INTERNATIONAL STANDARD

ISO 5772

First edition
1998-12-15

Rubber hoses and hose assemblies for measured fuel dispensing — Specification

Tuyaux et flexibles en caoutchouc pour distribution mesurée de carburants — Spécification

Contents

Page

1 Scope 1

2 Normative references 1

3 Materials and construction 2

4 Pressure requirements 2

5 Dimensions and tolerances 2

6 Physical properties 3

7 Electrical resistance of assemblies 5

8 Frequency of testing 5

9 Marking 6

Annex A (normative) **End-fitting pull-off test** 7

Annex B (normative) **Method for determination of adhesion between components** 8

International Organization for Standardization
Case postale 56 • CH-1211 Genève 20 • Switzerland
Internet iso@iso.ch

Printed in Switzerland

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 5772 was prepared by Technical Committee ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Hoses (rubber and plastics)*.

It cancels and replaces ISO 5772-1:1986, which has been technically revised.

Annexes A and B form an integral part of this International Standard.

Rubber hoses and hose assemblies for measured fuel dispensing — Specification

1 Scope

This International Standard specifies the requirements for three types of rubber hose and hose assembly used for measured fuel dispensing, including oxygenated fuels (up to a maximum of 15 % oxygenated compounds).

The three types of hose are as follows:

a) type 1: hoses with textile reinforcement suitable for reeling on a drum or hanging in bends;

b) type 2: hoses with textile and helical wire reinforcement designed for torsional flexibility, suitable for coiling, reeling on a drum or hanging in bends;

c) type 3: hoses with fine wire reinforcement designed for low dilation, suitable for reeling on a drum or hanging in bends.

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

ISO 188:1998, *Rubber, vulcanized or thermoplastic — Accelerated ageing and 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 1746:1998, *Rubber or plastics hoses and tubing — Bending tests.*

ISO 1817:—[1)], *Rubber, vulcanized — Determination of the effect of liquids.*

ISO 4649:1985, *Rubber — Determination of abrasion resistance using a rotating cylindrical drum device.*

ISO 4672:1997, *Rubber and plastics hoses — Sub-ambient temperature flexibility tests.*

1) To be published. (Revision of ISO 1817:1985)

ISO 6801:1983, *Rubber or plastics hoses — Determination of volumetric expansion.*

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

ISO 8031:1993, *Rubber and plastics hoses and hose assemblies — Determination of electrical resistance.*

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

3 Materials and construction

The hose shall consist of the following:

— a smooth, fuel-resistant lining of rubber or thermoplastic elastomer (TPE);

— a suitable reinforcement;

— a non-corrugated, fuel- and weather-resistant rubber or TPE cover.

Coupled hose assemblies shall be capable of conducting an electrical charge from coupling to coupling.

When this capability is provided by means of metallic wires, not less than two (crossed) metallic bonding wires shall be embedded in the hose, and the metal used shall have a high resistance to fatigue, work hardening and corrosion.

Hoses with metallic wires for electrical conductivity shall be designated "M" and those using conductive compounds shall be designated "Ω", the relevant mark being branded on the hose (see clause 9).

NOTE Non-reusable corrosion-resistant couplings should preferably be used for this application.

4 Pressure requirements

For all types of hose, the following shall apply:

- maximum working pressure 1,2 MPa (12 bar)
- proof pressure 2,4 MPa (24 bar)
- minimum bursting pressure 4,8 MPa (48 bar)

5 Dimensions and tolerances

5.1 Internal diameter

The internal diameter of the hose shall comply with the dimensions given in table 1.

5.2 Minimum thickness of lining and cover

The thickness of the lining shall be not less than 1,6 mm.

The thickness of the cover shall be not less than 1,0 mm.

5.3 Cut lengths

For cut lengths, the tolerances on length shall comply with ISO 1307.

Table 1 — Nominal bores, internal diameters and tolerances

Nominal bore	Internal diameter mm	Tolerance mm
12 16 19	12,5 16,0 19,0	± 0,8
21 25 32 38 40	21,0 25,0 32,0 38,0 40,0	± 1,25

6 Physical properties

The physical properties of the hose shall comply with the requirements given in table 2 when tested by the methods indicated in table 2.

Table 2 — Physical properties of hoses

Property	Unit	Requirement		Test piece	Method of test
Proof pressure		No leakage or other signs of weakness		Full length of hose or hose assembly	ISO 1402 Proof test pressure
Burst pressure, min.	MPa (bar)	4,8 (48)		Short length cut from hose or hose assembly	ISO 1402 Burst pressure
Volumetric expansion, max. Types 1 and 2 Type 3	%	 2 1		Hydrostatic test piece	ISO 6801 Test pressure 0,3 MPa (3 bar)
Adhesion between components on: a) unaged hoses, min. b) aged hoses, min.	kN/m	 2,4 1,8		Short length cut from hose	ISO 8033 For conditioning, see annex B
Ambient-temperature flexibility		$T/D \geqslant 0,8$		Short length cut from hose	ISO 1746 Nominal diameter $C = 10 \times$ nominal bore
Low-temperature flexibility		No cracks or breaks		Short length cut from hose	ISO 4672 (method B) Test temperature – 25 °C (– 40 °C if requested) (see note 1)
Tensile strength, min. Lining Cover	MPa	Rubber 7 7	TPE 12 12	Test piece cut from hose or from test sheet (see note 2)	ISO 37
Elongation at break, min. Lining Cover	%	Rubber 250 250	TPE 350 350	Test piece cut from hose or from test sheet (see note 2)	ISO 37

Table 2 — Physical properties of hoses *(concluded)*

Property	Unit	Requirement		Test piece	Method of test
Accelerated ageing:		Rubber	TPE	Test piece cut from hose or from test sheet (see note 2)	ISO 188 14 days at 70 °C ± 1 °C
Tensile-strength change for lining and cover, max.		– 20	– 10		
Elongation at break change for lining and cover, max.		– 35	– 20		
Abrasion resistance (cover compound)	mm^3	500		Test piece from moulded test sheet of cover compound	Method A of ISO 4649
Resistance to liquids				Test piece cut from hose or from test sheet (see note 2)	ISO 1817
Lining swell, max.	%	+ 50			70 h at 23 °C in liquid C
		+ 70			70 h at 40 °C in type 3 oxygenated fuel
		+ 25			70 h at 100 °C in oil No. 3
Lining extracted matter, max.	%	+ 5			70 h at 23 °C in liquid C
		+ 10			70 h at 40 °C in type 3 oxygenated fuel
Cover swell, max.	%	+ 100			70 h at 23 °C in liquid B
Ozone resistance of cover		No cracks under × 2 magnification		Short length of hose	ISO 7326 Method 1 or method 2, depending on bore size
Electrical resistance using electrically conducting compounds (see also clause 7) max.	Ω/length	1×10^6		Full length of hose	ISO 8031 Without liquid inside; hose in straight position
Pull-off test		No movement of end fitting after removal of force		Short length of hose assembly	Annex A

NOTE 1 This test (method B of ISO 4672:1997) does not measure the force required to bend the hose. Future work will provide appropriate limits for this force, and may involve modifications of the test.

NOTE 2 The test report shall indicate the source of the test piece.

NOTE 3 Liquid-permeation test and appropriate limits are still to be finalized.

7 Electrical resistance of assemblies

When determined using the method described in ISO 8031, the electrical resistance of an assembly from coupling to coupling shall be not more than 10^6 Ω.

8 Frequency of testing

Minimum frequencies of testing shall comply with the schedule given in table 3.

Type approval tests are those tests required to obtain type approval.

Routine tests are those carried out on each finished length of hose or hose assembly.

Table 3 — Minimum test frequency

Property	Type approval tests	Routine tests
Compound tests		
Tensile strength and elongation at break (lining and cover)	X	NA
Accelerated ageing	X	NA
Swelling in fuel (lining and cover)	X	NA
Matter extracted from lining	X	NA
Abrasion of cover	X	NA
Hose tests		
Adhesion between components	X	NA
Ambient-temperature flexibility	X	NA
Matter extracted from lining	X	NA
Low-temperature flexibility	X	NA
Measurement of internal diameter	X	X
Measurement of thickness (lining and cover)	X	X
Proof pressure	X	X
Bursting pressure	X	NA
Ozone resistance of cover	X	NA
Electrical resistance	X	X
Permeability to liquids	X	NA
Volumetric expansion	X	NA
Hose-assembly tests		
Proof pressure	X	X
Electrical resistance	X	X
Pull-off test	X	NA
X = Test carried out NA = Not applicable		