INTERNATIONAL STANDARD

ISO 6806

Second edition
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Rubber hoses and hose assemblies for use in oil burners — Specification

Tuyaux et flexibles en caoutchouc pour brûleurs — Spécifications

Reference number
ISO 6806:1992(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 6806 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 6806:1984), clauses 1 and 2 , tables 3 and 4, sub-clause 6.2 and annex C of which have been technically revised.

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

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Rubber hoses and hose assemblies for use in oil burners — Specification

1 Scope

This International Standard specifies the minimum requirements for rubber hoses and hose assemblies for use in oil burners.

Two types of hose assembly are specified:

— Type 1: Hose assemblies for flux and reflux, but not for insertion between the oil burner pump and the atomizing connection; maximum working pressure 1,0 MPa (10 bar); maximum oil temperature 100 °C.

— Type 2: Hose assemblies for insertion between the oil burner pump and the atomizing connection; working pressure 4,0 MPa (40 bar); maximum oil temperature 100 °C.

NOTE 1 The hose assemblies specified in this International Standard should not be used, without special assessment, for purposes other than oil burner installations.

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

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

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

ISO 1307:1983, *Rubber and plastics hoses — Bore diameters and tolerances on length.*

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

ISO 1436:1991, *Rubber hoses and hose assemblies — Wire-reinforced hydraulic type — Specification.*

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

3 Construction

Hoses in accordance with this International Standard shall consist of either

a) an internally smooth rubber lining and an external corrosion-resistant metal braid; or

b) an internally smooth rubber lining, a reinforcement consisting of one or more layers of textile or corrosion-resistant metal braid and a rubber outer cover.

The hoses shall be fitted with permanently attached couplings.

Both the couplings and the metal braid shall be provided with suitable corrosion protection. The metals used shall not have any deleterious effects on the rubber components.

4 Dimensions and tolerances

4.1 Bore

The bore of the hose shall be in accordance with the nominal dimensions and tolerances given in table 1, which is in accordance with ISO 1307.

4.2 Bending radii

The hoses shall not be used at bending radii, measured at the inside of the bend, smaller than the minimum bending radii specified in table 2.

4.3 Thickness of lining and cover

When measured in accordance with ISO 4671, the minimum thickness of the lining and cover shall be not less than 1,7 mm and 1,3 mm, respectively.

5 Physical requirements for lining and cover

When tested in accordance with the methods of test indicated, the lining and cover shall comply with the requirements of table 3.

Table 1 — Nominal bore

Dimensions in millimetres

Nominal bore	Tolerance
5	± 0,5
6,3 8 10 12,5 16 20	± 0,75
25	± 1,25

Table 2 — Minimum bending radii

Dimensions in millimetres

Nominal bore	Minimum bending radius
5	50
6,3	60
8	75
10	80
12,5	105
16	120
20	145
25	165

Table 3 — Physical requirements for lining and cover

Property	Requirement	Method of test
Tensile strength (lining and cover)	8,0 MPa	ISO 37
Elongation at break (lining and cover)	250 % min.	ISO 37
Accelerated ageing:		ISO 188:
Change in tensile strength (lining and cover)	30 % max.	3 days at 100 °C ± 1 °C
Change in elongation at break (lining and cover)	35 % max.	3 days at 100 °C ± 1 °C
Oil resistance:		ISO 1817:
Volume change:		$(72\ ^{0}_{-2})$ h in No. 3 oil
– lining	– 5 % to + 15 %	at 70 °C ± 1 °C for type 1
– cover	– 5 % to + 60 %	at 125 °C ± 2 °C for type 2
Hardness change:[1]		
– lining	± 10 IRHD	ISO 48

1) No initial hardness is specified, but a limit on hardness change after oil immersion is included to ensure that a lining with adequate oil resistance is employed.

6 Physical requirements for hoses and hose assemblies

6.1 Hydrostatic tests

6.1.1 Proof pressure test

When tested in accordance with the method specified in ISO 1402 to the proof test pressure specified in table 4, the hose assembly shall show no signs of leakage or distortion or movement of the couplings.

6.1.2 Burst test

When tested in accordance with the method specified in ISO 1402, the hose assembly shall show no signs of leakage or failure before the minimum burst pressure specified in table 4 has been attained.

Table 4 — Hydrostatic pressure requirements

Parameter	Pressure requirements			
	Type 1		Type 2	
	MPa	bar	MPa	bar
Maximum design working pressure	1,0	10	4,0	40
Proof test pressure	2,0	20	8,0	80
Minimum burst pressure	4,0	40	16,0	160

6.2 Oil swell

When tested in accordance with the method specified in annex A, the reduction in the internal diameter of the hose shall not exceed 10 %.

6.3 External pressure test

When tested in accordance with the method specified in annex B, the reduction in the external diameter of the hose shall not exceed 6 %.

6.4 Low-temperature flexibility

When tested in accordance with method B of ISO 4672, at a temperature of $-40\ °C \pm 2\ °C$, the hose shall not crack and shall show no signs of leakage when subsequently proof pressure tested in accordance with 6.1.

6.5 Flammability

When tested in accordance with the method specified in annex C, the hose shall show no signs of leakage.

6.6 Ozone resistance (cover only)

When tested in accordance with ISO 7326, there shall be no signs of cracking.

6.7 Impulse test

When tested in accordance with the method specified in annex D, there shall be no leakage or damage after 30 000 cycles.

7 Marking

Hose assemblies complying with the requirements of this International Standard shall be marked with the following information:

a) the number of this International Standard;

b) the nominal bore size;

c) the type number;

d) the manufacturer's mark or reference;

e) the quarter and year of manufacture.

Annex A
(normative)

Determination of oil swell

Measure the internal diameter in accordance with ISO 4671 of a hose of length at least 500 mm. Fill the hose assembly with No. 3 oil as specified in ISO 1817 and condition it for 28 days at 100 °C with the ends sealed. At the end of this period, re-measure the internal diameter of the hose and express the result as a percentage change from the original.

Annex B
(normative)

Determination of resistance to external pressure

Measure the free length l between the fittings of a hose assembly of length about 500 mm. Seal one end and attach the other end to a connector inside a pressure vessel. Connect the other end of the connector to a calibrated glass standpipe (see figure B.1).

Close the pressure vessel, fill the hose assembly and standpipe with water, free from entrained air, and condition for 1 h at 70 °C. Apply a pressure of 0,06 MPa ± 0,005 MPa (0,6 bar ± 0,05 bar) within the pressure vessel and, after 5 min, read the change in the level of the meniscus, Δh, in the standpipe.

Calculate the reduction in the internal diameter of the hose assembly, expressed as a percentage, using the formula

$$\frac{d_k^2 \times \Delta h}{d_s^2 \times l} \times 100$$

where

d_k is the internal diameter, in millimetres, of the standpipe;

d_s is the internal diameter, in millimetres, of the hose;

Δh is the change in the level, in millimetres, of the meniscus;

l is the free length, in millimetres, of the hose.

The internal diameter of the standpipe shall be selected so that the meniscus does not rise by more than 150 mm above the lowest point of the hose assembly.

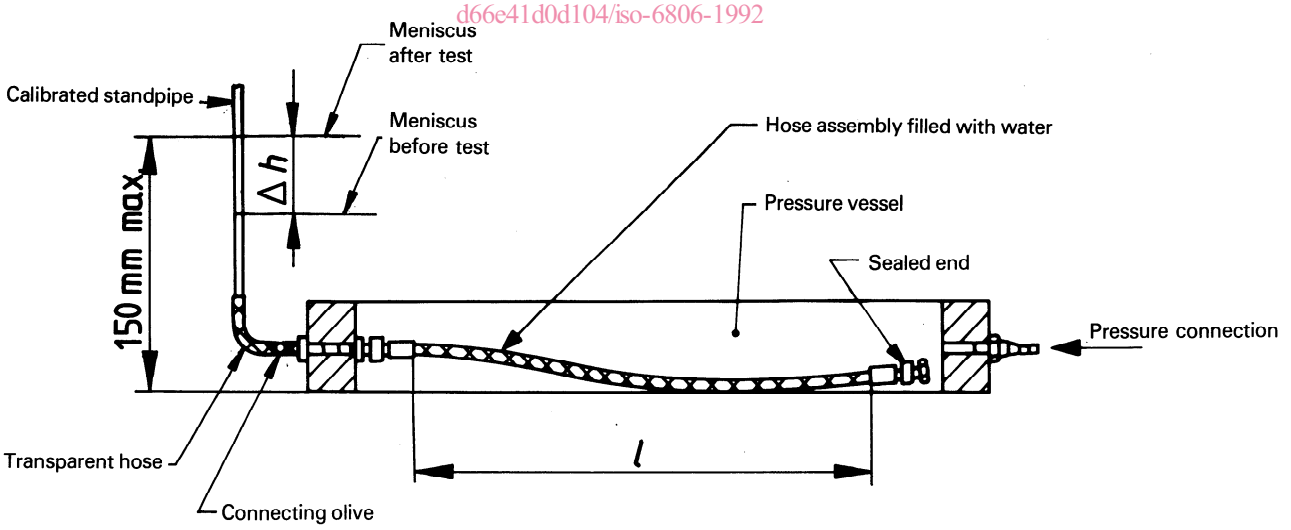

Figure B.1 — Apparatus for determination of resistance to external pressure

Annex C
(normative)

Determination of flammability

Seal one end of a hose assembly of length about 1 000 mm. Fill the assembly to about 90 % of its volume with No. 3 oil as specified in ISO 1817 and connect the assembly to a water pressure standpipe. Bend the assembly as shown in figure C.1 and, using laboratory clamps, fix it in this position.

Apply internal water pressure to the assembly. The water pressure shall be 0,5 MPa (5 bar) for type 1 hose assemblies and 4,0 MPa (40 bar) for type 2 hose assemblies.

Expose the lowest bent portion of the hose assembly for 5 min to the flame of a Bunsen burner burning propane gas at a temperature of 675 °C ± 75 °C. The nominal inside diameter of the burner tube shall be 10 mm and the air inlet shall be closed. The pressure of the propane gas fed to the Bunsen burner shall be approximately 5 kPa (50 mbar). Use a burner tip of frustum shape to stabilize the flame.

WARNING — Attention is drawn to the potential fire hazard associated with hose failing to meet the requirements of this test. Adequate precautions shall be taken to restrict the spread of fire and to ensure the safety of personnel in the event of failure.

Dimensions in millimetres

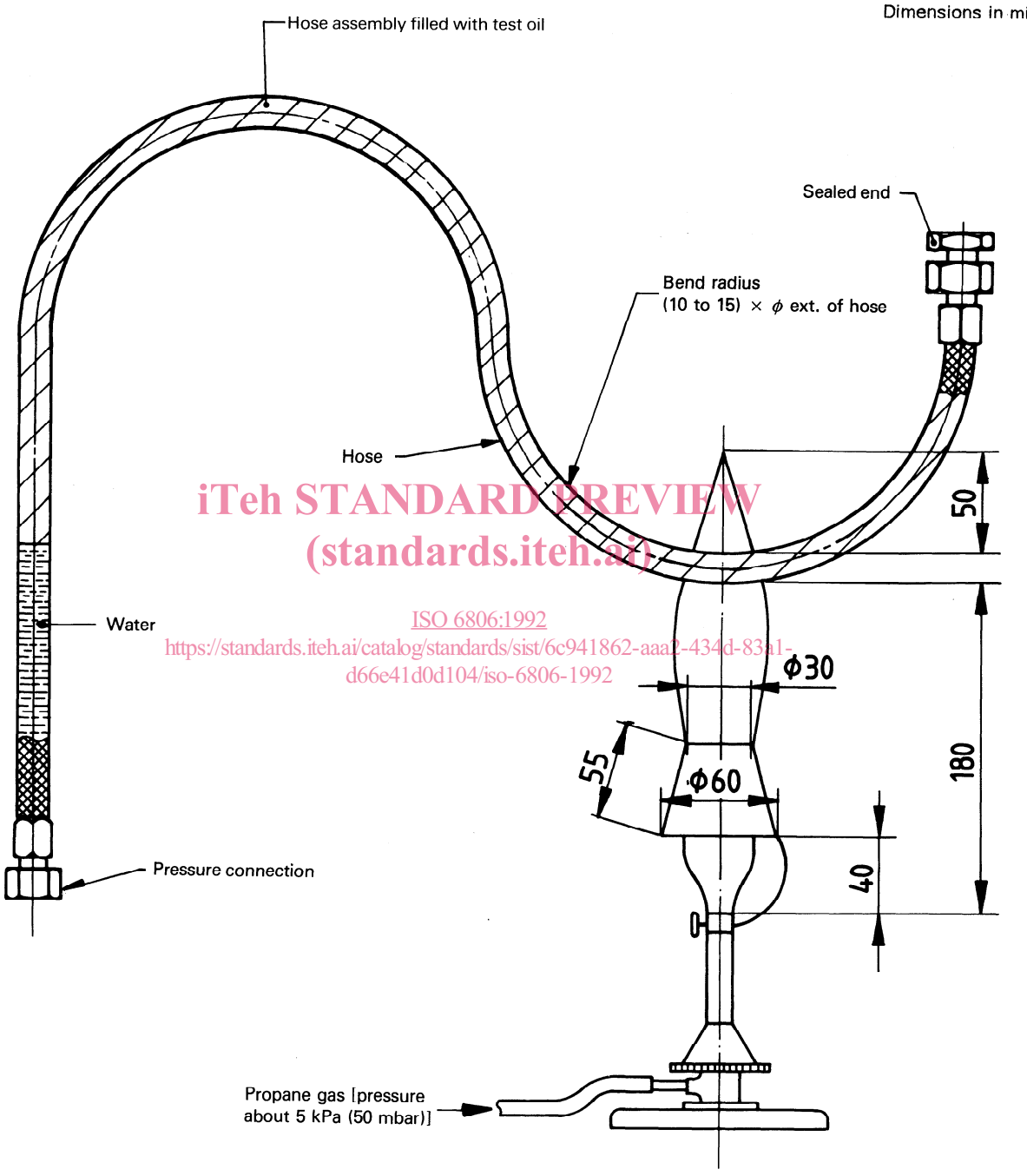

Figure C.1 — Arrangement for flammability test