INTERNATIONAL STANDARD

ISO 13590

Second edition
2003-12-15

Small craft — Personal watercraft — Construction and system installation requirements

Petits navires — Motos aquatiques — Exigences de construction et d'installation des systèmes

Reference number
ISO 13590:2003(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 13590 was prepared by Technical Committee ISO/TC 188, *Small craft*.

This second edition cancels and replaces the first edition (ISO 13590:1997), which has been technically revised.

Small craft — Personal watercraft — Construction and system installation requirements

1 Scope

This International Standard applies to personal watercraft as defined in 3.1, for the construction and installation of builder's plate, permanently installed petrol fuel systems, electrical systems, steering systems, ventilation, hull structure and floatation, and requirements for stability, freeboard and owner's manual.

2 Normative references

The following referenced documents are indispensable for the application 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 1402:1994, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing*

ISO 1817:1999, *Rubber, vulcanized — Determination of the effect of liquids*

ISO 7326:1991, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions*

ISO 7840:—[1], *Small craft — Fire-resistant fuel hoses*

ISO 8469:1994, *Small craft — Non-fire-resistant fuel hoses*

ISO 10133:2000, *Small craft — Electrical systems — Extra-low-voltage d.c. installations*

ISO 10240:—[2], *Small craft — Owner's manual*

ASTM D 1621:2000, *Standard Test Method for Compressive Properties of Rigid Cellular Plastics*

3 Terms and definitions

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

3.1
personal watercraft
vessel less than 4 m in length, which uses an internal combustion engine powering a water-jet pump as its primary source of propulsion, and is designed to be operated by a person or persons sitting, standing, or kneeling on, rather than within, the confines of a hull

1) To be published. (Revision of ISO 7840:1994)

2) To be published. (Revision of ISO 10240:1995)

3.2
fuel system
entire assembly of the fuel fill, vent, tank and distribution components, including and not limited to pumps, valves, strainers, carburettors and filters

3.3
static floating position
attitude in which a personal watercraft floats in calm water, with each fuel tank filled to its rated capacity, but with no person or items of portable equipment on board

3.4
conduit
any type of rigid plastic or metal piping or tubing which supports the conductors contained within

3.5
AWG
American Wire Gauge

3.6
ignition protection
design and construction of a device such that, under design operation conditions; it will not ignite an inflammable hydrocarbon mixture surrounding the device when an ignition source causes an internal explosion, or it is incapable of releasing sufficient electrical or thermal energy to ignite a hydrocarbon mixture, or the source of ignition is hermetically sealed

3.7
sheath
material used as a continuous protective covering, such as electrical tape, moulded rubber, moulded plastic or flexible tubing, around one or more insulated conductors

3.8
open to the atmosphere
space or compartment that has at least 0,34 m^2 of open area directly exposed to the atmosphere for each cubic metre of net compartment volume

3.9
engine compartment
space where the engine is permanently installed

3.10
bilge
area, excluding engine rooms, in the personal watercraft below a height of 100 mm measured from the lowest point in the personal watercraft, where liquid can collect when the personal watercraft is in its static floating position

3.11
engine-compartment bilge
space in the engine compartment or a connected compartment, below a height of 300 mm measured from the lowest point, where liquid can collect when the personal watercraft is in its static floating position

3.12
design category
description of the sea and wind conditions for which a craft is assessed to be suitable

NOTE The following design categories apply:

— **C: Inshore:** Designed for voyages in coastal waters, large bays, estuaries, lakes and rivers where conditions up to and including wind force 6 and significant wave heights up to, and including, 2 m may be experienced;

— **D: Sheltered waters:** Designed for voyages on small lakes, rivers and canals where conditions up to and including wind force 4 and significant wave heights up to and including 0,5 m may be experienced.

3.13
builder's plate
label or plate to display critical information related to the personal watercraft

3.14
handlebar
mechanical means for applying manual steering effort into the helm, normally a horizontal configuration with hand grips at each end and the helm connected to the handle

3.15
helm
mechanism, exclusive of handlebar or other means for manual application of a controlling force, by which the controlling force is fed into a personal-watercraft steering-system cable

3.16
maximum recommended load
maximum weight of persons and portable equipment that may be carried on the personal watercraft

4 Builder's plate

4.1 General requirements

4.1.1 Size of characters

The minimum required information characters shall be at least 5 mm in height. Other characters shall be at least 3 mm in height.

4.1.2 Size of marking, pictograms and symbols

Pictogram and symbols shall be at least 8 mm in height.

4.1.3 Location

The “builder's plate” shall be readily visible, preferably near the driver's position. In any case, the builder's plate shall be separate from the hull identification number.

4.1.4 Fixing and marking

The “builder's plate” shall be permanently displayed, and characters and other marking shall be capable of withstanding the combined effects of water, oil, salt spray, direct sunlight, heat, cold and wear expected during normal operation of the personal watercraft without loss of legibility, and shall be resistant to removal and alteration of information without leaving some obvious sign of such effects.

Alternatively, the information may be printed or etched on the craft itself.

The colours applied to the label shall be fade resistant.

4.2 Display information

4.2.1 The following information shall be displayed on each “builder's plate”:

— manufacturer's name;

— design category;

— maximum recommended load, according to Clause 9;

— number of persons, recommended by the manufacturer, which the craft is designed to carry when underway, according to Clause 9.

4.2.2 The manufacturer may provide additional information on the label. The inclusion of this additional information shall not impair the legibility of the minimum required information.

5 Fuel system

5.1 General

5.1.1 Each fuel-system fitting, joint and connection shall be arranged so that it can be reached for inspection, removal or maintenance without removal of any part of the permanent watercraft structure.

5.1.2 The fuel system shall be designed not to leak liquid fuel into the watercraft when

— the personal watercraft is overturned through 180° of roll in either direction, or

— the personal watercraft is overturned through 90° of pitch in either direction.

5.1.3 The fuel system shall be designed not to leak liquid fuel into the personal watercraft when subjected to 20 kPa or 90 % of the relief pressure designed for the system, whichever is greater.

5.1.4 The fuel system shall be designed to automatically stop the supply of fuel to the engine when the engine is not running.

5.2 Fuel tanks

5.2.1 Materials prohibited for fuel tanks

5.2.1.1 A fuel tank shall not be constructed of terne-plate.

5.2.1.2 Unless it has an inorganic sacrificial galvanic coating on the inside and outside of the tank, a fuel tank shall not be constructed of black iron or steel.

5.2.1.3 A fuel tank encased in cellular plastic or in fibre-reinforced plastic shall not be constructed from a ferrous alloy.

5.2.2 Cellular plastic used to encase fuel tanks

5.2.2.1 Cellular plastic used to encase fuel tanks shall not change volume by more than 5 % or dissolve after being immersed in any of the following liquids for 24 h at 29 °C:

— reference fuel B in accordance with ISO 1817:1999, Table A.1, or an equivalent fuel;

— reference oil No. 2 in accordance with ISO 1817:1999, A.2.1.2, or an equivalent fuel;

— 5 % solution of trisodium phosphate in water.

5.2.2.2 Cellular plastic used to encase fuel tanks shall not absorb more than 60 g of water per 0,1 m^2 of cut surface.

5.2.2.3 Non-polyurethane cellular plastic used to encase metallic fuel tanks shall have a compressive strength of at least 400 kPa at 10 % deflection, when determined in accordance with ASTM D 1621.

5.2.2.4 Polyurethane cellular plastic used to encase metallic fuel tanks shall have a density of at least 0,032 g/cm^3.

5.2.3 Fuel-level indication

A means shall be provided to check the fuel level, or a reserve fuel supply shall be provided.

5.2.4 Tank pressure limitation

With the personal watercraft in its static floating position, a fuel tank, when filled, shall have an air-expansion volume or be equipped with a system that prevents pressure in the tank from exceeding 80 % of the fuel-tank design pressure.

5.2.5 Fill and vent openings

Fill and vent openings shall be at or above the liquid level when the tank is filled to its nominal capacity with the personal watercraft in its static floating position.

5.2.6 Fuel-tank static-pressure test

5.2.6.1 A representative fuel tank shall not leak if tested using the procedures given in 5.2.6.2 and 5.2.6.3.

5.2.6.2 Fill the tank with air or inert gas to 20 kPa or 90 % of the design relief pressure, whichever is greater.

5.2.6.3 Examine each tank fitting and seam for leaks using a leak detection method other than the pressure drop method.

5.2.7 Fuel-tank shock test

5.2.7.1 A representative fuel tank shall not leak when tested using the procedures given in 5.2.7.2 to 5.2.7.7.

5.2.7.2 Confirm that the tank does not leak when pressure tested according to 5.2.6.

5.2.7.3 If the tank is non-metallic, precondition the tank by filling it to capacity with petrol that has at least a 50 % aromatic content. Keep the fuel in the tank at 21 °C or higher for at least 30 days prior to testing.

5.2.7.4 Mount the empty tank on the platform of an impact-test machine in a manner similar to the manner in which the tank and hold-down arrangement is installed in the personal watercraft.

5.2.7.5 Fill the tank to capacity with water.

5.2.7.6 Apply 1 000 cycles of vertical accelerations of 25 g at a rate of 80 cycles or less per minute. Apply the accelerations within 76 mm of the centre of the horizontal mounting surface of the tank. The duration of each vertical acceleration cycle measured from the base of the shock envelope shall be between 6 ms and 14 ms.

5.2.7.7 Check the tank for leaks using the procedure specified in 5.2.6.

5.3 Fuel-tank installations

5.3.1 Non-encased fuel tanks

5.3.1.1 Each fuel tank shall not support a deck, bulkhead or other structural component.

5.3.1.2 Fuel tanks shall not be integral with the hull or engine.