INTERNATIONAL STANDARD

ISO 11592

First edition
2001-06-15

Small craft less than 8 m length of hull — Determination of maximum propulsion power rating

Petits navires d'une longueur de coque de moins de 8 m — Détermination de la puissance maximale de propulsion

Reference number
ISO 11592:2001(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.ch
Web www.iso.ch

Printed 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 3.

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 International Standard may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

International Standard ISO 11592 was prepared by Technical Committee ISO/TC 188, *Small craft*.

Annexes A and B form a normative part of this International Standard. Annex C is for information only.

Small craft less than 8 m length of hull — Determination of maximum propulsion power rating

1 Scope

This International Standard establishes the requirements for determination of the maximum propulsion power rating for engine-driven small craft with a length of hull of less than 8 m.

This International Standard is not applicable to:

— personal water craft as defined by ISO 13590;

— canoes and kayaks;

— inflatable boats, as defined by parts 1 to 3 of ISO 6185, except that ISO 6185–3 requires rigid inflatable boats (RIBS) capable of a maximum speed of 30 kn or more to be tested in accordance with ISO 11592;

— racing boats: craft designed and constructed solely for competitive racing.

This International Standard does not specify craft constructional strength requirements related to maximum rated power and does not guarantee security from instability under all conditions of seaway, wind, wakes and waves.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 6185-3:—[1)], *Inflatable boats — Part 3: Boats with a maximum motor power rating of 15 kW and greater*

ISO 8665:1994, *Small craft — Marine propulsion engines and systems — Power measurements and declarations*

ISO 8666:—[1)], *Small craft — Principal data*

ISO 10240:1995, *Small craft — Owner's manual*

ISO 11192:—[1)], *Small craft — Graphical symbols*

1) To be published.

3 Terms and definitions

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

3.1
engine power
engine manufacturer's declared power rated as specified in ISO 8665

3.2
craft speed
speed of the craft on a straight course, measured in knots[2)]

4 Determination and marking of the maximum propulsion power rating

4.1 Outboard powered craft

4.1.1 The engine power for performance evaluation for outboard powered craft shall be determined by the craft manufacturer in accordance with the method given in clauses 6 and 7, and

— if $v_{max} > 7\sqrt{L_H}$ kn, where L_H is the length of hull as defined in ISO 8666 and v_{max} is the maximum speed of the craft, when evaluated in accordance with clause 6, verified by the manoeuvring test procedure clause 7, or

— if $v_{max} \leqslant 7\sqrt{L_H}$ kn, the engine power, at the option of the craft manufacturer, shall be the maximum propulsion power rating of the craft.

NOTE Guidelines for determining the maximum power for initial craft performance evaluation are provided in annex C.

4.1.2 Outboard powered craft supplied by the manufacturer for tiller or optional remote steering shall be tested for both steering configurations if $v_{max} > 7\sqrt{L_H}$ kn.

4.2 Other types of craft

4.2.1 The maximum propulsion power rating for inboard, inboard-outboard and inboard water jet powered craft shall be established when tested in accordance with clauses 5 and 6 and, if $v_{max} > 7\sqrt{L_H}$ kn, verified by the manoeuvring test procedure given in clause 7.

4.2.2 Displacement (non-planing) multihull craft, such as pontoon boats with rounded bottom surfaces, individual hull length to beam ratio of ten or more and outer hull centreline to centreline beam of not less than $L_H/3$, shall:

— have maximum propulsion power rating established when tested in accordance with clauses 5 and 6; and

— if $v_{max} > 7\sqrt{L_H}$ kn, meet the manoeuvring test requirements of clause 7; or

— if not in accordance with the manoeuvring test requirements, may be rated for the maximum power tested if they remain stable without loss of directional control or difficulty of the operator remaining at the helm when the helm is turned to the limit stop or two revolutions (720°) from the straight ahead position, whichever occurs first, in both directions; and

— be capable of stopping or turning from a distance of $6L_H$ from the avoidance line, following throttle reduction from v_{max}, without crossing the avoidance line.

2) 1 kn = 1 nautical mile per hour = 0,514 444 m/s

4.2.3 Any manufacturer modification to a boat model that changes the centre of gravity of the craft vertically by more than 10 % of its height above the keel, e.g. for monohulls the bottom at the centreline, horizontally by more than 10 % of L_H or reduces the weight from the original model tested by more than 10 % of that specified in 5.3, shall be tested and rated as a separate boat type.

4.2.4 If installation of single or multiple engines of equal total engine power is possible as designed and manufactured, both single and multiple engine installations shall be tested if $v_{max} > 7\sqrt{L_H}$ kn in accordance with clauses 5 and 6.

4.3 Power capacity label and owner's manual

4.3.1 All craft with installed engine power or designed to be engine powered, shall display a permanent power capacity label. For outboard powered craft this label shall be located so as to be easily visible to the operator; for inboard, inboard-outboard and inboard water jet powered craft, it shall be located in the cockpit interior or in the engine compartment of the craft. The label shall give the maximum propulsion power rating of the craft as determined in accordance with this International Standard. Outboard powered craft supplied by the manufacturer for tiller or optional remote steering shall display a maximum propulsion power rating on the capacity label identified for both steering configurations and operator positions, if not of equal value.

The maximum propulsion power rating indicated on the capacity label shall be expressed in symbols, in accordance with ISO 11192, and/or in a language acceptable in the country of use. See Figure 1.

4.3.2 An owner's manual shall be provided with the craft and shall include at least the informational elements specified in annex B.

Figure 1 — Maximum propulsion power indication on capacity label

5 Test craft preparation

5.1 The test shall be conducted with the manufacturer installed largest engine power or designated maximum rated engine power for inboard, inboard/outdrive or inboard water jet drive powered craft; or for outboard powered craft, the rated outboard engine power to be indicated on the boat capacity label.

5.2 The propeller installed shall be as specified by the manufacturer for inboard or inboard/outdrive powered craft or, for outboard powered craft, available from the outboard engine manufacturer, providing maximum speed within the engine manufacturer's recommended full throttle RPM range at the trim setting as in 5.7.

5.3 Standard equipment permanently installed fuel tanks shall be no more than half full at the start of each test trial. Portable tanks, if used for outboard engines, one for each engine, shall be between full and half-full at the beginning of each test trial. Portable tanks shall be located in the manufacturer's designated positions, or, if none are designated, located as far aft as practicable.

5.4 Craft shall be equipped with the standard supplied or recommended remote steering system and location or the outboard tiller steering, if so intended for use. See 4.1.2.

5.5 Outboard engines shall be installed in the lowest vertical position on the engine mounting surface, or if so indicated in the owner's manual, the vertical position recommended by the craft manufacturer.

5.6 The craft bottom, engine and propeller shall be clean.

5.7 For propulsion units with power trim, the outboard, inboard-outdrive or water jet nozzle trim angle shall be adjusted to provide full throttle steady state craft speed short of excessive porpoising (fore and aft angular

oscillation) or propeller ventilation without loss of directional control. Propulsion units without power trim shall be set at the maximum trim angle (bow up) position permitting acceleration from displacement to planing speed and meeting these requirements.

6 Test conditions and determination of maximum speed

6.1 Testing shall be conducted on calm water, meaning a wind velocity below 5 m/s (10 kn) and maximum wave height of less than 0,2 m.

6.2 Testing shall be conducted with no onboard load other than standard supplied equipment, fuel as indicated in 5.3, and the operator, whose weight shall not be more than 90 kg or less than 70 kg.

6.3 The maximum full throttle craft speed, v_{max}, shall be determined by not less than two passages over a measured distance in both directions, or by any other suitable and accepted means of craft speed measurement accurate within 2 % or one knot of true boat speed, whichever is greater.

7 Manoeuvring test procedure and criteria

7.1 The test shall be conducted using the avoidance line test course as shown in annex A.

7.2 Operate the craft at full throttle, at v_{max} straight ahead on a course parallel with and within 5 m of marker line A-B.

NOTE Preliminary familiarization test runs may be conducted at any throttle setting and speed.

7.3 For boats with $v_{max} \leqslant 30$ kn, the distance, d, from the avoidance line at which turns are initiated shall be $6L_H$.

7.4 For boats with $v_{max} > 30$ kn, the distance, d, from the avoidance line at which turns are initiated shall be $6L_H$ plus two metres for each knot above 30 kn. See Table 1.

7.5 Turns shall be initiated when the bow of the boat reaches a point opposite marker B as established by the speed at which the boat is being tested.

7.6 Execute turn without reducing the throttle setting, without crossing the avoidance line and assume a course parallel with the avoidance line. Complete six test runs, turning three times to port and three times to starboard.

7.7 To pass the test, the craft must comply with the requirements of 7.1 through 7.6 in such a way that the operator experiences no loss of directional control or stability and no difficulties maintaining position at the helm.

7.7.1 If the maximum manoeuvring speed determined by test, i.e. not crossing the avoidance line while meeting the requirements of 7.6 and 7.7, for a given engine installation, is less than v_{max}, the craft manufacturer shall reduce the engine power installed for test and the capacity label maximum propulsion power rating until the craft passes the manoeuvring test in accordance with clause 7 at v_{max}; or,

7.7.2 for craft which can maintain directional control and stability while on a straight course at v_{max}, but are unable to meet the turning test requirements of 7.6 and 7.7, the turns required by 7.6 may be executed at a reduced speed with the distance from the avoidance line set in accordance with 7.4 for that reduced speed. The craft may be rated for that maximum power if the maximum manoeuvring speed at which the craft complies with the test requirements is not less than 85 % of v_{max} or less than $7\sqrt{L_H}$ kn; and

7.7.3 a speedometer is installed as standard equipment accurate to within 5 % of the maximum manoeuvring speed as determined in 7.7.2, and

7.7.4 a permanent sign indicating the maximum manoeuvring speed is installed in clear view of the operator with the information as indicated in the examples given in Figure 2.

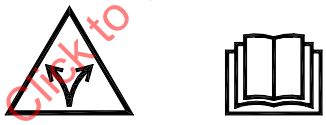
Table 1

Max. speed, v_{max} kn	**Test**	**Distance from avoidance line,** d m	**If test failed**
$v_{max} \leqslant 7\sqrt{L_H}$	no	—	—
$7\sqrt{L_H} < v_{max} \leqslant 30$	yes	$6L_H$	Reduce power rating, retest at v_{max}, or retest at > 85 % of v_{max} to pass and install sign and speedometer
$v_{max} > 30$	yes	$6L_H + 2(v_{max} - 30)$	Reduce power rating, retest at v_{max}, or retest at > 85 % of v_{max} to pass, and install sign and speedometer
The power ratings to be posted on capacity label are determined by craft manufacturer.			

Warning

Manoeuvrability above ..... knots is limited
Sudden turns may cause loss of control
Reduce speed before making sharp turns in either direction
Read owner's manual

in language acceptable in the country of use, or



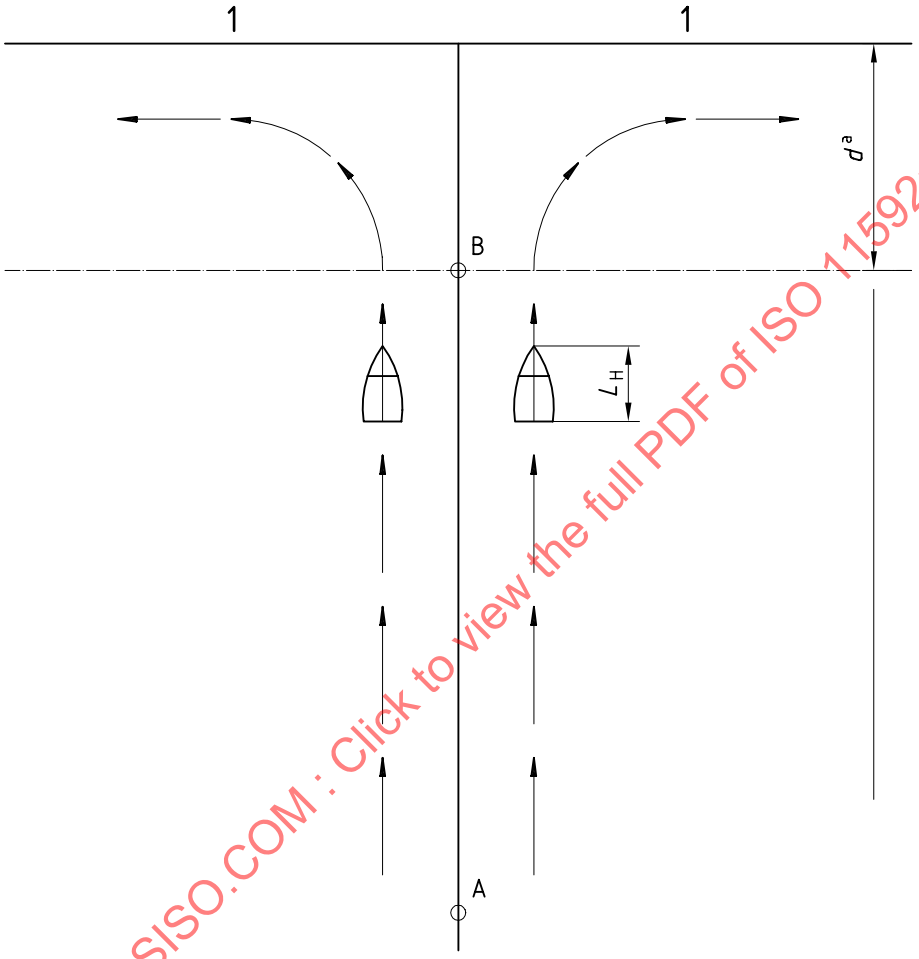
..... KNOTS MAX

The characters of the printing of the language sign shall not be less than 5 mm in height.

Figure 2 — Examples of manoeuvring speed signs

Annex A
(normative)

Manoeuvring test — Craft with $v_{max} > 7\sqrt{L_H}$ kn



Key

1 Avoidance line

a See Table 1.

Figure A.1

Annex B
(normative)

Owner's manual

The owner's manual provided with the craft, in accordance with ISO 10240, shall include at least the following informational elements.

Explanations and warnings concerning powering and manoeuvring limitations, if applicable, such as:

— “Maximum propulsion power rating for the craft: **..... kW**”

— “Do not operate this craft with an engine of rated power larger than that posted on the capacity label in the craft.”

— “Do not operate this craft at negative propulsion unit trim settings (bow down) at high speed. Craft may lean over on side. Instability in turns may result. Use negative trim to accelerate to planing speed from displacement speed and at lower planing speeds in choppy water (applicable to craft equipped with propulsion unit power trim).”

— “Do not operate at maximum speed while in congested high traffic waterways or in weather and sea conditions of reduced visibility high winds or large waves. Reduce speed and wake as a courtesy and as a safety consideration to yourself and others. Observe and obey speed limit and no wake zones.”

— “Observe right-of-way as defined by Rules of the Road and required by COLREG.”

— “Always be certain to have sufficient distance to stop or manoeuvre if required to avoid collisions.”

— If applicable, the warning sign given in 7.7.

Annex C
(informative)

Guidelines for determining the maximum power for initial testing of outboard powered small craft

The maximum power for initial testing of outboard powered craft is determined based on the following:

— factor λ, calculated as follows:

$$\lambda = L_H \times B_T$$

where

L_H is the length of hull, in metres, as defined in ISO 8666;

B_T is the transom width, in metres, at or below the sheer, as defined in ISO 8666;

NOTE If spray rails act as chines or as part of the planing surface of the hull they may be included in the transom width, but flares or extensions above the sheer are excluded. For craft with rounded or pointed sterns or with a transom width of less than half the width of the craft amidships, the width B_T is the widest width in the after quarter length of the hull forward of the stern.

— the type of steering with which the craft is equipped: remote wheel steering or engine tiller steering;

— bottom deadrise angle, α, i.e. the transverse inclination of the bottom of the craft, measured amidships in degrees, determined in accordance with Figure C.1.

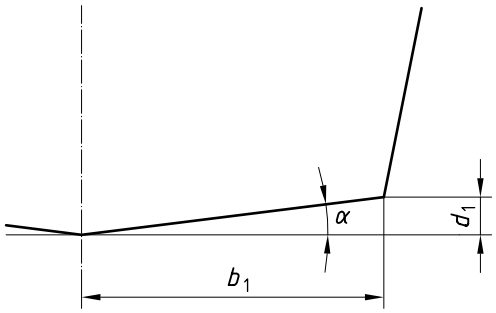
To determine the maximum power for initial testing for craft with a factor λ of 5,1 or less, see Figure C.2.

For craft with a factor λ greater than 5,1, the value of the maximum power for initial testing, expressed in kilowatts, is taken as the following (see Figure C.3):

— without remote wheel steering, deadrise angle $\alpha < 5$: $4{,}2\lambda - 11$;

— without remote wheel steering, deadrise angle $\alpha \geqslant 5$: $6{,}4\lambda - 19$;

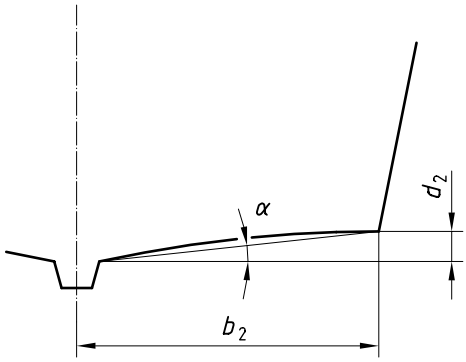
— with remote wheel steering: $16\lambda - 67$.



$\alpha = \arctan(d_1/b_1)$

Steps and other protrusions shall be ignored.

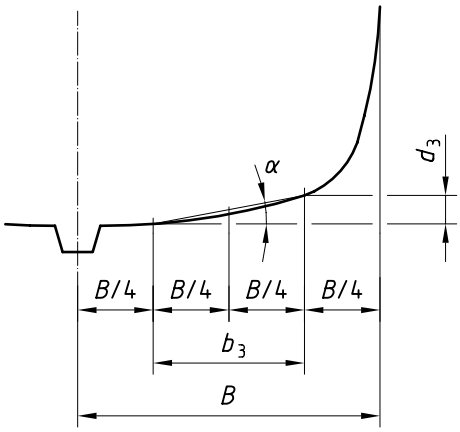
a) Straight bottom



$\alpha = \arctan(d_2/b_2)$

α is measured between keel intersection and chine.

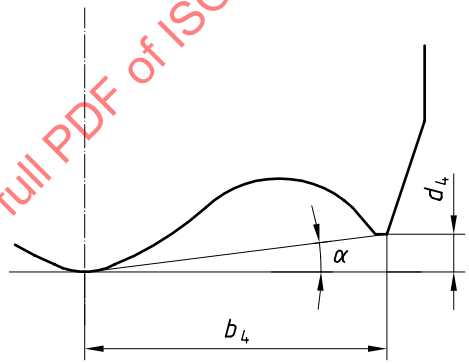
b) Concave bottom plus keel



$\alpha = \arctan(d_3/b_3)$

α is measured between $B/4$ and $3B/4$.

c) Convex bottom

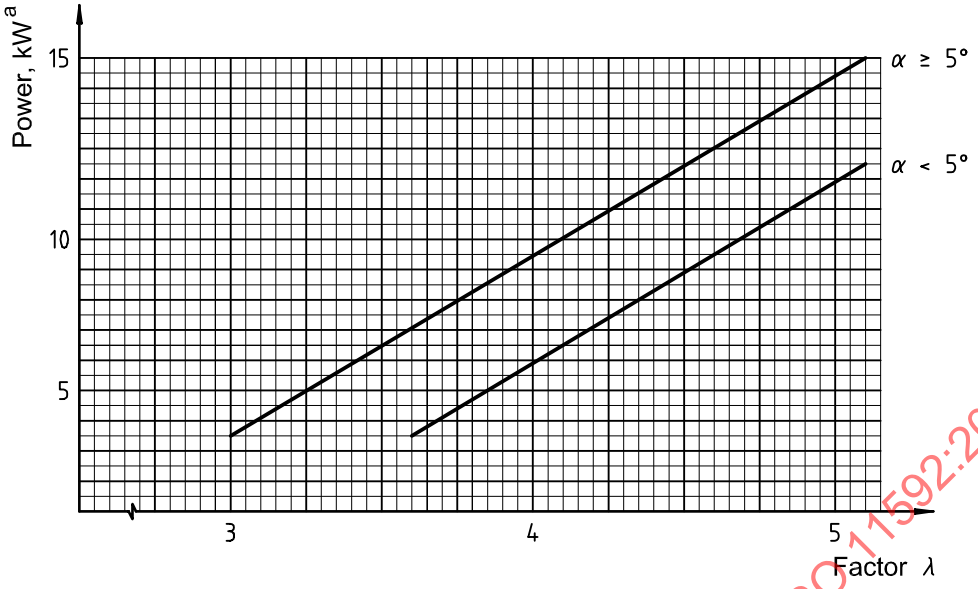


$\alpha = \arctan(d_4/b_4)$

α is measured between centreline and lower protrusion of outer wing.

d) Cathedral hull

Figure C.1 — Deadrise angle, α, for various craft types



[a] Round up to next whole kilowatt.

Figure C.2 — Maximum outboard capacity rating for initial testing, $\lambda \leqslant 5{,}1$