
**Small craft, engine-driven — Field of vision
from helm position**

*Petits navires à moteur — Champ de visibilité au niveau du poste de
pilotage*



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Foreword

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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 11591 was prepared by Technical Committee ISO/TC 188, *Small craft*.

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Small craft, engine-driven — Field of vision from helm position

1 Scope

This International Standard specifies requirements for the field of vision from the helm position, forward and astern, in small engine-driven craft of hull length up to 24 m.

The following craft are exempt from the application of this International Standard:

- sailboats;
- tiller-steered craft (2.9) with maximum speed less than 10 kn (10 knots).

NOTE Small engine-driven craft can be operated in a manner and at certain speeds causing trim angles such that vision forward is temporarily obscured. This International Standard cannot assure that a craft can be operated without some temporary loss of vision from the helm position while operating at high trim angles during the transition from displacement to planing mode.

2 Terms and definitions

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

2.1

high eye position

⟨helmsman in standing position⟩ position 1 730 mm above the surface on which the helmsman stands, 400 mm from the centre of the steering-wheel rim (see Figure 1)

2.2

high eye position

⟨helmsman in seated position⟩ position 840 mm above the intersection of the compressed seat and the seat back, 400 mm from the centre of the steering-wheel rim (see Figure 2)

2.3

low eye position

⟨helmsman in standing position⟩ position 1 480 mm above the surface on which the helmsman stands, 400 mm from the centre of the steering-wheel rim (see Figure 1)

2.4

low eye position

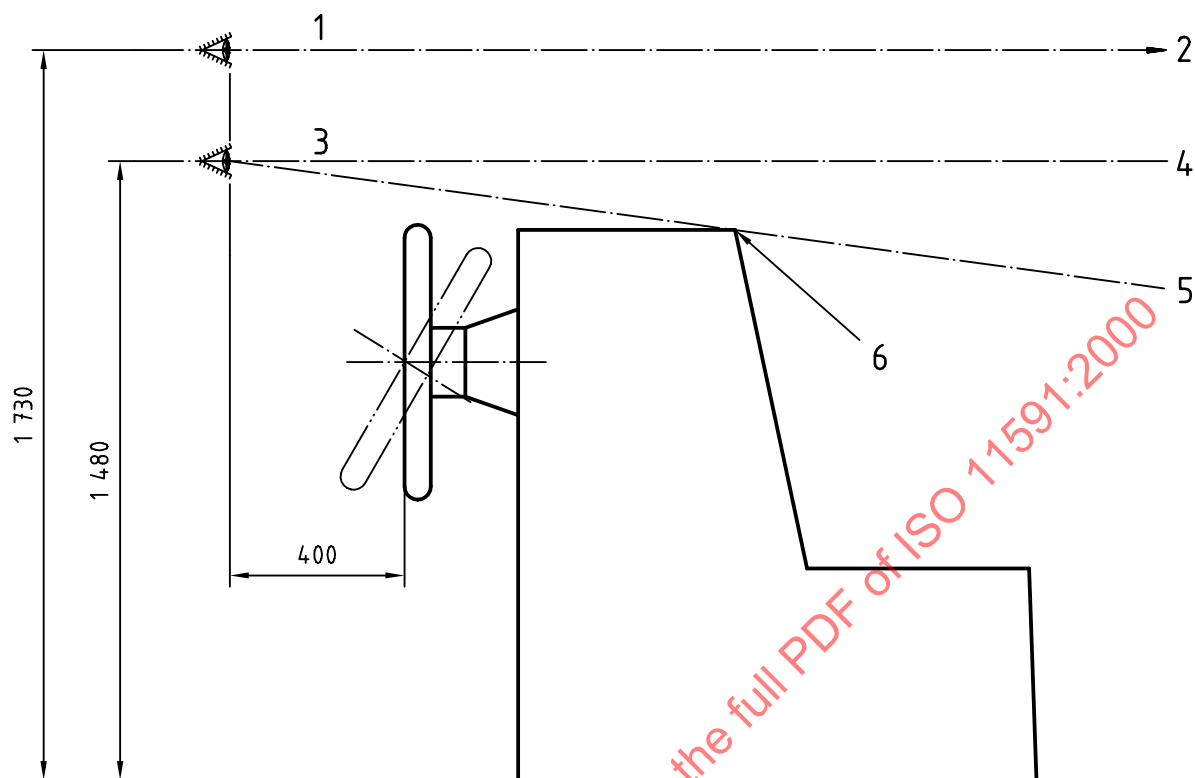
⟨helmsman in seated position⟩ position 690 mm above the intersection of the compressed seat and the seat-back, 400 mm from the centre of the steering-wheel rim (see Figure 2)

2.5

compressed seat bottom

surface of the centre of the helm seat at the intersection of the seat-back and seat-bottom when compressed by a 25 mm diameter spherical object under a vertical load of 100 N (see Figure 2)

Dimensions in millimetres

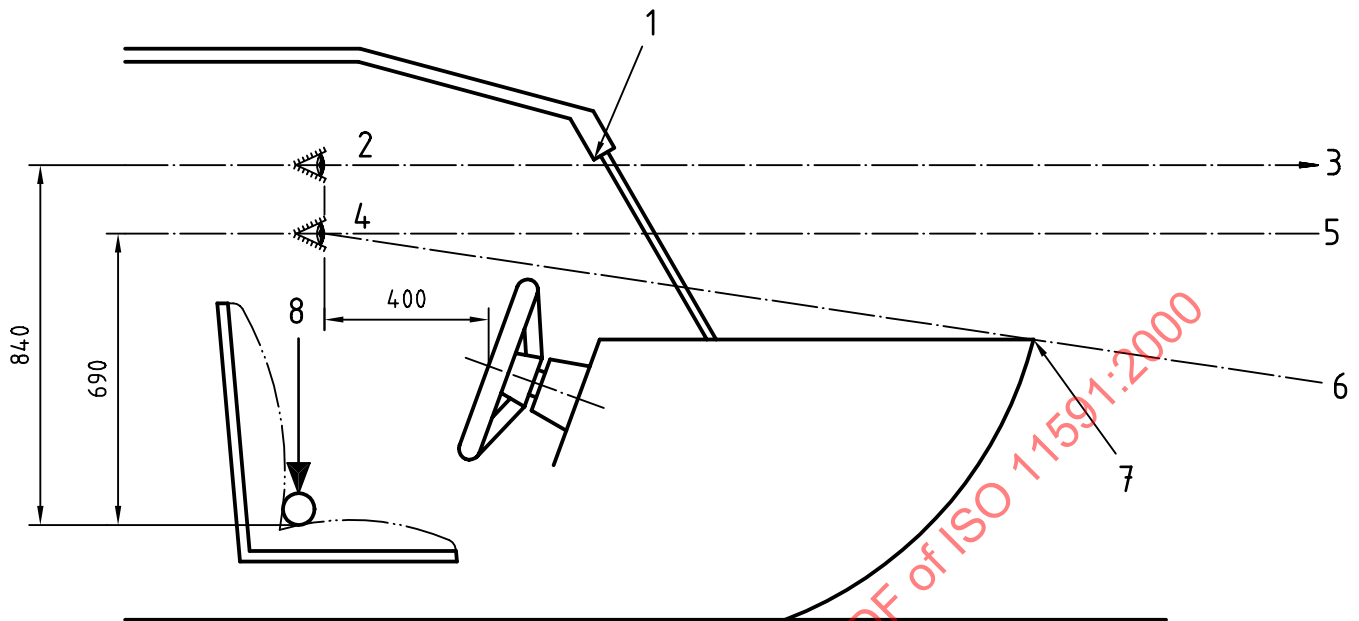


Key

- 1 High eye position
- 2 To horizon
- 3 Low eye position
- 4 Required vertical range of vision
- 5 Lowest unobstructed line of vision
- 6 Point of visual obstruction

Figure 1 — Eye positions and vertical range of vision — Helmsman in standing position

Dimensions in millimetres

**Key**

- 1 Vision obstruction
- 2 High eye position
- 3 To horizon
- 4 Low eye position
- 5 Required vertical range of vision
- 6 Lowest unobstructed line of vision
- 7 Point of visual obstruction
- 8 Seat compression (2.5)

Figure 2 — Eye positions and vertical range of vision — Helmsman in seated position

2.6**theoretical keel**

on craft without a clear intersection of bottom running surfaces at the longitudinal centreline, the intersection of the lowest bottom surfaces of the craft projected horizontally to the longitudinal centreplane of the craft (see Figure 3)

2.7**level reference line**

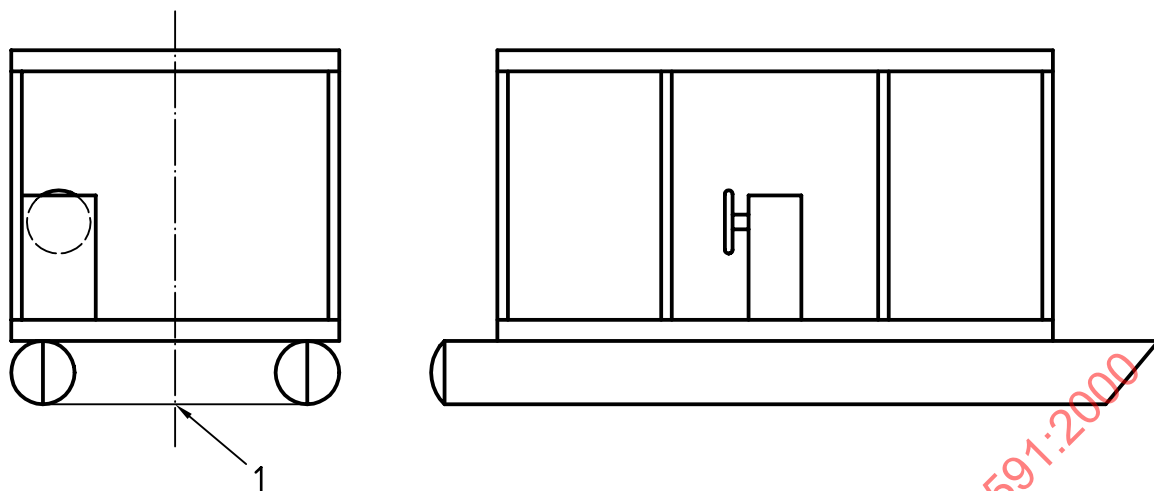
real or designated waterline of the craft determined for navigation conditions at the planned speed

2.8**vertical range of vision**

range between the lowest unobstructed line of vision from the low eye position and the highest unobstructed line of vision from the high eye position (see Figures 1 and 2)

2.9**tiller-steered craft**

craft steered from the stern position by the outboard engine tiller or stern rudder with the tiller arm directly attached



Key

- 1 Theoretical keel (2.6)

Figure 3 — Multihull theoretical keel

3 General requirements

3.1 The helmsman's position shall permit the operator to have a field of vision, including sight of the water surface, conforming with the requirements of this International Standard when in the fully loaded, ready for use, condition during cruising, manoeuvring, docking or other extended operational modes.

3.2 All glazing through which vision from the helm station is maintained shall conform with the requirements of this International Standard and shall have at least 70 % light transmission.

3.3 For craft having more than one helm station, at least one helm station shall meet the vision requirements of this International Standard. Other helm stations that do not meet the requirements of this International Standard shall display a sign at these helm stations, in clear view of the operator, with the ISO symbol for caution, , and at least the following information in a language acceptable in the country of operation:

CAUTION — Vision from this helm station is limited. Maintain a lookout as required.

3.4 Helm locations designed to be used from either standing or sitting positions shall meet the requirements of this International Standard from at least one of the positions.

3.5 Throttle and shift controls, as intended for use by the helmsman, shall be positioned within 0,7 m of the high eye position and shall enable the maintenance of at least the low eye position by the helmsman at all throttle settings. For craft designed to be operated from both the seated and standing positions, the controls shall be located to meet these requirements from at least the seated position.

3.6 The requirements for the low eye position may be met by a helmsman's seat with vertical height adjustment.

3.7 Permanent and removable tops and/or other structural parts and mounted instruments in the vicinity of the helmsman shall not obstruct forward vision as required by this International Standard.

4 Field of vision — forward

4.1 Horizontal

See Figure 4.

4.1.1 A field of vision from the eye positions at the helm shall be provided throughout a horizontal arc of $112,5^\circ$ on the starboard side to 90° on the port side of the craft. For the port side, starboard side or centreline helm locations, the same angles of vision to port and starboard are required.

4.1.2 Vision from 90° to $112,5^\circ$ on the port side shall be provided without the helmsman leaving the helm or controls, i.e. without more than 0,5 m forward displacement from the eye position.

4.1.3 A central field of vision shall be provided directly in front of the helmsman's eye position throughout the vertical range of vision and extending to at least 15° on either side of a line forward from the eye position to the obstructed vision distance described in 4.1.5. Fixed obstructions to vision within this area, such as instruments, deck hardware, horns, lights, and stanchions, shall be such that clear vision can be maintained with movement of the head from the eye positions not exceeding 35 mm in any horizontal direction. The total angle measured from the eye position subtended by fixed objects shall not exceed 8° and the objects shall not overlap when viewed from the eye position.

4.1.4 For sectors outside the arc of the central field of vision as required in 4.1.3, but within the field of vision as required in 4.1.1, fixed obstructions to vision shall be such that vision can be maintained with displacement of the head from the eye positions not exceeding 100 mm in any horizontal direction. The total angle measured from the eye position subtended by fixed objects shall not exceed 30° and the objects shall not overlap when viewed from the eye position.

4.1.5 Obstructed vision distance to the water surface in the horizontal range of vision from the stemhead or point of visual obstruction on the craft, as determined by the level reference line (see 4.2.1), shall not exceed four times the hull length, L_H , and in no case shall exceed 50 m.

4.2 Vertical

4.2.1 The vertical field of vision to the horizon and water surface shall be determined with the craft in a position established by the level reference line determined with the craft in the fully loaded, ready for use, condition.

For craft of hull length less than 10 m capable of planing at a speed in knots greater than seven times the square root of the hull length, L_H , expressed in metres, or 20 kn, whichever is less, the level reference line is determined with the most powerful outboard engine for which the craft is rated or the most powerful inboard engine installed by the manufacturer, and

- a) with the hull bottom surface adjacent to the keel, or theoretical keel, in the rear half of the craft inclined at an angle of 4° relative to the horizontal (bow raised); and
- b) with the hull bottom surface adjacent to the keel, or theoretical keel, intersecting the horizontal plane representing the water surface one-third of the hull length from the bow (see Figure 5); or

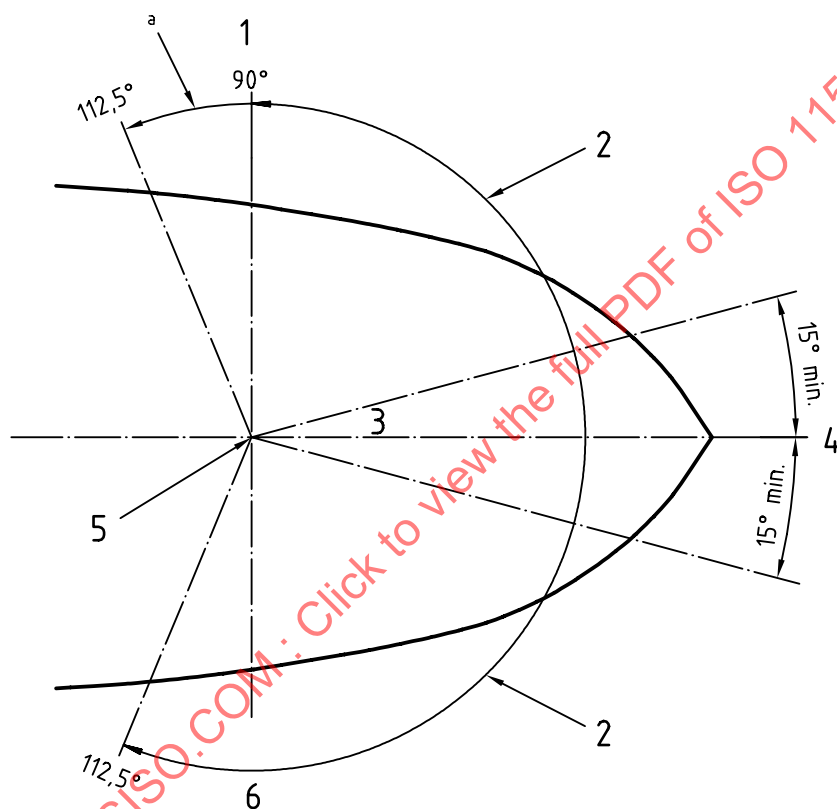
for craft of hull length up to 24 m capable of operating at planing speed,

- c) at the planing angle of the hull bottom surface as determined with the craft operating at cruising speed, i.e. 5 knots above minimum planing speed or one-fourth of the speed difference between minimum planing speed and maximum speed, whichever is less, and
- d) with the hull bottom surface at the keel intersecting the plane of the water surface at the distance from the bow as observed and verified under operating conditions as in c) above.

On craft equipped with transom-mounted trim planes and/or propulsion-unit power trim systems, the trim planes shall be adjusted and set at an angle not exceeding one-half of the total travel angle; the propulsion-unit trim position shall be adjusted and set with the forward centreline of the propeller shaft or water-jet nozzle at an angle not exceeding 5° upward relative to the hull bottom immediately forward of the propulsion unit, and with the planing craft at the same displacement speed as when manoeuvring for docking.

For craft capable of operating only at displacement speed, the level reference line is determined with the craft at rest or at maximum displacement speed, whichever produces the greatest obstructed vision distance.

4.2.2 The minimum vertical field of vision shall extend from the horizontal with respect to the high eye position to the unobstructed line of vision from the low eye position (see Figures 1 and 2), while respecting the requirements of 4.1.5 for the complete horizontal arc of vision described in 4.1.1.

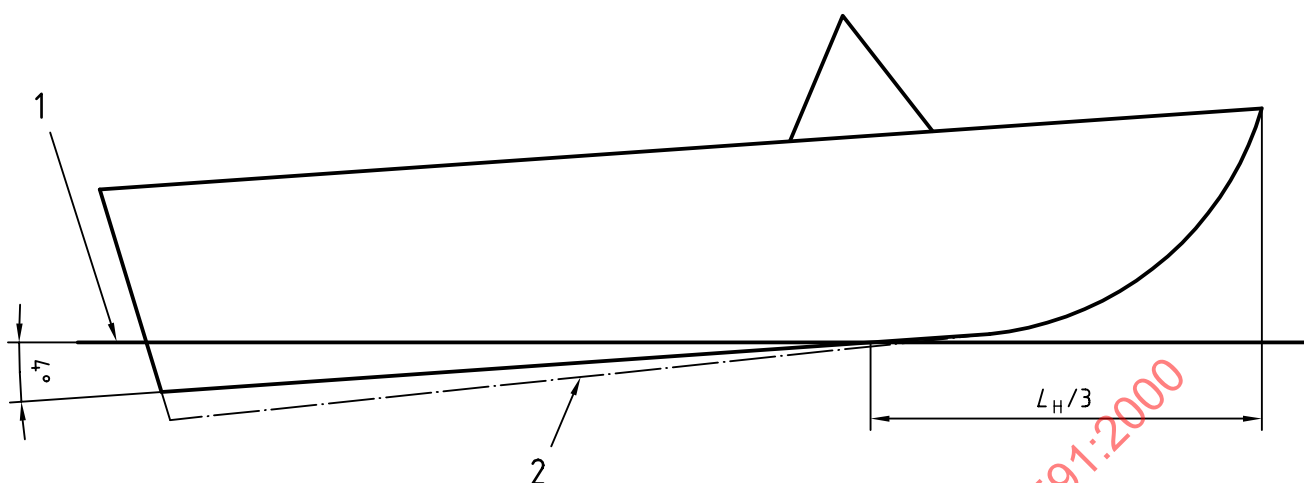


Key

- 1 Port
- 2 Horizontal range of vision
- 3 Centreline of craft
- 4 Central field of vision
- 5 Eye position at helm station
- 6 Starboard

NOTE For helm location on the port or starboard side, the same angles of vision to port and starboard are required.

Figure 4 — Horizontal range of vision

**Key**

- 1 Water surface
- 2 External keel, if present

Figure 5 — Planing attitude

5 Field of horizontal vision — astern**5.1 Craft without permanent cabin or other superstructure aft of the main helm position obstructing vision astern**

A field of vision astern to the horizon shall be provided throughout a horizontal arc of 135° equally divided on either side of a longitudinal axis directly astern from the helm. Vision astern shall be provided without leaving the helm or controls, i.e. not more than 0,5 m to either side from a seated position or 1 m to either side from a standing position in craft intended to be operated from a standing position.

5.2 Craft with permanent cabins or other permanent superstructure aft of the helm obstructing vision astern

NOTE Readily removable obstructions to vision, such as convertible or camper tops, aft and side cockpit curtains, are not considered as permanent superstructures. It is assumed that, during inclement weather when these items are in place, caution in operation will be exercised and a lookout will be maintained.

Other means such as mirrors shall be provided to meet the requirements for vision astern specified in 5.1, without leaving the helm or controls.

On craft fitted with autopilots, the helmsman may leave the helm position briefly to meet the requirements for visibility in 5.1.

6 Owner's manual

The following information should be included in the owner's manual.

- a) Operator vision from the helm can be obstructed by high trim angles of the craft and other factors caused by one or more of the following variable conditions:

- propulsion-engine trim angles (on craft equipped with a power trim system on the propulsion unit);