INTERNATIONAL STANDARD

ISO 9094

First edition
2015-11-15

Small craft — Fire protection

Petits navires — Protection contre l'incendie

Reference number
ISO 9094:2015(E)

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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 on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 88, *Small craft*.

This first edition of ISO 9094 cancels and replaces ISO 9094-1:2003 and ISO 9094-2:2002.

The major technical changes concern:

— change in definition of "readily accessible" being for "emergency conditions";

— added definitions and requirements for cooking appliances, solid fuel appliances and heating appliance installations;

— requirements for cooking and heating appliances using liquid fuel;

— specific requirements addressing compartments containing petrol tanks and containers and portable petrol driven engines;

— added requirements for fire protection for "domed " decklights;

— fire detection requirements for craft over 12 m;

— clarification of escape routes for quarter cabin arrangements;

— detailed requirements for access to deck hatches designated as fire exits;

— changes to engine and engine compartment fire extinguishing requirements;

— fixed fire extinguishing systems to be "approved systems";

— requirement for diesel engine shut down and "shut off dampers";

— audible alarm requirements required only for protected spaces able to be occupied.

Introduction

This International Standard 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 might not be effective against some battery chemistries (for example Lithium based products). Battery manufacturers should be consulted for appropriate methods of fire suppression.

Small craft — Fire protection

1 Scope

This International Standard 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 all small craft of up to 24 m length of hull (L_H) except for personal watercraft.

This International Standard excludes:

— the design and installation of those 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;

— carbon monoxide detecting systems, which are covered by ISO 12133[3].

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

EN 1869, *Fire blankets*

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

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

ISO 5923, *Equipment for fire protection and fire fighting — Fire extinguishing media — Carbon dioxide*

ISO 7010:2011, *Graphical symbols — Safety colours and safety signs — Registered safety signs*

ISO 7165, *Fire fighting-Portable fire extinguishers – Performance and construction*

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

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

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

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

ISO 10240, *Small craft — Owner's manual*

ISO 11105:1997, *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 current installations*

ISO 14895, *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*

3 Terms and definitions

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

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 main or auxiliary engine(s)

3.4
fixed fire extinguishing system
fire fighting system having all components fixed in position and having automatic activation and/or manual release from outside of the space protected

Note 1 to entry: In the following text this system is called "a fixed system".

3.5
fire exit
any 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
any appliance where direct bodily contact with an exposed open flame is possible during normal operation

3.7
petrol
hydrocarbon fuel or blends thereof which 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 which is liquid at atmospheric pressure and is used in compression ignition engines

3.9
asphyxiant
any fire extinguishing medium that can dilute or displace oxygen in air, leading to asphyxiation if inhaled

3.10
toxic
any 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 exit or fire exit

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 separated from the nearest fire exit by bulkheads and/or solid doors

3.14
radiated heat device
any 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
solid fuel appliance
heating appliance intended to be fuelled by solid minerals fuel, natural or manufactured wood logs or pellets, including solidified alcohol

3.17
heating appliance
appliance intended to be used for comfort heating with or without integral heat sources

3.18
decklight
translucent deck fitting providing daytime lighting to inboard spaces by refracting sunlight

Note 1 to entry: These decklights are usually no more than 200 mm 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

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.

4.1.2 Appliances with flues

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

— installed in accordance to 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

Permanently installed (non-integral) tanks and supply lines using fuel which is liquid at atmospheric pressure shall meet the applicable requirements of ISO 21487, ISO 14895 and ISO 10088 respectively. 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, 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 fire or 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

4.2.2 to 4.2.4 address the potential for the ignition of materials adjacent to cooking and heating appliances.

Materials and finishes 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 up to a heel angle of 20° for monohull sailboats or 10° for multihulls and monohull motorboats, where gimballed stoves are fitted.

These requirements do not apply to the materials of the appliance itself.

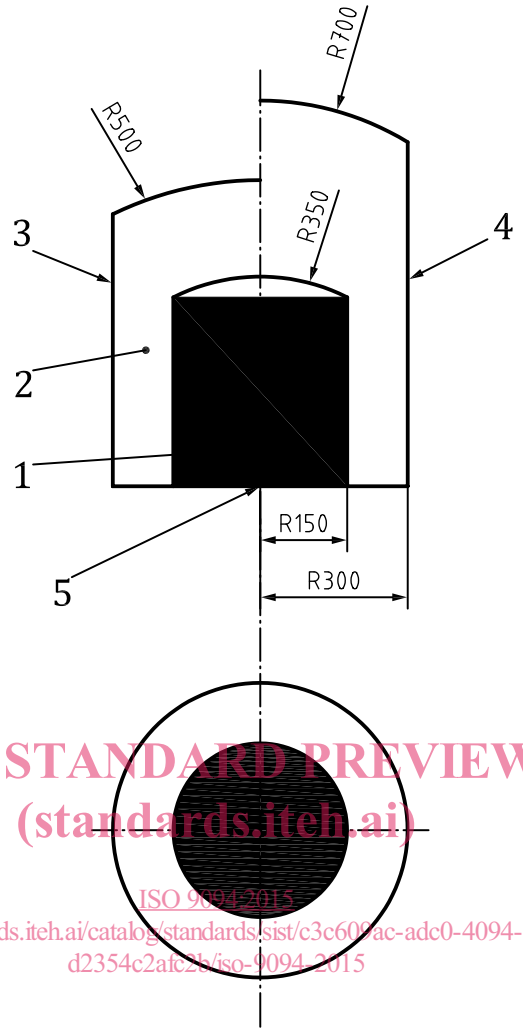
4.2.2 Protection from open flames

4.2.2.1 Free hanging curtains or other fabrics adjacent to open flame devices shall not be fitted in Zone I and Zone II according to Figure 1.

4.2.2.2 Exposed materials adjacent to open flame devices installed in Zone I and Zone II shall not support combustion and accordingly shall have an oxygen index (OI) of at least 21 according to ISO 4589-3 at an ambient temperature of 60°C, or be tested as meeting an equivalent standard. They shall be thermally insulated from the supporting structure to prevent combustion of the supporting structure, if the surface temperature exceeds 80°C during the fire test described in Annex A.

Thermal insulation may be achieved by an air gap or the use of a suitable material.

Dimensions in millimetres



Key

1 Zone I
2 Zone II
3 Limit of zone II for LPG, CNG or electric appliances
4 Limit of zone II for liquid fuel appliances
5 Centre of burner

NOTE Measurements are taken from the centre of the burner

Figure 1 — Areas of special material requirements

4.2.3 Protection from radiated heat devices

4.2.3.1 If their surface temperature can exceed 85°C, combustible materials adjacent to radiated heat devices and other appliances, whether exposed or covered, shall be thermally insulated to ensure that the surface temperature of the combustible materials does not exceed 85°C with the appliance operating at its maximum nominal output.

4.2.3.2 Thermal insulation may be achieved by an air gap, a radiation shielding surface or the use of a suitable material. Materials used to shield the combustible surface shall be ceramics, metals, non-combustible insulation board or other materials with similar fireproof characteristics.

Appliance manufacturer's instructions may be followed to meet this clause provided the appliance has been temperature tested in accordance with EN 12815[5], EN 13240[6] or UL 1100[8].

4.2.4 Protection from solid fuel appliances

4.2.4.1 Solid fuel appliances shall stand on and be secured to a hearth, designed and constructed of suitable robust and non-combustible materials, substantial enough to support the weight of the appliance and be of appropriate dimensions such that, in normal use, will prevent ignition of floor coverings through radiated heat or in the event a hot solid fuel falls from the appliance.

Appliance manufacturer's instructions may be followed to meet this clause provided the appliance has been temperature tested in accordance with EN 12815[5], EN 13240[6] or UL 1100[8].

4.2.4.2 Combustible fixtures, fittings or furniture other than flooring and its covering shall not be positioned within the distance from solid fuel appliance specified by the manufacturer or, if no distance is specified, within 600 mm of the closest point to the appliance.

4.2.4.3 Free-hanging combustible material, such as curtains or blinds adjacent to solid fuel appliance shall be fitted not less than the minimum distance specified by the manufacturer or, if no distance is specified, not within 600 mm of the closest point to the appliance and any uninsulated flue pipe.

NOTE Careful consideration needs to be given in the selection of materials in all other parts of habitable spaces to ensure, as far as practical, that the materials are not readily ignitable and/or have low flame spread characteristics and do not readily give rise to toxic or explosive hazards at elevated temperatures.

4.2.5 Protection from electrical appliances

4.2.5.1 Free hanging curtains or other fabrics adjacent to electrical cooking hobs shall not be fitted in Zone I according to Figure 1.

4.2.5.2 Electrical heating appliances shall not be fitted with an element so exposed that clothing, curtains, or other similar materials can be scorched or set on fire by heat from the element.

4.3 Engine and fuel compartments and exhausts

4.3.1 General requirements not dependent on fuel type

4.3.1.1 Insulation material

Material used for the insulation of engine compartments shall:

— present a non-fuel absorbent surface towards the engine; and

— not support combustion and accordingly shall have an oxygen index (OI) of at least 21 according to ISO 4589-3 at an ambient temperature of 60°C, or be tested as meeting an equivalent standard

4.3.1.2 Permanently installed fuel tanks

Permanently installed fuel tanks shall be designed and constructed in accordance with the requirements of ISO 21487 and installed in accordance with ISO 10088.

