INTERNATIONAL STANDARD

ISO 4079

Second edition
1991-09-15

Rubber hoses and hose assemblies — Textile-reinforced hydraulic type — Specification

Tuyaux et flexibles en caoutchouc — Type hydraulique à armature textile — Spécifications

Reference number
ISO 4079:1991(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 4079 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Sub-Committee SC 1, *Hoses (rubber and plastics)*.

This second edition cancels and replaces the first edition (ISO 4079:1978), of which it constitutes a technical revision.

International Organization for Standardization
Case Postale 56 • CH-1211 Genève 20 • Switzerland
Printed in Switzerland

Rubber hoses and hose assemblies — Textile-reinforced hydraulic type — Specification

1 Scope

This International Standard specifies requirements for four types of textile-reinforced rubber hose and hose assembly of internal diameter from 5 mm to 100 mm for use with common hydraulic fluids, such as mineral oils, soluble oils, oil and water emulsions, aqueous glycol solution, and water, at temperatures ranging from − 40 °C to + 100 °C.

The standard does not include requirements for end fittings. It is limited to the performance of the hoses and hose assemblies.

NOTE 1 The hoses are not suitable for use with castor-oil-based and ester-based fluids. Operating temperatures in excess of 93 °C may materially reduce the life of the hose.

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

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 4672:1988, *Rubber and plastics hoses — Sub-ambient temperature flexibility tests.*

ISO 6803:1984, *Rubber or plastics hoses and hose assemblies — Hydraulic pressure impulse test without flexing.*

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

ISO 7751:—[1], *Rubber and plastics hoses and hose assemblies — Ratios of proof and burst pressure to design working pressure.*

ISO 8033:1985, *Rubber and plastics hose — Determination of adhesion between components.*

3 Types

Four types of hose are specified, distinguished by their design working pressure (see table 2) and minimum bend radius (see table 3).

Types 1 and 2 shall be constructed with one textile yarn braid, type 3 with two textile yarn braids and type 4 with either one or two textile yarn braids.

4 Materials and construction

4.1 The hoses shall consist of an oil- and water-resistant synthetic rubber tube, one or more layers of suitable textile yarn and an oil and weather-resistant rubber cover.

4.2 The hose shall be concentric in accordance with the following:

The measurements of the wall thickness at different points shall not differ by more than the following values:

1) To be published. (Revision of ISO 7751:1983)

— up to and including 6,3 mm nominal bore: 0,8 mm;

— over 6,3 mm up to and including 19 mm nominal bore: 1,0 mm;

— over 19 mm nominal bore: 1,3 mm.

5 Dimensions

The bore diameter and outside diameter of the hose shall meet the requirements of table 1 when measured in accordance with ISO 4671.

NOTE 2 ISO 1307:1983, *Rubber and plastics hoses — Bore diameters and tolerances on length*, has not been followed for nominal bore or permitted range. The dimensions adopted in table 1 are to ensure compatibility with fittings that are in wide use throughout the world.

6 Hydrostatic requirements

6.1 The design working pressure of the hoses shall comply with the requirements of table 2, when tested in accordance with ISO 1402. The ratios of design working pressure to proof pressure and to minimum burst pressure shall be in accordance with category No. 3 of ISO 7751.

6.2 When tested in accordance with ISO 1402, the change in length of hose at the design working pressure shall not exceed + 2 % to − 4 %.

Table 1 — Bore diameter and outside diameter of hose

Dimensions in millimetres

Nominal bore	Bore diameter		Outside diameter of hose							
	(All types)		Type 1		Type 2		Type 3		Type 4	
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.
5	4,5	5,4	10,3	11,9	11,0	12,6	11,9	13,5	12,0	13,6
6,3	6,1	6,9	11,9	13,5	12,6	14,2	13,5	15,1	13,6	15,2
8	7,7	8,5	13,5	15,1	14,1	15,7	16,7	18,3	16,2	17,8
10	9,3	10,1	15,1	16,7	15,7	17,3	18,3	19,8	17,7	19,3
12,5	12,3	13,5	19,0	20,6	18,7	20,7	23,0	24,6	20,7	22,7
16	15,4	16,7	22,2	23,8	22,9	24,9	26,2	27,8	24,9	26,9
19	18,6	19,8	—	—	26,0	28,0	31,0	32,5	28,0	30,0
25	25,0	26,4	—	—	32,9	35,9	36,9	39,3	34,4	37,4
31,5	31,3	33,0	—	—	—	—	42,9	46,0	41,0	44,0
38	37,1	39,1	—	—	—	—	—	—	47,6	51,6
51	49,8	51,8	—	—	—	—	—	—	60,3	64,3
60	58,8	61,2	—	—	—	—	—	—	70,0	74,0
80	78,8	81,2	—	—	—	—	—	—	91,5	96,5
100	98,6	101,4	—	—	—	—	—	—	113,5	118,5

Table 2 — Design working pressure

Nominal bore	Design working pressure							
	Type 1		Type 2		Type 3		Type 4	
mm	MPa	bar	MPa	bar	MPa	bar	MPa	bar
5	3,4	34	8,0	80	10,3	103	16,0	160
6,3	2,8	28	7,5	75	8,6	86	14,5	145
8	2,8	28	6,8	68	8,3	83	13,0	130
10	2,8	28	6,3	63	7,8	78	11,0	110
12,5	2,8	28	5,8	58	6,9	69	9,3	93
16	2,4	24	5,0	50	6,0	60	8,0	80
19	—	—	4,5	45	5,2	52	7,0	70
25	—	—	4,0	40	3,9	39	5,5	55
31,5	—	—	—	—	2,6	26	4,5	45
38	—	—	—	—	—	—	4,0	40
51	—	—	—	—	—	—	3,3	33
60	—	—	—	—	—	—	2,5	25
80	—	—	—	—	—	—	1,8	18
100	—	—	—	—	—	—	1,0	10

7 Minimum bend radius

The hoses shall be capable of performing at design working pressure when curved to a radius not less than that given in table 3 as measured on the inside of the bend.

NOTE 3 Should any portion of the hose be curved to a radius less than the specified bend radius, performance capability of the hose is reduced.

Table 3 — Minimum bend radius

Dimensions in millimetres

Nominal bore	Bend radius			
	Type 1	Type 2	Type 3	Type 4
5	50	35	80	40
6,3	65	40	80	45
8	80	50	100	55
10	80	60	100	70
12,5	100	70	125	85
16	125	90	140	105
19	—	110	150	130
25	—	150	205	150
31,5	—	—	255	190
38	—	—	—	240
51	—	—	—	300
60	—	—	—	400
80	—	—	—	500
100	—	—	—	600

8 Tolerances on hose length

8.1 The hoses shall be supplied in lengths as specified by the purchaser, subject to a tolerance on the specified lengths of ± 1 % or ± 3 mm, whichever is the greater.

8.2 When no specific hose lengths have been ordered, the percentages of different lengths in any given delivery shall be as follows:

— over 13 m: not less than 65 % of total length;

— 7,5 m to 13 m: not more than 35 % of total length;

— 1 m to 7,5 m: not more than 10 % of total length.

No length shall be less than 1 m.

9 Impulse test requirements (not applicable to type 1)

9.1 Four unaged samples of hose with end fittings shall be tested in accordance with the method specified in ISO 6803.

9.2 The hoses or hose assemblies, when tested at 133 % of the design working pressure for hoses of nominal bore 25 mm and smaller, and at 100 % of the working pressure for nominal bore 31,5 mm and above, at a temperature of 93 °C ± 3 °C, shall withstand a minimum of 200 000 impulse cycles.

There shall be no leakage or other malfunction after the specified number of cycles.

Leakage at the end-fitting, fitting blow-off or rupture of the hose adjacent to the fitting shall be considered as failures in the performance of the assembly. Such failures do not necessarily demonstrate an inability of the hose to meet the specified requirements with an alternative fitting.

The mode and position of any failures shall be recorded.

NOTE 4 If an impulse test is unavoidably stopped for a period of more than 24 h before completion of the minimum number of cycles, slight seepage of test fluid may occur at the hose/fitting junction upon restarting the test. Such seepage, provided that it seals itself within 30 min of the re-start, is not deemed to constitute a failure.

10 Leakage

Unaged hose assemblies on which the end fittings have been attached for less than 30 days shall be subjected to a hydrostatic pressure equal to 70 % of the specified minimum burst pressure for a period of 5 min to 5,5 min and then reduced to zero, after which the 70 % of minimum burst pressure shall be reapplied for another 5 min. There shall be no leakage or evidence of failure. This test shall be considered a destructive test and the sample shall be destroyed.

11 Cold flexibility requirements

When tested in accordance with method B of ISO 4672 at a temperature of −40 °C ± 2 °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 (see 6.1) after regaining ambient temperature.

12 Oil resistance

The lining and cover, when tested by the method specified in ISO 1817, immersed in oil No. 3 for (72 $^{0}_{2}$) h at a temperature of 100 °C ± 1 °C, shall show no shrinkage and shall not show volume swelling greater than 100 %.

13 Ozone resistance

When tested in accordance with ISO 7326, no cracking or deterioration of the cover shall be visible at a magnification of × 2, after exposure to an ozone concentration of 50 pphm (V/V) ± 5 pphm (V/V) at 40 °C ± 2 °C for (72 $^{0}_{2}$) h.

14 Adhesion between components

When tested in accordance with ISO 8033, adhesion between lining and reinforcement, between reinforcement layers and between cover and reinforcement shall be not less than 1,4 kN/m. Test pieces shall be type 1 or type 4, dependent upon hose size, as described in the table for test piece selection in ISO 8033.

15 Marking

Hoses and hose assemblies complying with this International Standard shall be marked with at least the following information:

a) the number of this International Standard (ISO 4079);

b) the hose type;

c) the nominal bore size;

d) the manufacturer's name or trademark;

e) the date of manufacture, i.e. quarter and last two digits of year of manufacture.

EXAMPLE: ISO 4079/Type 1/19/XXXX/4.91

Other information as agreed between the purchaser and the manufacturer shall be included, if requested.