SLOVENSKI STANDARD
oSIST prEN ISO 10088:2020

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Mala plovila - Trajno vgrajeni sistemi za gorivo (ISO/DIS 10088:2020)

Small craft - Permanently installed fuel systems (ISO/DIS 10088:2020)

Kleine Wasserfahrzeuge - Dauerhaft installierte Kraftstoffsysteme (ISO/DIS 10088:2020)

Petits navires - Systèmes à carburant installés à demeure (ISO/DIS 10088:2020)

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47.080	Čolni	Small craft

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Small craft — Permanently installed fuel systems

Petits navires — Systèmes à carburant installés à demeure

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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 10088:2013), which has been technically revised.

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

— permeation test limits and test procedures have been added as an Informative Annex B to serve as a harmonized reference for evaporative emissions.

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 — Permanently installed fuel systems

1 Scope

This International Standard specifies the requirements for the design, materials, construction, installation and testing of permanently installed fuel systems as installed for internal combustion engines.

It applies to all parts of permanently installed diesel and petrol fuel systems as installed, from the fuel fill opening to the point of connection with the propulsion or auxiliary engine(s) on inboard- and outboard-powered small craft of up to 24 m hull length as defined in ISO 8666.

Requirements for the design, materials, construction and testing of permanently installed fixed fuel tanks are given in ISO 21487.

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

ISO 7840:2013, *Small craft — Fire-resistant fuel hoses*

ISO 8469:2013, *Small craft — Non-fire-resistant fuel hoses*

ISO 8846:1990, *Small craft — Electrical devices — Protection against ignition of surrounding flammable gases*

ISO 8666:2016, *Small craft — Principal data*

ISO 10133:2012, *Small craft — Electrical systems — Extra-low-voltage d.c. installations*

ISO 11105:1997, *Small craft — Ventilation of petrol engine and/or petrol tank compartments*

ISO 11192:2005, *Small craft — Graphical symbols*

ISO 13297:2014, *Small craft — Electrical systems — Alternating current installations*

ISO 21487:2012, *Small craft — Permanently installed petrol and diesel fuel tanks*

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
accessible
capable of being reached for inspection, removal or maintenance without removal of permanent craft structure

Note 1 to entry: Hatches are not regarded as permanent craft structures in this sense, even if tools such as wrenches or screwdrivers are needed to open them. Hatches for inspection or maintenance of fuel tanks are permitted to be covered by uncut carpet, provided that all tank fittings can be inspected and maintained through other openings.

3.2
readily accessible
capable of being reached quickly and safely for maintenance or effective use under emergency conditions without the use of tools

3.3
permanently installed
securely fastened so that tools are required for removal

3.4
anti-siphon valve
demand valve which can be opened only by fuel pump suction to withdraw fuel from a tank and which will remain closed when the fuel pump is not operating, preventing siphon action created by a break or leakage at any point in the fuel distribution system

3.5
static floating position
attitude in which the craft floats in calm fresh water according to light craft mass m_{LCC} with each fuel tank filled to rated capacity but excluding all non-permanently attached interior and exterior equipment

Note 1 to entry: Light craft mass m_{LCC} is specified in ISO 8666:2002, 6.3.

[SOURCE: ISO 13590:2003, 3.3, modified]

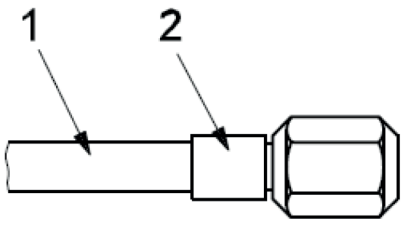
3.6
petrol
hydrocarbon fuel, or blend thereof, which is liquid at atmospheric pressure and is used in spark-ignition engines

3.7
diesel
hydrocarbon fuel, or blend thereof, which is liquid at atmospheric pressure and is used in compression-ignition engines

3.8
spud
rigid pipe or spigot used for the connection of pipes and hoses to tanks or components such as filters and pumps

3.9
swaged sleeve
permanently attached fuel hose end fitting obtained by applying even compression to a metal sleeve or ferrule, sufficient to make the inner lining of the hose take up the shape of the insert and create a pressure seal

Note 1 to entry: See Figure 1.



Key

1 hose

2 sleeve

Figure 1 — Swaged sleeve

3.10
sleeve and threaded insert
permanently attached fuel hose end fitting made by screwing an insert sleeve with threads into the hose and applying even compression to a metal sleeve or ring to secure the hose in place

Note 1 to entry: This type of connection can be made with the sleeve placed on the outside of the hose and then screwing the threaded insert into the inner lining.

3.11
compartment
cabin or enclosure able to be closed to the outside of the craft

3.12
craft's ground
ground which is established by a conducting connection (intended or accidental) with the common ground (potential of the earth's surface), including any conductive part of the wetted surface of the hull

Note 1 to entry: "Ground" is also known as "earth".

3.13
evaporative emissions
fuel emissions that result from permeation of fuel through the fuel system materials or from ventilation of the fuel system

4 General requirements

4.1 Materials and design

4.1.1 Individual components of the fuel system, and the fuel system as a whole, shall be designed to withstand the combined conditions of pressure, vibration, shocks, corrosion and movement encountered under normal operating conditions and storage.

4.1.2 Each component of the fuel system, and the fuel system as a whole, shall be capable of operation within an ambient temperature range of − 10 °C to + 80 °C, without failure or leakage, and be capable of being stored without operation within an ambient temperature range of − 30 °C to + 80 °C, without failure or leakage.

NOTE Thermoplastic tanks and components may be affected by high return fuel temperature. It is therefore important to read the engine installation manual for information.

4.1.3 All materials used in the fuel system shall be resistant to deterioration by its designated fuel and to other liquids or compounds with which it may come into contact under normal operating conditions, e.g. grease, lubricating oil, bilge solvents and sea water.

4.1.4 Petrol engine compartments and petrol tank compartments shall have ventilation and ignition protection in accordance with ISO 11105 and ISO 8846.

4.1.5 The only outlets for drawing fuel from the fuel system shall be

— plugs in petrol filter bowls intended solely for the purpose of servicing the filter,

— plugs or valves in diesel filter bowls intended solely for the purpose of servicing the filter.

NOTE Tank openings are covered by ISO 21487.

4.1.6 Any metal or metallic plated component of a petrol tank and its filling system that is in contact with petrol shall be grounded so that its resistance to the craft's ground is less than 1 Ω.

Grounding wires shall not be installed between a hose and its clamps.

4.1.7 Fuel filling systems shall be designed to avoid blowback of fuel through the fill fitting. Fuel systems shall be tested in accordance with 4.2.3.

4.1.8 Provision shall be made to prevent fuel overflow from the vent opening from entering the craft or the environment.

4.1.9 All fuel system components in engine compartments (e.g. filters, pumps, water separators, and hoses) – excluding permanently installed fuel tanks, which are tested in accordance with ISO 21487 – shall individually, or as installed in the craft, be capable of withstanding a 2,5 min fire test as specified in ISO 7840:2013, Annex A.

Fasteners supporting metal fuel lines constitute an exception to this requirement.

4.1.10 Copper-base alloy fittings may be used for aluminum tanks if protected by a galvanic barrier to reduce galvanic corrosion.

4.1.11 A means to determine the level of fuel in the tank or quantity shall be provided.

4.1.12 Petrol fuel systems must meet evaporative emissions limits set forth in Annex B.

4.2 Testing

4.2.1 After installation, the fuel system as a whole shall pass the pressure test specified in Annex A.

4.2.2 Small components of the fuel system (e.g. filters, pumps, water separators, and hoses), required to be fire tested according to 4.1.9, shall be tested as specified in ISO 7840:2013, Annex A, with the lower part mounted 250 mm above the surface of liquid in a pan of which the sides extend beyond the component by 150 mm. The component to be tested shall be a complete assembly and include all accessories intended to be attached directly to the component.

4.2.3 There shall be no blow back of fuel through the fill fitting when filling at a rate of 30 l/min from 25 % to 75 % of the capacity on the tank label. For fuel tanks of 100 l capacity or less, the fill rate may be reduced to 20 l/min. (see 4.1.7). The test to determine compliance with this shall be performed on at least one craft or a representative installation.

4.3 Installation

4.3.1 The fuel system shall be permanently installed. All component parts, except small connectors and fittings and short sections of flexible hoses, shall be independently supported.

4.3.2 All valves and other components intended to be operated or observed during normal operation of the craft, or for emergency purposes, shall be readily accessible. All fittings and connections of the fuel system shall be readily accessible, or accessible through an access panel, port or hatch. Tanks need not be accessible for removal.

4.3.3 The clearance between a petrol fuel tank and a combustion engine shall not be less than 100 mm.

4.3.4 The clearance between a petrol tank and exhaust components having a temperature exceeding 90 °C shall not be less than 250 mm, unless an equivalent thermal barrier is provided.

4.3.5 Fuel system electrical components shall be installed in accordance with ISO 10133 or ISO 13297.

4.3.6 Fuel tanks and components of petrol fuel systems shall not be installed directly above batteries unless the batteries are protected against the effects of fuel leakage.

5 Fuel pipes, hoses, connections and accessories

5.1 Fuel filling lines

5.1.1 The minimum inside diameter of the fill pipe system shall be 28,5 mm and the minimum inside diameter of fuel filling hoses shall be 38 mm.

5.1.2 Fuel filling hoses located in engine compartments shall be fire resistant, of type A1, A2 or A15 in accordance with ISO 7840:2013. Fuel fill hoses outside engine compartments shall be of either type A1, A2, or A15 in accordance with ISO 7840:2013, or of type B1, B2, or B15 in accordance with ISO 8469:2013.

NOTE The 1, 2, and 15 designations describe the level of permeation:

1 = 100 g/m^2/24 h;

2 = 300 g/m^2/24 h;

15 = g/m^2/24 h.

5.1.3 Fuel filling lines shall be self-draining to the tank(s) when the craft is in its static floating position.

5.1.4 The fuel filling system shall be designed so that accidental fuel spillage does not enter the craft when it is in its static floating position.

5.1.5 The distance between compartment ventilation openings and fuel fill openings shall be at least 400 mm, except where the craft's coaming, superstructure or hull creates a barrier to prevent fuel vapour entering the craft through the ventilation opening.

5.1.6 The fuel filling point shall be marked "petrol" or "diesel" and/or with a symbol specified in ISO 11192 to identify the type of fuel to be used.