SLOVENSKI STANDARD
oSIST prEN ISO 16147:2020

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Mala plovila - Vgrajeni dizelski motorji - Nameščene komponente za gorivo, olje in elektriko (ISO/FDIS 16147:2020)

Small craft - Inboard diesel engines - Engine-mounted fuel, oil and electrical components (ISO/FDIS 16147:2020)

Kleine Wasserfahrzeuge - Eingebaute Dieselmotoren - Am Motor befestigte Kraftstoff-, Öl- und Elektrikbauteile (ISO/FDIS 16147:2020)

Petits navires - Moteurs intérieurs diesels - Éléments des circuits d'alimentation, des systèmes de lubrification et des systèmes électriques fixés sur le moteur (ISO/FDIS 16147:2020)

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Small craft — Inboard diesel engines — Engine-mounted fuel, oil and electrical components

Petits navires — Moteurs intérieurs diesels — Éléments des circuits d'alimentation, des systèmes de lubrification et des systèmes électriques fixés sur le moteur

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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*, in collaboration with the European Committee for Standardization (CEN) Technical Committee CEN/TC 464, *Small craft*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

This third edition of ISO 16147 cancels and replaces the second edition (ISO 16147:2018), of which it constitutes a minor revision. The changes compared to the previous edition are as follows:

— clarification in the Scope that the length of hull is as defined in ISO 8666, and reference added in a new Bibliography;

— all references have been dated.

Small craft — Inboard diesel engines — Engine-mounted fuel, oil and electrical components

1 Scope

This document establishes requirements for the design and installation of engine-mounted fuel, oil and electrical components on diesel inboard-mounted engines for minimizing fuel leakage, risk of electric shock and the risk of and/or the spread of fire on small craft of hull length up to 24 m in accordance with ISO 8666.

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

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

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

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

ISO 25197:2020, *Small craft — Electrical/electronic control systems for steering, shift and throttle*

IEC 60529:1989+A1:1999+A2:2013, *Degrees of protection provided by enclosures (IP CODE)*

IEC 60092-507:2014, *Electrical Installations in Ships — Part 507: Small vessels*

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
engine-mounted
component fixed to the marine inboard engine and which remains while the engine is in operation

3.2
diesel fuel
hydrocarbon fuel or blends of hydrocarbon fuels including bio-fuel which are liquids at atmospheric pressure and are used in compression-ignition engines

3.3
diesel engine
internal combustion engine that uses the heat of highly compressed air to ignite a spray of *diesel fuel* (3.2) introduced after the start of the compression stroke

3.4
accessible
capable of being reached for inspection, removal or maintenance without removal of the permanent boat structure

Note 1 to entry: Hatches are not regarded as permanent boat structures in this sense, even if tools are needed to open them.

3.5
low-pressure fuel line
hose or pipe for fuel supply to high-pressure pumps or injection pumps including leak-off and return pipes from high-pressure pumps, injection pumps, injectors, etc.

3.6
high-pressure fuel pipe
fuel pipes from high-pressure pumps or injection pumps including high-pressure accumulators (rails)

3.7
fatty acid methyl ester
FAME
fuel composed of mono-alkyl esters of long-chain fatty acids derived from vegetable oils or animal fats

4 General

4.1 All material and components shall be suitable for intended use and 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.

4.2 Engine-mounted fuel and electrical components and accessories that require frequent inspection and/or servicing shall be accessible.

4.3 Exposed operating or hot engine-mounted components that could cause personal injury shall be effectively shielded.

4.4 Installation of engine-mounted diesel fuel and electrical components shall take account of the risk and spread of fire. Special attention shall be paid to hot areas of engines. Routing of electrical wiring, in particular, shall be located away from heat sources and hot areas.

5 Engine fuel and oil system and components

5.1 General

5.1.1 Engine-mounted fuel and lubricating systems shall be leak free, such that there is no dripping or wetting of surface areas at the interface of connecting components and pipe joints due to misting atomization, or liquid from fuel or lubrication under normal operation.

5.1.2 All materials used in fuel systems shall be resistant to deterioration by the diesel fuel, including bio diesel that contains FAME and to other liquids or compounds with which they may come into contact under normal operating conditions, e.g. grease, lubricating oil, bilge solvents and sea water.

5.1.3 All sealing material, such as gaskets, o-rings, joint-rings, etc. shall be of the non-wicking, i.e. non-fuel-absorbent type.

5.1.4 Fuel and oil filters, flexible hoses including fittings and terminations shall, individually or as installed, withstand a 2,5 min fire test as described in ISO 10088:2013, Annex B, or ISO 7840:2013, Annex A.

If the component is being tested as installed on an engine, the pan shall be large enough to extend beyond the vertical projection of the perimeter of the engine.

NOTE A permanently installed shielding of fuel return hoses, including their fittings and terminations, is accepted as protection against fire.

5.2 High-pressure fuel pipes

5.2.1 High-pressure fuel pipes shall be suitable for the pressure and pressure impulses in the system.

5.2.2 High-pressure fuel pipes shall be secured to prevent vibrations leading to pipe fracture.

5.3 Low-pressure fuel lines

5.3.1 Flexible hoses shall meet the requirements of ISO 7840:2013 and be secured by a metal hose clamp or permanently installed end fittings, such as a swaged sleeve, threaded insert or connections with compression ring sealings.

5.3.2 Hose connections having a nominal diameter of more than 25 mm shall have two hose clamps. The spud shall be at least 35 mm long to provide space for the clamps.

5.3.3 All low-pressure fuel lines shall be secured into position so as to prevent damage due to excessive vibration leading to pipe fracture. All flexible hoses shall be located away from non-insulated components with a surface temperature above 200 °C, but remain accessible for inspection and maintenance.

5.4 Fuel and lubrication oil filters

Fuel and lubricating oil filters shall

— be independently supported to avoid stress on pipe connections,

— be readily accessible, and

— not be mounted above turbochargers or uncooled exhaust gas manifolds.

6 Electrical systems and components

6.1 General

6.1.1 d.c. installations shall meet the requirements of ISO 10133:2012.

6.1.2 a.c. installations shall meet the requirements of IEC 60092–507:2014 or ISO 13297:2014.

6.1.3 Electronic shift and throttle components if engine mounted and part of engine delivery from manufacturer shall meet the requirements of ISO 25197:2020.

6.2 Cranking motors

Earth-return cranking motors shall be earthed (d.c. negative ground/earth) to the earth return system of the engine.