

# INTERNATIONAL STANDARD

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**6134**

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## Rubber hoses and hose assemblies for steam — Specification

**iTeh STANDARD PREVIEW**  
*Tuyaux et flexibles en caoutchouc pour la vapeur — Spécifications*  
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Reference number  
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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.

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.

International Standard ISO 6134 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Sub-Committee SC 1, *Hoses (rubber and plastics)*.

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This second edition cancels and replaces the first edition (ISO 6134:1981), of which it constitutes a technical revision.

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# Rubber hoses and hose assemblies for steam — Specification

## 1 Scope

This International Standard specifies the minimum requirements for two classes and five types of rubber steam hoses and hose assemblies 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 0,3 MPa (3 bar) corresponding to a temperature of 144 °C;
- type 2: intended for a maximum working steam pressure of 0,6 MPa (6 bar) corresponding to a temperature of 165 °C;
- type 3: intended for a maximum working steam pressure of 1,0 MPa (10 bar) corresponding to a temperature of 184 °C;
- type 4: intended for a maximum working steam pressure of 1,6 MPa (16 bar) corresponding to a temperature of 204 °C;
- type 5: intended for a maximum working steam pressure of 1,6 MPa (16 bar) corresponding to a temperature of 204 °C for extended service.

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

## 2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions

of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 3:1973, *Preferred numbers — Series of preferred numbers.*

ISO 37:1977, *Rubber, vulcanized — Determination of tensile stress-strain properties.*

ISO 48:1979, *Vulcanized rubbers — Determination of hardness (Hardness between 30 and 85 IRHD).*

ISO 1307:1992, *Rubber and plastics hoses for general-purpose industrial applications — Bore diameters and tolerances, and tolerances on length.*

ISO 1402:1984, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing.*

ISO 1817:1985, *Rubber, vulcanized — Determination of the effect of liquids.*

ISO 4023:1991, *Rubber hoses for steam — Test methods.*

ISO 4661-1:1986, *Rubber, vulcanized — Preparation of samples and test pieces — Part 1: Physical tests.*

ISO 7326:1991, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions.*

ISO 8033:1991, *Rubber and plastics hose — Determination of adhesion between components.*

## 3 Construction

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

### 3.1 Lining

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

### 3.2 Reinforcement

#### 3.2.1 Types 1 and 2

The reinforcement shall consist of textile fibre which shall ensure compliance of the hose with the requirements of clauses 5 to 7.

#### 3.2.2 Types 3, 4 and 5

The reinforcement shall consist of high-strength steel wire which shall ensure compliance of the hose with the requirements of clauses 5 to 7.

### 3.3 Cover

The rubber cover shall be resistant to ozone in accordance with clause 9. The cover on the hoses shall be perforated after cure with a minimum of 280 holes per metre, e.g. in four rows radially spaced at 90° around the periphery. This is to relieve pressure build-up between the inner lining and the cover. The cover on class II hoses shall be oil-resistant in accordance with clause 8.

## 4 Dimensions and tolerances

### 4.1 Bore sizes and tolerances

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 1 If special cases call for extra sizes, the numbers should be chosen from the R20 series of preferred numbers from ISO 3, with the tolerances as given for the next-larger size.

### 4.2 Hose length tolerances

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

### 4.3 Lining and cover thickness

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

## 5 Hydrostatic requirements

When tested in accordance with ISO 1402, the hose shall show no sign of excessive dilation or abrupt change of section at proof pressure and shall have a minimum burst pressure as given in table 2.

Table 2 — Minimum burst pressure

Hose type	Proof pressure MPa	Minimum burst pressure MPa
1	1,5	3
2	3,0	6
3	5,0	10
4	8,0	16
5	8,0	16

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## 6 Adhesion

When tested in accordance with ISO 8033, the adhesion between the lining and the reinforcement, between layers of reinforcement and between the cover and the reinforcement shall be not less than 1,5 kN/m.

## 7 Resistance to steam

### 7.1 Retention of properties

Take test pieces from the lining of unaged hose in accordance with ISO 4661-1. Determine the elongation at break by the method specified in ISO 37 and the 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, in accordance with ISO 1402.

Expose the other two test pieces to a flow of saturated steam in accordance with ISO 4023:1991, method B, using the steam pressure and exposure time specified in table 3.

**Table 3 — Steam pressure and exposure time**

Hose type	Steam pressure MPa	Time h
1	0,25 to 0,35	166 to 168
2	0,55 to 0,65	166 to 168
3	0,95 to 1,05	166 to 168
4	1,55 to 1,65	166 to 168
5	1,55 to 1,65	334 to 336

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	
	Types 1 and 2	Types 3, 4 and 5
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 in accordance with 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 in accordance with ISO 37 and hardness in accordance with ISO 48 on test pieces prepared from the lining in accordance with ISO 4661-1.

Determine the reduction in burst pressure, reduction in elongation at break and increase in hardness based on 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.

**Table 5 — Permissible changes in properties**

Property	Type 1	Type 2	Type 3	Type 4	Type 5
Maximum reduction in actual hose burst pressure, %	30	30	15	15	15
Maximum reduction in lining elongation at break, % <sup>1)</sup>	50	50	50	50	50
Minimum elongation of lining at break after steam test, %	150	150	150	150	150
Maximum lining hardness increase, IRHD	10	10	10	10	10

1) i.e. The percentage elongation at break after steam treatment shall not be less than one-half of the percentage elongation at break before steam treatment.

## 7.2 Extended steam exposure (type 5 hoses only)

Select one additional hose test piece of type 5 hose and expose it to a flow of saturated steam in accordance with ISO 4023:1991, method B. The steam pressure shall be 1,55 MPa to 1,65 MPa for a duration of 28 days.

During the test, there shall be no leakage of steam through the hose wall. Following the test, the lining shall not be cracked, blistered or pop-corned and the cover shall not be cracked or blistered.

## 8 Resistance to oil (class II hoses only)

The cover, when tested in accordance with ISO 1817, immersed in oil No. 3 for 72 h at a temperature of 100 °C, shall not have a volume change greater than 100 %.

## 9 Resistance to ozone (cover only)

When tested under the conditions specified in method 1 or 2 of ISO 7326:1991, there shall be no cracks in the cover.

## 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 quarter and year of manufacture;

d) the hose type and class;

e) the maximum working pressure.

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**Descriptors:** rubber, rubber products, hoses, steam hoses, classification, specifications, dimensions, dimensional tolerances, marking.

Price based on 4 pages

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