

International Standard



6134

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Rubber hoses for steam — Specification

Tuyaux en caoutchouc pour la vapeur — Spécifications

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Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 6134 was developed by Technical Committee ISO/TC 45, *Rubber and rubber products*, and was circulated to the member bodies in May 1979.

It has been approved by the member bodies of the following countries :

Australia	Germany, F.R.	Romania
Austria	Greece	South Africa, Rep. of
Belgium	Hungary	Spain
Brazil	India	Sri Lanka
Canada	Italy	Sweden
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Czechoslovakia	Mexico	Turkey
Denmark	Netherlands	USA
Egypt, Arab Rep. of	New Zealand	USSR
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The member body of the following country expressed disapproval of the document on technical grounds :

United Kingdom

Rubber hoses for steam — Specification

1 Scope and field of application

This International Standard specifies requirements for two classes and three types of rubber steam hoses as follows :

a) Classes :

- class I : non-oil-resistant cover,
- class II : oil-resistant cover;

b) Types :

- type 1 : intended for a maximum working steam pressure of 0,6 MPa (6 bar) corresponding to a temperature of 165 °C,
- type 2 : intended for a maximum working steam pressure of 1,0 MPa (10 bar) corresponding to a temperature of 184 °C,
- type 3 : intended for a maximum working steam pressure of 1,6 MPa (16 bar) corresponding to a temperature of 204 °C.

Hoses complying with the requirements of this International Standard are not suitable for use in the preparation of foodstuffs, for example by steam cooking, or for special service applications, such as in pile drivers, etc.

NOTE — The end fittings used with the hose should be of a type which will permit compensation for creep of the rubber compounds during service.

2 References

ISO/R 36, *Determination of the adhesion strength of vulcanized rubbers to textile fabrics.*

ISO 37, *Rubber, vulcanized — Determination of tensile stress-strain properties.*

ISO 48, *Vulcanized rubbers — Determination of hardness (Hardness between 30 and 85 IRHD).*

ISO 1307, *Rubber hose — Bore sizes, tolerances on length, and test pressures.*

ISO 1402, *Rubber hose — Hydrostatic testing.*

ISO 1817, *Vulcanized rubbers — Resistance to liquids — Methods of test.*

ISO 4023, *Rubber products — Hoses for steam — Methods of test.*

ISO 4661, *Rubber — Preparation of test pieces.*

ISO 6133, *Rubber and plastics — Analysis of multi-peak traces obtained in determinations of tear strength and adhesion strength.*

3 Construction

3.1 Lining

The rubber lining shall be resistant to ageing by pressurized steam.

3.2 Reinforcement

3.2.1 Type 1

The reinforcement shall consist of either textile fibre or steel wire which ensures compliance of the hose with the requirements of clauses 5, 6, 7 and 8.

3.2.2 Types 2 and 3

The reinforcement shall consist of either high strength steel wire or other material which ensures compliance of the hose with the requirements of clauses 5, 7 and 8.

3.3 Cover

The rubber cover shall be resistant to ozone. It shall be perforated with a minimum of 280 holes per metre, in four rows radially spaced at 90° around the periphery, to relieve pressure build-up between the inner lining and the cover.

4 Dimensions and tolerances

4.1 Bore size

Bore sizes and tolerances shall be as shown in table 1.

Table 1 — Nominal bore sizes and tolerances

Dimensions in millimetres

Nominal bore	Tolerance
12,5	± 0,75
16	± 0,75
19	± 0,75
20	± 0,75
25	± 1,25
31,5	± 1,25
38	± 1,50
40	± 1,50
50	± 1,50
51	± 1,50
63	± 1,50
80	± 2,00

NOTE — If special cases call for extra sizes :

a) for smaller or larger dimensions, further numbers should be chosen from the R 10 series of preferred numbers, with tolerances as given in ISO 1307;

b) for intermediate dimensions, numbers should be chosen from the R 20 series of preferred numbers, with the tolerances as given for the next larger size.

4.2 Length

The tolerances on cut lengths shall be as specified in ISO 1307.

4.3 Lining and cover thickness (all types)

The minimum thickness of the lining shall be 2,0 mm and that of the cover shall be 1,5 mm.

5 Hydrostatic test

When tested by the method specified in ISO 1402, the hoses shall withstand the appropriate minimum burst pressure specified in table 2.

Table 2 — Minimum burst pressure

Type	Minimum burst pressure MPa
1	6
2	10
3	16

6 Adhesion (textile reinforced hoses only)

When tested by the method specified in ISO/R 36, the adhesion between the lining and the reinforcement, between layers of reinforcement, and between the cover and the reinforcement, shall be not less than 2,0 kN/m. The method of calculating the adhesion strength shall be that specified in ISO 6133.

7 Resistance to steam

Take test pieces from the lining in accordance with ISO 4661.

Determine their elongation at break by the method specified in ISO 37 and their hardness by the method specified in ISO 48.

Take four hose test pieces and burst two of them by hydrostatic testing, using water at room temperature, by the method specified in ISO 1402.

Expose the other two test pieces to a flow of saturated steam in accordance with ISO 4023, method B, using the appropriate steam pressure and exposure time specified in table 3.

Table 3 — Steam pressure and exposure time

Type	Steam pressure MPa	Time h
1	0,55 to 0,65	166 to 168
2	0,95 to 1,05	166 to 168
3	1,55 to 1,65	166 to 168

On completion of the steam treatment, bend the test piece through 180°, four times over a mandrel of the appropriate radius specified in table 4, at room temperature. Rotate the test piece through 90° between each bending operation.

Table 4 — Mandrel radius

Dimensions in millimetres

Hose internal diameter	Mandrel radius	
	Type 1	Types 2 and 3
12,5	80	180
16	100	200
19	135	240
20	135	240
25	170	300
31,5	240	400
38	300	500
40	300	500
50	375	650
51	375	650
63	500	800
80	650	1 000

After the bending test, burst the test pieces by hydrostatic pressure at room temperature using the method specified in ISO 1402, after which cut the test pieces open and inspect the rubber for cracks, blisters and pop-corning (an eruption evident on the surface of a hose lining after exposure to pressurized steam). Determine the elongation at break of the rubber lining by the method specified in ISO 37 and hardness by the method specified in ISO 48, on test pieces prepared from the lining in accordance with ISO 4661.

Determine the reduction in burst pressure, reduction in elongation at break and increase in hardness on the basis of the mean values relating to test pieces subjected to steam treatment, and the mean values relating to test pieces not subjected to steam treatment.

The changes in these properties shall not exceed the limits specified in table 5.

Neither the rubber lining nor the outer cover shall show cracks, blisters or pop-corning.

8 Resistance to oil (class II hoses only)

The cover, when tested by the method specified in ISO 1817, immersed in oil No. 3 for 70 ± 2 h at a temperature of 100 ± 1 °C, shall not show a volume change higher than 100 %, or as agreed between the purchaser and the supplier.

9 Resistance to ozone

Methods of test will form the subject of ISO 7326. When tested under the conditions specified, method 1 or 2 as appropriate, there shall be no cracking.

10 Marking

Each length of hose shall be marked to include the following information or as agreed between the purchaser and the supplier :

- a) the number of this International Standard;
- b) the manufacturer's name or trademark;
- c) the year of manufacture;
- d) the hose type and class;
- e) the maximum working steam pressure.

Table 5 — Permissible changes in properties

Property	Type 1	Type 2	Type 3
Maximum reduction in burst pressure, %	50	20	10
Maximum reduction in elongation at break, %	50	50	50
Minimum elongation at break after steam treatment, %	150	150	150
Maximum hardness increase, IRHD.	10	10	10

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