International Standard 7840

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Small craft — Fire resistant fuel hoses

Navires de plaisance — Tuyaux souples résistants au feu, pour carburant

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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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council. They are approved in accordance with ISO procedures requiring at least 75 % approval by the member bodies voting.

International Standard ISO 7840 was prepared by Technical Committee ISO/TC 188, *Pleasure boats*.

Users should note that all International Standards undergo revision from time to time and that any reference made herein to any other International Standard implies its latest edition, unless otherwise stated.

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Small craft — Fire resistant fuel hoses

1 Scope and field of application

This International Standard specifies general requirements and physical tests for fire resistant hoses for conveying petrol and diesel oil, designed for a working pressure not exceeding 0,34 MPa for hoses with nominal bore up to and including 10 mm and 0,25 MPa for hoses with larger bore.

It applies to hoses for small craft with permanently installed inboard engines.

2 References

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

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

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

ISO 7233, *Rubber and plastics hoses and hose assemblies — Vacuum resistance — Methods of test.*

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

ISO 8469, *Small craft — Non-fire-resistant fuel hoses.*[1)]

3 General requirements

Hoses complying with this International Standard shall present a seamless, smooth inner surface, free from pores, other defects and chemical contaminants.

The nominal bore shall be in accordance with clause 4. Hoses shall demonstrate suitability for marine use by complying with the requirements of the tests in clause 5. They shall be marked according to clause 6.

4 Nominal bore

Table 1 gives a range of nominal bores, based on series R 10 of ISO 3, with their corresponding tolerance.

Table 1 — Nominal bores and tolerances

Nominal bore, *d* mm	Tolerance mm
3,2 4 5	± 0,5
6,3 8 10 12,5 16 20	± 0,75
25 31,5	± 1,25
40 50 63	± 1,50

5 Physical tests on finished hose

5.1 Bursting pressure

Fill three hoses or test pieces from the hoses with Standard Immersion Liquid C, as specified in ISO 1817, and store them for 7 days in air at standard laboratory temperature.

Empty the liquid out and fill the hoses or test pieces with cold water; subject them to bursting pressure, as described in ISO 1402.

The bursting pressure shall be at least 1 MPa.

5.2 Vacuum collapse test

Carry out the test in accordance with ISO 7233, method A, using the test conditions specified in table 2.

1) At present at the stage of draft.

Table 2 — Pressure conditions for the vacuum collapse test

Nominal bore, d mm	Pressure kPa
$d < 10$	80
$12,5 < d < 25$	35
$d > 25$	No test required

The time shall be 15 to 60 s and the diameter of the sphere 0,8 d (nominal bore).

5.3 Volume change in liquid C

Determine the change in volume of the hose by the procedure described in ISO 1817.

Place the test pieces in liquid C at standard laboratory temperature for 70 ± 2 h.

If the hose is made of a homogeneous compound (with or without reinforcements), the swelling in liquid C shall not exceed 30 % by volume. For hose with an inner layer of fuel resistant material and a cover of another material, mainly intended for weather and ozone resistance, the increase in volume in liquid C shall not exceed 30 % for the tube and 120 % for the cover.

5.4 Mass reduction in liquid C

Determine the reduction in mass of the hose by the procedure described in ISO 1817. Treat the test pieces as specified in 5.1 of this International Standard.

The reduction in mass of the hose shall not exceed 8 % of the initial mass of the test pieces.

NOTE — A reduction in mass of 8 % corresponds to a decrease in volume of approximately 10 %.

5.5 Fire resistance

Test a sample of the hose in accordance with the method described in the annex. The hose shall not leak after this test.

5.6 Effect of ozone

When the hose is tested as described in ISO 7326, in the following conditions :

- ozone concentration in air : 0,5 cm^3/m^3
- temperature : 40 ± 2 °C
- elongation : 20 %
- duration : 70 ± 2 h

the sample shall show no visible cracks at X 2 magnification.

6 Marking

To comply with this International Standard a hose shall be marked, at least every 0,3 m, with

- the name or trade mark of the manufacturer or supplier;
- the year of manufacture (the last two figures of the year);
- the words "ISO 7840-MARINE FUEL A".

NOTE — "MARINE FUEL A" is used to designate a fire resistant type of fuel hose. "MARINE FUEL B" is used to designate a non-fire-resistant type of fuel hose (see ISO 8469).

The marking shall be in letters and figures at least 3 mm high and shall withstand washing with ordinary detergents.

Additional information may be included in the marking.

Annex

Fire test

(This annex forms an integral part of the standard.)

A.1 Principle

The hose coupling assembly, filled with the fuel to be transported, is subjected to a flame for 2,5 min, and then to a hydraulic pressure test, when it shall show no leakage.

A.2 Sampling

Three hose samples fitted with their couplings shall be tested in turn.

A.3 Equipment

The test equipment shall be as shown in the figure.

Thermocouples shall be located in the same horizontal plane as the sample, at a distance of 12 mm from the surface of the hose and 25 mm from the end of the hose.

A.4 Test procedure

If the hose is intended to be delivered with couplings, at least one of the couplings shall be located directly above the fuel pan.

Fill the hose with fuel by opening the tank valve; ensure that no air is left in the hose.

Check that the air velocity outside the device does not exceed 0,5 m/s.

Pour heptane into the fuel pan and ignite it. Ensure that at least one coupling is exposed to the flame.

Allow the heptane to burn for 150 s and record temperatures. At the end of the period of 150 s, extinguish the flame.

The test shall be repeated on a new sample if the temperature has not reached 650 °C.

Open the discharge valve so that fuel can flow through the hose under test. As soon as steady flow is achieved, close the valve and submit the hose to a hydrostatic pressure corresponding to 900 mm of fuel. Note any sign of leakage.

A.5 Test report

The test report shall include :

a) a reference to this International Standard;

b) reference to the sample to allow its identification;

c) signs of leakage, if any;

d) any incident likely to have influenced the test results.

Dimensions in millimetres

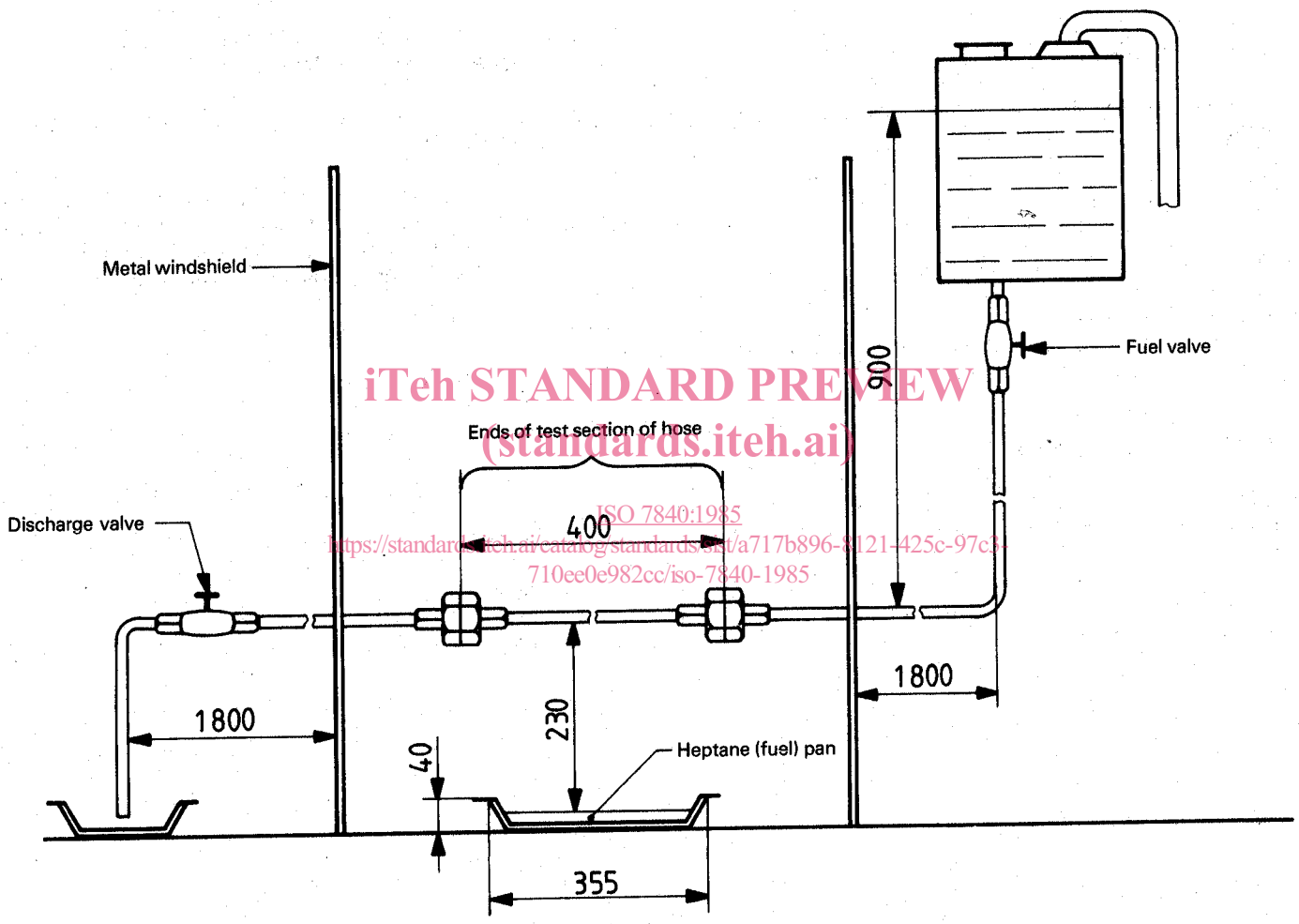

Figure — Fire test equipment