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Small craft — Fire protection

Petits navires — Protection contre l'incendie

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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 88, *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 second edition cancels and replaces the first edition (ISO 9094:2015), which has been technically revised.

The main changes are as follows:

- the “engine compartment” definition (3.3) has been updated;
- the “fire resistant” definition (3.21) has been added;
- the pitch angle up to 15° for all craft to prevent cooking devices from sliding off the stove, in 4.1.1, has been updated;
- the pitch and heel angles in 4.2.1 have been updated;
- the requirements for protection from open flame in 4.2.2 have been updated;
- Table 1 to expand the understanding of zone protection has been updated;
- a clarification for fire escape routes in 6.1 has been added;
- Table 2, “Protection of the engine(s) and engine compartments”, has been updated;
- the requirements for portable fire extinguisher locations have been updated (see 7.5);
- the asphyxiant medium from fixed fire extinguishing systems has been removed (see 7.6);
- Clause 8, “Displayed information”, has been updated;
- the Bibliography has been updated.

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.

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Introduction

This document covers the prevention of fire and the protection of life in case of fire on small craft.

It is intended to ensure that the design and layout of the craft and the type of equipment installed minimize the risk and spread of fire and that every habitable craft is provided with viable means of escape in the event of fire.

The requirements in this document may not be effective against fires of some battery chemistries (for example lithium-based products). Battery manufacturers should be consulted for appropriate methods of fire suppression.

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Small craft — Fire protection

1 Scope

This document defines a practical degree of fire prevention and protection intended to provide enough time for occupants to escape a fire on board small craft.

It applies to small craft having a length of the hull (L_H) of up to 24 m except for personal watercraft.

This document does not cover:

- the design and installation of permanently installed galley stoves and heating appliances (including components used to distribute the heat) using fuels that are liquid at atmospheric pressure on small craft, which are covered by ISO 14895:2016;
- carbon monoxide detecting systems, which are covered by ISO 12133.

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 4589-3:2017, *Plastics — Determination of burning behaviour by oxygen index — Part 3: Elevated-temperature test*

ISO 7165:2017, *Fire fighting — Portable fire extinguishers — Performance and construction*

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

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

ISO 10239:2014, *Small craft — Liquefied petroleum gas (LPG) systems*

ISO 11105:2020, *Small craft — Ventilation of petrol engine and/or petrol tank compartments*

ISO 12216, *Small craft — Windows, portlights, hatches, deadlights and doors — Strength and watertightness requirements*

ISO 13297, *Small craft — Electrical systems — Alternating and direct current installations*

ISO 14895:2016, *Small craft — Liquid-fuelled galley stoves and heating appliances*

ISO 16315, *Small craft — Electric propulsion system*

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

IEC 60092-507:2014, *Electrical installations in ships — Part 507: Small vessels*

EN 3-7:2004+A1:2007, *Portable fire extinguishers – Part 7: Characteristics, performance requirements and test methods*

EN 1869:2019, *Fire blankets*

EN 15609:2021, *LPG equipment and accessories — LPG propulsion systems for boats, yachts and other craft*

3 Terms and definitions

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

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://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 are needed to open them.

3.2 readily accessible

capable of being reached quickly and safely for effective use under emergency conditions without the use of tools

3.3 engine compartment

compartment of the craft, containing spark or compression ignition internal combustion engine(s)

3.4 fixed fire extinguishing system fixed system

fire-fighting system having all components fixed in position and having automatic activation and/or manual release from outside of the space protected

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3.5 fire exit

door, hatch, or aperture designated as an exit in case of fire and leading either directly, or via other areas of the craft, to the open air

3.6 open flame device

appliance where direct bodily contact with an exposed open flame is possible during normal operation

3.7 petrol

hydrocarbon fuel or blends thereof that is liquid at atmospheric pressure and is used in spark ignition engines

Note 1 to entry: In this context, kerosene is not regarded as petrol.

3.8 diesel

hydrocarbon fuel or blends thereof that is liquid at atmospheric pressure and is used in compression ignition engines

3.9 asphyxiant

fire extinguishing medium that can dilute or displace oxygen in air, leading to asphyxiation if inhaled

3.10 toxic

fire extinguishing medium that can be poisonous or harmful if inhaled

3.11**escape route**

way through which a person has to pass to access the nearest craft exit or *fire exit* (3.5)

3.12**habitable space**

space surrounded by permanent structure in which there is provision for any of the following activities: sleeping, cooking, eating, washing/toilet, navigation, steering

Note 1 to entry: Spaces intended exclusively for storage, open cockpits with or without canvas enclosures and engine rooms are not included.

3.13**enclosed habitable space**

habitable space (3.12) separated from the nearest *fire exit* (3.5) by bulkheads and/or solid doors

3.14**radiated heat device**

appliance intended to transfer heat from its surfaces during normal operation by way of radiation

3.15**cooking appliance**

appliance intended to be used for the preparation of food and that makes use of a heat source

3.16**heating appliance**

appliance intended to be used for comfort heating with or without integral heat sources

3.17**solid fuel appliance**

heating appliance (3.16) intended to be fuelled by solid minerals fuel, natural or manufactured wood logs or pellets, including solidified alcohol

3.18**decklight**

translucent deck fitting providing daytime lighting to inboard spaces by refracting sunlight

Note 1 to entry: Decklights are usually no more than 200 mm in diameter.

3.19**shut off damper**

air damper or rated fire damper device that closes or reduces air flow at engine space air intakes and/or exhaust ventilators

3.20**portlight**

openable window in the hull of the craft below the sheer line and above the waterline

3.21**fire resistant**

the ability of a material to self-extinguish upon the removal of an ignition source

3.22**craft****small craft**

recreational boat, and other watercraft using similar equipment, of up to 24 m length of hull (L_H)

[SOURCE: ISO 8666:2020, 3.15]

4 Fire prevention

4.1 Cooking and heating appliances

4.1.1 General

Cooking and heating appliances shall be suitable for use in a marine environment.

When selecting appliances, consideration should be given to the size and design of the space into which the appliance is to be installed and the appliance's stated heat output.

Cooking and heating appliances shall be installed in accordance with the manufacturer's instructions for small craft installations and secured against accidental or unintended movement. Gimballed appliances shall include a retaining mechanism that meets this requirement.

Means shall be provided on or adjacent to stove-top cooking surfaces to prevent both deep and shallow cooking utensils from sliding across or off the stove, at pitch angles up to 15° for all craft, and at heel angles up to 30° for sailing craft or up to 15° for engine-driven craft and multihulls (sail and power).

4.1.2 Appliances with flues

Where flues and associated flue pipes are installed, they shall be:

- installed in accordance with manufacturer's instructions;
- routed directly to the open air so that no exhaust gases can enter the interior of the craft;
- insulated or shielded in accordance with [4.2.3.1](#), where necessary, to avoid overheating or damage to adjacent material or to the structure of the craft.

4.1.3 Permanently installed fuel systems ISO 9094:2022

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Permanently installed tanks and supply lines using fuel which is liquid at atmospheric pressure shall meet the applicable requirements of ISO 21487 and ISO 10088. In addition:

- permanently installed fuel tanks shall be installed outside Zone II according to [Figure 1](#);
- filler openings for tanks shall be prominently identified to indicate the type of fuel to be used with the system;
- unless covered by the design and installation requirements of ISO 14895:2016, a readily accessible shut-off valve shall be installed in the supply line at the tank connection. If this is outside the space containing the appliance, a second valve shall be fitted in the fuel line in the space containing the appliance, outside Zone II according to [Figure 1](#), but not behind the appliance. This requirement does not apply:
 - where the tank is located lower than the cooking appliance/heater and there is no possibility of back siphoning; or
 - where a fusible valve that prevents fuel from continuing to flow to an appliance in the event of a fire is installed in the appliance or near to the final fuel supply joint to it.

4.2 Materials near cooking or heating appliances

4.2.1 General

Materials and finishes (surfaces) used in the vicinity of open flame devices within the ranges as defined in [Figure 1](#) shall comply with [4.2.2](#), taking into account the movement of the burner at pitch angles up