appropriate type of coupling and end fitting to form hose assemblies.

NOTE Guidance on coupling types is given in ISO/TR 17784.

6 Materials and construction

The hose construction shall be as follows.

a) The hose lining shall consist of rubber for type 1 and type 2 or thermoplastics material for type 3.

b) The hose reinforcement shall consist of natural or synthetic textile material applied by any suitable technique.

c) The hose cover shall consist of an ozone-resistant rubber for type 1 and type 2 or a weather-resistant thermoplastics material for type 3. Alternatively, a stainless-steel braid may be used instead of a cover.

The lining and the cover shall be of uniform thickness, concentric, fully gelled and free from visible cracks, porosity, foreign inclusions and other defects which can cause the hose to be unserviceable.

7 Dimensions and tolerances

7.1 Inside diameters, tolerances and minimum wall thickness

7.1.1 Type 1 and type 2 hoses

The preferred values for the bore of the hose are 10 mm and 12,5 mm.

The tolerances on the bore depend on the characteristics of the end fittings; consequently, they shall be agreed between the manufacturer of the hose and the constructor of the hose assembly but shall not exceed the maximum tolerances specified in ISO 1307.

7.1.2 Type 3 hoses

When measured in accordance with ISO 4671, the inside diameter and minimum wall thickness of the hose shall meet the requirements specified in Table 1.

Table 1 — Nominal bores, inside diameters, tolerances on inside diameter and minimum wall thicknesses of plastics hoses

Nominal bore	Inside diameter mm	Tolerances on inside diameter mm	Minimum wall thickness mm
10	10	±0,6	2,6
13	12,7	±0,6	2,6

7.2 Concentricity

When determined in accordance with ISO 4671, the concentricity, based on a total indicator reading between the inside diameter and the outside surface of the cover, shall not be greater than 0,3 mm.

7.3 Tolerances on length

The tolerances on cut lengths of hose shall be in accordance with ISO 1307.

8 Performance requirements for finished hoses and hose assemblies

8.1 Hydrostatic-pressure requirements — Proof pressure test

The proof pressure test shall be carried out on every length of finished hose and on hose assemblies. When tested in accordance with ISO 1402, the hose (and the hose assembly) shall meet the requirements of Table 2. The maximum variation in length and outside diameter at maximum working pressure shall be ±5 % and the hose/hose assembly shall not burst or fail by showing signs of leakage, cracking, abrupt distortion indicating irregularities in material or manufacture or other signs of failure.

Table 2 — Hydrostatic-pressure requirements

Hose type	Maximum working pressure		Proof pressure		Minimum burst pressure	
	MPa	bar	MPa	bar	MPa	bar
1	1	10	1,5	15	3	30
2	1	10	1,5	15	3	30
3	0,8	8	1,2	12	2,4	24

8.2 Burst test

When tested by the method specified in ISO 1402, hoses shall meet the requirements of Table 2.

8.3 Bending test

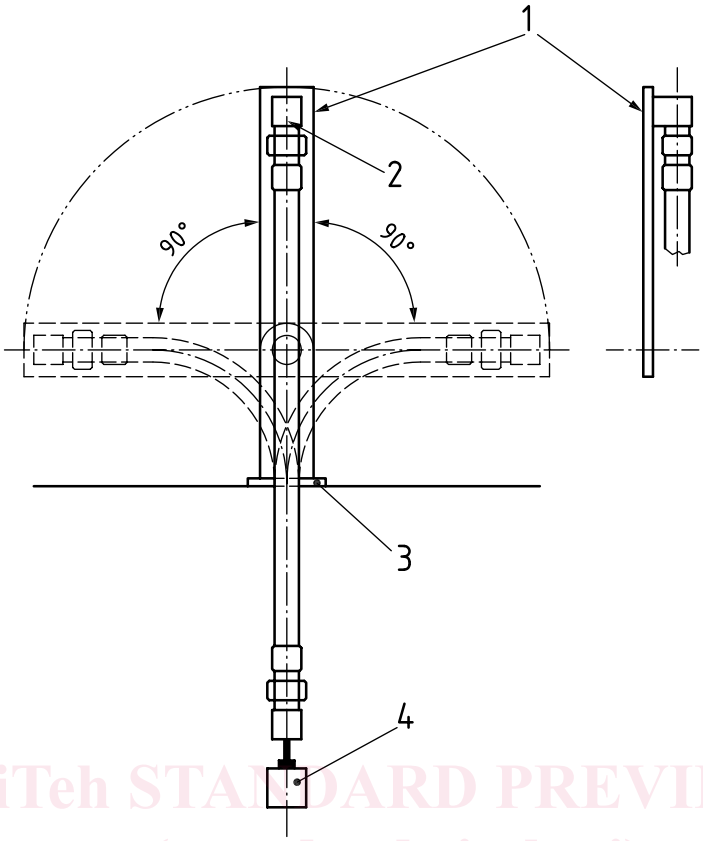
The bending test shall be carried out at a standard temperature as specified in ISO 23529.

When tested in accordance with ISO 10619-1:2017, method A, using a bending radius of 7,5 times the outside diameter, the hoses shall show no evidence, under visual examination, of kinking, breaking or peeling. The value of the coefficient of deformation (T/D) shall not be lower than 0,8.

8.4 Flexing tests

8.4.1 General

In the case of type 3 hoses, flexing tests shall be carried out using the test arrangement shown in Figure 1.



Key

1 oscillating arm
2 flexing of coupling
3 support
4 2 kg weight

Figure 1 — Arrangement for flexing tests

8.4.2 Sub-ambient temperature flexing test

When the hose is tested during and after conditioning for 5 h at (−5 ± 3) °C, the oscillating arm is moved right and left alternately through an angle of 90° at a rate of (50 ± 10) flexings per minute for 500 flexings. The hose shall show no evidence of cracking or other defects.

8.4.3 Standard laboratory temperature flexing test

When tested at a standard laboratory temperature as specified in ISO 23529, moving the oscillating arm through an angle of 180° at a rate of (20 ± 5) flexings per minute for 100 000 flexings, the hose shall show no evidence of cracking or other defects.

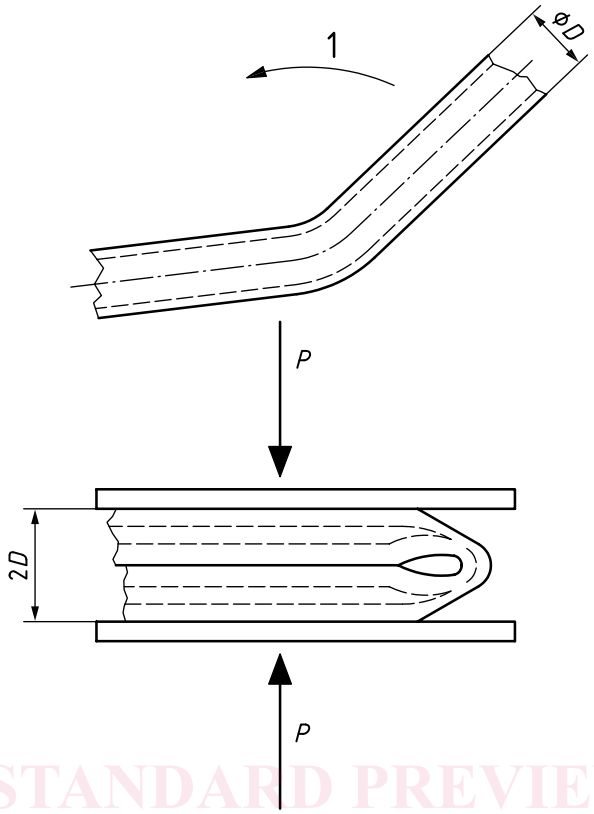
8.5 Resistance to kinking

The kinking test shall be carried out at a standard temperature as specified in ISO 23529.

The hose assembly is folded through an angle of 180° and then compressed in such a way that the total thickness is equal to twice the outer diameter of the hose, as shown in Figure 2.

The pressure is maintained for 5 s, after which the hose assembly is allowed to rest for 1 min.

The test is carried out 10 times at the same point, the fold being made in the same direction each time.



Key

1 direction of fold

P pressure

D outside diameter of the hose

Figure 2 — Kinking test

After the test, the hose assembly shall be filled with water at the specified temperature and then tested at a pressure of 2,1 MPa (21 bar) for type 1 and type 2, and 1,7 MPa (17 bar) for type 3 by the method specified in ISO 1402 for 1 min. The hose shall show no evidence of leakage or other defects.

8.6 Resistance to hydrostatic pressure after ageing

The hose assembly, filled with water, shall be aged for 7 d (168 h) in an oven, in accordance with ISO 188, at

— (60 ± 2) °C for type 3 hoses,

— (70 ± 2) °C for type 1 hoses, and

— (90 ± 2) °C for type 2 hoses.

After ageing, the hose assembly shall be emptied, refilled with water at the specified temperature and again tested at a pressure of 2,1 MPa (21 bar) for type 1 and type 2, and 1,7 MPa (17 bar) for type 3 by the method specified in ISO 1402 for 1 min.

During the pressure test, the hose assembly shall not burst or show defects such as leakage or blisters, nor shall there be evidence of coupling slippage.

8.7 Resistance to ozone or weathering

8.7.1 Resistance to ozone — Type 1 and type 2 hoses

The resistance to ozone test shall be carried out in accordance with ISO 7326:2016, method 1.

The hose test piece shall be tested in an atmosphere having an ozone concentration of (50 ± 5) pphm at (40 ± 2) °C for 72 h.

After testing, when viewed under a magnification of ×2, the cover shall show no evidence of cracking.

8.7.2 Resistance to weathering — Type 3 hoses

The weathering test shall be carried out in accordance with the appropriate part of the ISO 4892 series.

The light sources and exposure conditions shall be selected by agreement between the interested parties. Unless otherwise specified, the light sources and exposure conditions indicated in Table 3 are recommended.

After testing, the cover shall show no evidence of cracks or other defects which can cause the hose to be unserviceable.

Table 3 — Light sources and exposure conditions for weathering

Light source	Cycle no.	Black-standard temperature °C	Chamber temperature °C	Relative humidity %	Exposure time h
Xenon-arc lamp	1	65 ± 3	38 ± 3	50 ± 10	400
Fluorescent UV lamp	1	60	—	Not controlled	350
Carbon-arc lamp with type 3 filter	4	63 ± 3	40 ± 3	50 ± 5	200

8.8 Resistance to hydraulic-pressure impulse test

The hose assembly is connected to a system in which water is circulated and subjected to pressure pulses, as shown in Figure 3.