SLOVENSKI STANDARD
oSIST prEN ISO 7840:2020

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Mala plovila - Proti ognju odporne cevi za gorivo (ISO/DIS 7840:2020)

Small craft - Fire-resistant fuel hoses (ISO/DIS 7840:2020)

Kleine Wasserfahrzeuge - Feuerwiderstandsfähige Kraftstoffschläuche (ISO/DIS 7840:2020)

Petits navires - Tuyaux souples pour carburant résistants au feu (ISO/DIS 7840:2020)

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Small craft — Fire-resistant fuel hoses

Petits navires — Tuyaux souples pour carburant résistants au feu

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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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 188, *Small craft*.

This fifth edition cancels and replaces the fourth edition (ISO 7840:2013), which has been technically revised.

The main changes compared to the previous edition are as follows:

— requirements for low permeation fuel hoses have been added;

— clarifies the test fluids for petrol;

— test fixture Figure B.1 has been revised to remove the vented capillary tube.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Small craft — Fire-resistant fuel hoses

1 Scope

This document specifies general requirements and physical tests for fire-resistant hoses for conveying petrol or petrol blended with ethanol, and diesel fuel or diesel fuel blended with FAME, designed for a working pressure not exceeding 0,34 MPa for hoses with inner diameter up to and including 10 mm and 0,25 MPa for hoses up to 63 mm inner diameter in craft of hull length up to 24 m.

It applies to hoses for small craft with permanently installed fuel systems. It does not apply to hoses entirely within the splash well at the stern of the craft connected directly to an outboard engine.

Specifications for non-fire-resistant fuel hoses are given in ISO 8469: 2013 Specifications for permanently installed fuel systems are given in ISO 10088:2013.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1402:2009, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing*

ISO 1817:2015, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 7326:2016, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions*

ISO 10088:2013, *Small craft — Permanently installed fuel systems*

EN 14214:2012, *+ A2:2019, Automotive fuels — Fatty acid methyl esters (FAME) for diesel engines — Requirements and test methods*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
FAME
Fatty Acid Methyl Esters
esters of fatty acids. The physical characteristics of fatty acid esters are closer to those of fossil diesel fuels than pure vegetable oils, but properties depend on the type of vegetable oil

3.2
tube
interior liner of the fuel hose that is normally in contact with the fuel.

4 General requirements

Hoses complying with this International Standard shall present a non-porous, smooth inner surface, free from defects and chemical contaminants.

Hoses shall demonstrate suitability for marine use by complying with the requirements of the tests in Clause 6. Hoses intended to be used for both petrol and diesel fuels must be tested with both test fluids separately in sections requiring preconditioning. They shall be marked according to Clause 7.

5 Hose inner diameter

Table 1 — Inner diameters and tolerances

Dimensions in millimetres

Inner diameter, *d*	Tolerance
3,2 4 5	± 0,5
6,3 7 8 9,5 10 12,5 16 19 20	± 0,75
25 31,5 38	± 1,25
40 50 63	± 1,5

6 Physical tests on finished hose

6.1 General

New samples shall be used for each of the tests below.

6.2 Test liquids

a) Petrol:

1) a mixture by volume of 90 % of liquid C specified in ISO 1817:2015, Table A.1, and 10 % by volume of ethanol.

b) Diesel:

1) a mixture by volume of 90 % liquid F specified in ISO 1817:2015 and 10 % by volume of Fatty.

Acid Methyl Esters (FAME), specified in EN 14214:2008+A2:2019.

6.3 Bursting pressure

Fill three hoses or sample lengths from hoses with the applicable test liquids as specified in 6.2, and store them for 40 days in air at a temperature of 40 °C ± 2 °C. For type 15 fuel hose (see 6.9) the 40 day test period may be reduced to 28 days.

Empty the liquid out and fill the hoses or sample lengths with cold water; subject them to hydrostatic pressure as specified in ISO 1402:2009.

The bursting pressure shall be at least 1,4 MPa for hoses with an inner diameter of 10 mm or less and

1,00 MPa for hoses with an inner diameter of more than 10 mm.

6.4 Vacuum-collapse test

Table 2 — Pressure conditions for the vacuum collapse test

Inner diameter, d mm	**Vacuum** kPa
$d \leq 10$	80
$10 < d \leq 25$	35
$d > 25$	No test required

The test duration shall be 60 s and the diameter of the sphere 0,8 d (inner diameter of the hose). The sphere shall pass freely through the hose while under vacuum.

6.5 Volume change in test liquids

Determine the change of volume of the hose test sample (tube and cover) by the procedure described in ISO 1817:2015. Completely submerge the test pieces in test liquids as specified in 6.2 at a temperature of 40 °C ± 2 °C for 40 days.

If the hose is made of a homogeneous compound (with or without reinforcement), the swelling shall not exceed 35 % by volume, as measured by displacement in water. 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 shall not exceed 35 % for the tube and 120 % for the cover.

6.6 Mass reduction of test hose

Determine the reduction in mass of the inner layer (tube) by the procedure described in ISO 1817:2015. Fill three hoses or submerge test pieces from the hoses with test liquids, as specified in 6.2, and store them for 40 days in air at a temperature of 40 °C ± 2 °C. For type 15 fuel hose (see 6.9) the 40 day test period may be reduced to 28 days.

The reduction in mass of the inner layer 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 %.

6.7 Fire resistance

Test the hose in accordance with the method described in Annex A.