INTERNATIONAL STANDARD

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Rubber hose, textile-reinforced, for compressed air — Specification

Tuyaux en caoutchouc renforcés textile pour l'air comprimé — Spécifications

Reference number
ISO 2398:1995(E)

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 2398 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Hoses (rubber and plastics)*.

This fourth edition cancels and replaces the third edition (ISO 2398:1987), which has been technically revised.

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Rubber hose, textile-reinforced, for compressed air — Specification

1 Scope

This International Standard specifies the requirements for seven types and two classes of rubber hose for compressed air up to a maximum working pressure of 2,5 MPa and a hose operating-temperature range of between −40 °C and + 70 °C, depending on the class.

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 37:1994, *Rubber, vulcanized or thermoplastic — Determination of tensile stress-strain properties.*

ISO 188:1982, *Rubber, vulcanized — Accelerated ageing or heat-resistance tests.*

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

ISO 1402:1994, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing.*

ISO 1746:1983, *Rubber or plastics hoses and tubing — Bending tests.*

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

ISO 4671:1984, *Rubber and plastics hose and hose assemblies — Methods of measurement of dimensions.*

ISO 4672:—[1], *Rubber and plastics hoses — Sub-ambient-temperature flexibility 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 Types and classes of hose

Seven types and two classes of hose are specified as follows:

Types

— Type 1: general industrial air hose for a maximum working pressure of 1,0 MPa

— Type 2: air hose for heavy-duty construction work and a maximum working pressure of 1,0 MPa

— Type 3: air hose for heavy-duty construction work and a maximum working pressure of 1,0 MPa, and having good oil resistance

— Type 4: air hose for heavy-duty construction work and a maximum working pressure of 1,6 MPa

— Type 5: air hose for heavy-duty construction work and a maximum working pressure of 1,6 MPa, and having good oil resistance

— Type 6: air hose for heavy-duty construction work and a maximum working pressure of 2,5 MPa

1) To be published. (Revision of ISO 4672:1988)

— Type 7: air hose for heavy-duty construction work and a maximum working pressure of 2,5 MPa, and having good oil resistance.

Classes

Class A: hose operating-temperature range: −25 °C to +70 °C

Class B: hose operating-temperature range: −40 °C to +70 °C

4 Construction and materials

The hose shall consist of the following:

— a rubber lining;

— a layer or layers of natural or synthetic textile, applied by any suitable technique;

— a rubber cover.

The lining and cover shall be of uniform thickness, concentric to comply with the minimum specified thickness and free from holes, porosity and other defects.

5 Dimensions and tolerances

5.1 Bore

The bore of the hose shall be in accordance with the nominal dimensions and tolerances given in table 1.

Table 1 — Nominal bores and tolerances

Values in millimetres

Nominal bore	Tolerance
5	± 0,5
6,3	± 0,75
8	± 0,75
10	± 0,75
12,5	± 0,75
16	± 0,75
20 (19)	± 0,75
25	± 1,25
31,5	± 1,25
40 (38)	± 1,5
50	± 1,5
63	± 1,5
80 (76)	± 2,0
100 (102)	± 2,0

NOTE — The numbers in brackets are alternatives.

If special cases call for extra sizes:

a) for smaller or larger dimensions, further numbers shall be chosen from the R 10 series of preferred numbers (see ISO 3), with tolerances as specified in ISO 1307;

b) for intermediate dimensions, numbers shall be chosen from the R 20 series of preferred numbers (see ISO 3), with the tolerances as given for the next-larger size.

5.2 Length

The tolerance on cut lengths of hose shall be as specified in ISO 1307.

5.3 Minimum thickness of lining and cover

When determined in accordance with ISO 4671, the minimum thickness of the lining and cover shall be as specified in table 2.

Table 2 — Minimum thickness of lining and cover

Values in millimetres

Type	1	2	3	4	5	6	7
Lining	1,0	1,0	1,0	1,5	1,5	2,0	2,0
Cover	1,5	1,5	1,5	2,0	2,0	2,5	2,5

6 Physical properties of lining and cover materials

6.1 Sampling

Samples shall be taken, where possible, from the actual hose.

6.2 Tensile strength and elongation at break of lining and cover

When determined in accordance with ISO 37, the tensile strength and elongation at break shall not be less than the values given in table 3.

Table 3 — Tensile strength and elongation at break

Hose type	Hose component	Tensile strength MPa	Elongation at break %
1	Lining	5,0	200
	Cover	7,0	250
2, 3, 4, 5, 6, 7	Lining	7,0	250
	Cover	10,0	300

6.3 Accelerated ageing

After ageing for 3 days at a temperature of 100 °C as specified in ISO 188, the tensile strength of the lining and cover as determined by ISO 37 shall not vary by more than ± 25 % and the elongation at break of the lining and cover shall not vary by more than ± 50 % of the initial values.

6.4 Resistance to liquids

6.4.1 Types 2, 4 and 6

After immersion in Oil No. 1 as described in ISO 1817, at 70 °C for 72 h, specimens of the lining shall show no shrinkage and the increase in volume shall not exceed 15 % when determined by the gravimetric method specified in ISO 1817.

6.4.2 Types 3, 5 and 7

After immersion in Oil No. 3 as described in ISO 1817, at 70 °C for 72 h, specimens of the lining and cover shall show no shrinkage and the increase in volume shall not exceed 30 % for the lining and 75 % for the cover when determined by the gravimetric method specified in ISO 1817.

7 Performance requirements

7.1 General

All tests shall be carried out on hose samples cut from full manufactured lengths.

7.2 Hydrostatic requirements

When tested in accordance with ISO 1402, the hose shall meet the requirements of table 4.

7.3 Adhesion

When determined in accordance with ISO 8033, the adhesion between the various components shall not be less than 1,5 kN/m for type 1 and 2,0 kN/m for all other types.

7.4 Ozone resistance

When tested in accordance with ISO 7326:1991, method 2, the test piece shall show no signs of cracking.

7.5 Low-temperature flexibility

When tested in accordance with ISO 4672:—[1], method B, the hose shall show no signs of cracks and shall pass the proof pressure test as specified in 7.2 and table 4.

The test shall be carried out at a temperature of

– 25 °C for class A hose;

– 40 °C for class B hose.

7.6 Deformation on bending

When tested in accordance with ISO 1746:1983, method A, using $C = 10$ times the nominal bore, the minimum coefficient of deformation T/D shall be 0,8.

Table 4 — Hydrostatic-pressure requirements

Hose type	Working pressure	Proof pressure	Minimum bursting pressure	Change in dimensions at proof pressure	
	MPa	MPa	MPa	Length	Diameter
1, 2, 3	1,0	2,0	4,0	± 5 %	± 5 %
4 and 5	1,6	3,2	6,4	± 5 %	± 5 %
6 and 7	2,5	5,0	10,0	± 5 %	± 5 %

1) To be published. (Revision of ISO 4672:1988)

8 Marking

The hose shall be continuously and durably marked, at least every metre, with the following information:

a) the manufacturer's name or identification;

b) the manufacturer's product identification (optional);

c) the number of this International Standard;

d) the hose type and class;

e) the nominal bore;

f) the maximum working pressure in MPa, if not included in d);

g) the quarter (using 1Q, 2Q, 3Q, or 4Q) and the year of manufacture (using four digits).

EXAMPLE: MAN-ISO 2398-1A-25 mm-1 MPa-4Q 1995.

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ICS 23.040.70

Descriptors: rubber products, compressed air circuits, hoses, rubber hoses, classification, specifications, performance, dimensions, dimensional tolerances, marking.

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