
**Floating leisure articles for use on and
in the water —**

**Part 7:
Additional specific safety
requirements and test methods for
Class E devices**

Articles de loisirs flottants à utiliser sur ou dans l'eau —

*Partie 7: Exigences de sécurité et méthodes d'essai complémentaires
propres aux dispositifs de Classe 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 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 the following URL: www.iso.org/iso/foreword.html.

ISO 25649-7 was prepared by the European Committee Standardization (CEN) Technical Committee CEN/TC 136, *Sports, playground and other recreational facilities and equipment*, in collaboration with ISO Technical Committee TC 83, *Sports and other recreational facilities and equipment*, in accordance with the agreement on technical cooperation between ISO and CEN (Vienna Agreement).

A list of all the parts in the ISO 25649-series can be found on the ISO website.

Introduction

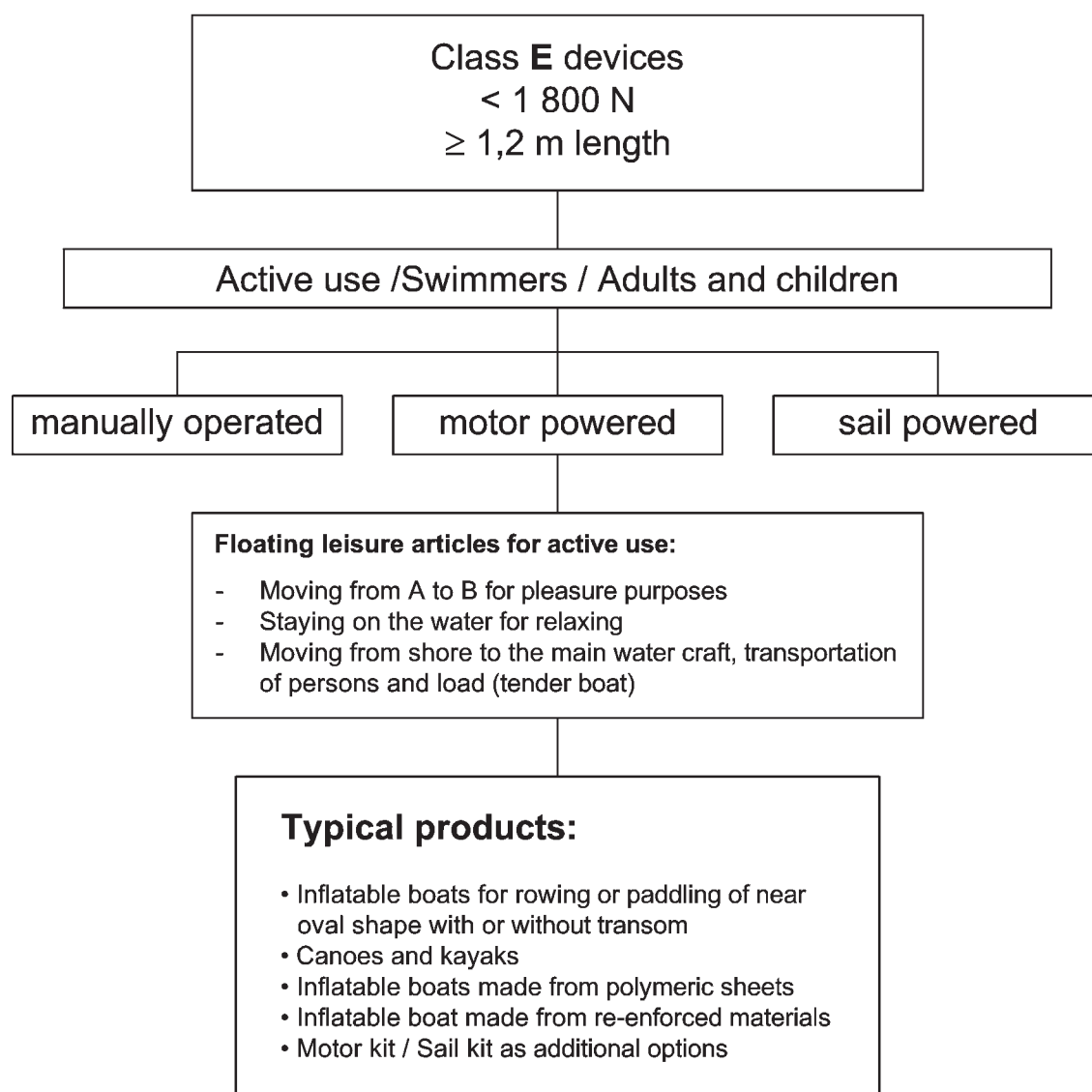
This document is closing the regulatory gap between aquatic toys smaller than 1,2 m on the one hand and inflatable boats providing a buoyancy greater than 1 800 N on the other hand. It includes all kinds of boat propulsion and covers canoes and kayaks as well. The mostly combined safety and performance requirements deal with space per person, load capacity, floating stability, engine power and behaviour after loss of air pressure (failure of an air chamber).

Practical test runs shall prove the manoeuvrability of the boat under various conditions and the adequate motorization.

Comprehensive consumer information related to selection before purchase and during use complete the requirement profile of the document.

This document covers boats of customary construction and design with an overall length from 1,2 m (uninflated, flat) up to 1 800 N buoyancy. Such boats are mostly intended for recreational water activities and for the use by children. However, smaller tender boats such as those used on yachts also fall within this size range and small boats for specific applications (e.g. fishing boats) may also be included. Therefore, irrespective of the main group of users, powered boats and sail boats have also been taken into consideration.

Interior Structure Class E



For figurative examples see [Annex C](#), [D](#), [E](#) and [F](#).

Table 1 — Introductory risk analysis

| No. | Typical products | Place of usage | Function; range of usage; target/ age group | Type of movement/ propulsion | Position of user in regard to the equipment, elevation above water | Predictable misuse | Partial risk related to water environment | Final risk | Protection aims standard/ regulation |
|--------------------------------------|--|--|---|---|--|--|--|------------------|--|
| E in work programme | Adults and children's boats rowing boats of near oval shape with or without transom canoes, kayaks, tender boats to yachts | Pools; sea, shore/ close to shore; rivers; lakes | Children, adults | Paddling, rowing, sail, engine passive and active use by hand, drifting; third party (towing) ... | Inside the boat | Overload; use by non-swimmers; wave riding | Drifting away; capsizing; entrapment; lack of supervision in case of child use ... | DROWN-ING | This document closes the gap between ISO 6185 and EN 71) |

Floating leisure articles for use on and in the water —

Part 7:

Additional specific safety requirements and test methods for Class E devices

1 Scope

This document is applicable for Class E floating leisure articles for use on and in water according to ISO 25649-1 regardless whether the buoyancy is achieved by inflation or inherent buoyant material.

This document is applicable with ISO 25649-1 and ISO 25649-2.

Class E devices are intended for use in bathing areas or in protected and safe shore zones.

NOTE 1 Typical products forming Class E (see [Annex E](#)):

- inflatable boats for rowing or paddling of near oval shape with or without transom;
- canoes and kayaks;
- inflatable boats made from plastic sheets or from reinforced materials;
- motor kit/sail kit as additional option.

NOTE 2 Typical places for application of Class E devices:

- moving from A to B for pleasure purposes;
- staying on the water for relaxing;
- moving from shore to the main boat, transportation of persons and load (tender boat).

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 8665, *Small craft — Marine propulsion reciprocating internal combustion engines — Power measurements and declarations*

ISO 25649-1:2017, *Floating leisure articles for use on and in the water — Part 1: Classification, materials, general requirements and test methods*

ISO 25649-2, *Floating leisure articles for use on and in the water — Part 2: Consumer information*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 25649-1 and the following apply.

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

- ISO Online browsing platform: available at <http://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1

residual buoyancy

provision of remaining buoyancy in case of a defect of any buoyancy chamber

3.2

inflatable boat

buoyant structure (hull), achieving all or part of its intended shape and buoyancy by the medium of inflation and intended for the transportation of persons on the water; its design and shape give it the capability to withstand forces and movements arising from various sea conditions

Note 1 to entry: An inflatable boat is considered as an aquatic toy (toy in form of a boat) according to EN 71-1, when

- a) it is intended for use without any propelling means (oars, paddles, motor, sail) and these are also not to be fitted subsequently, and
- b) its overall length is <120 cm and the boat is additionally marked with the following warning note "Caution, to be used only in shallow water and under supervision".

3.3

tender

boat that serves as an auxiliary means in working around a bigger boat but mainly to commute from the boat to shore or other places nearby

Note 1 to entry: In this respect it serves for transport of crew and load. Tenders are propelled by oars, frequently they are equipped with an outboard engine, partly they can be fitted with sails. For stowage reasons tenders are often small in size but robust in material and construction.

3.4

leisure boat

boat that serves as a recreational boat, slowly moving around on the water for relaxing, extended bathing, etc

Note 1 to entry: It does not have the purpose of a working boat.

3.5

inherent buoyant material

non-crosslinked (closed-cell) foam or other materials enclosed in (a) sealed compartment(s) in the hull which has a specific weight less than fresh water

Note 1 to entry: Boat made from inherent buoyant material is a buoyant structure (hull) achieving all or parts of its intended shape and buoyancy from soft foam, hard foam or sealed chambers filled with air, gas or granules.

3.6

inboard area

internal surface area defined by a vertical plane tangential to the innermost side of the buoyancy tube and perpendicular to the deck

3.7

inboard length

length of the cockpit, including the area below any spray cover, measured along the boat centreline between the innermost points of the bow and stern

3.8

usable seating area

inboard area, including the area below any spray cover, available for the users to sit on

3.9

permissible rated load

maximum loading of the boat by persons, propelling means and other items

3.10**integrated transom**

rear part of the boat's cockpit normally made by a flat wooden board inseparably integrated in the boats hull on which the motor is clamped by clamp screws

3.11**motor mount transom**

small board attached to the rear part of the boat via a tube frame and hull fittings by means of separate fixings for the purpose of clamping the motor to it

3.12**kayak**

boat which is propelled by means of double paddle(s) and user(s) sitting in line in a mid boat position

Note 1 to entry: The width/length-ratio of kayaks is above 1:3. Kayaks can be equipped with sail and motor.

3.13**canoe**

boat which is propelled by means of a single paddle(s) and user(s) are kneeling or sitting at bow and rear of the boat

Note 1 to entry: The width/length-ratio of canoes is above 1:3. Canoes can be equipped with sail and motor.

4 Materials

Boats conforming to this document shall meet the requirements set out in ISO 25649-1:2017, Clause 6.

All materials shall be selected by the manufacturer according to the requirements for shape, dimensions, maximum load, etc. to which the boat is to be subjected and which are resulting from the intended service conditions.

5 Construction and functional components of boats**5.1 Conditioning**

All tests shall be performed at a temperature of $(20 \pm 3) ^\circ\text{C}$.

5.2 Hull integrity**5.2.1 Requirements**

The materials and the method of construction used in the construction of a boat shall be compatible with that of the hull itself. Any load-bearing fittings attached to the boat shall not result in any impairment in air tightness or water integrity, when loaded as described in [5.2.2](#).

5.2.2 Test method

Load-bearing fittings shall be loaded in any direction up to breaking point, but not exceeding 1 kN for leisure boats (see 3.4) and 2 kN for tenders (see [3.3](#)). If maximum load is reached, this load shall be maintained for 1 min.

Any cordage used for test purposes shall have a diameter of 8 mm.

5.3 Manual lifting and carrying devices

5.3.1 Requirements

The boat shall be equipped with a means for portage. There shall be no failure of the carrying device, when tested in accordance with [5.3.2](#).

Where lifting or carrying devices also function as safety ropes or grab handles, they shall also comply with the requirements of [6.6.1](#).

5.3.2 Test method

The carrying device shall be gradually loaded with a force of 500 N for 1 min in the appropriate directions.

Any cordage used for test purposes shall have a diameter of 8 mm.

5.4 Rowlocks and oars

5.4.1 Requirements

5.4.1.1 General

The provision of paddles, rowlocks and oars is not mandatory. The assembly system oar/rowlock shall comply with the requirements given in [5.4.1.2](#) to [5.4.1.5](#).

Exclusions according to [Annex A](#).

5.4.1.2 Abrasion damage

The bearing surfaces of the oars and rowlocks shall be free from any roughness likely to cause excessive wear. All external surfaces of the rowlocks shall be smooth and free from sharp edges and corners.

5.4.1.3 Securing against loss

Rowlocks shall be secured against unintended loosening. Means shall be provided for safe location of at least two oars or paddles when stowed away.

5.4.1.4 Strength of rowlocks

There shall be no structural failure of the rowlocks and/or associated fittings when tested in accordance with [5.4.2.2](#).

5.4.1.5 Strength and performance of rowlocks and oars

When tested in accordance with [7.4](#), there shall be no structural failure or permanent deformation of any component during the test and it shall be clearly demonstrated that the rowlock system is sufficiently rigid for efficient rowing. A minimum unrestricted movement of the oars 60° ahead and 60° astern shall be enabled.

5.4.2 Test methods

5.4.2.1 Abrasion damage and prevention of loosening

Visual inspection and performance testing.

5.4.2.2 Strength of rowlocks

The rowing system, including the rowlocks, shall be loaded with a force of 300 N for 1 min in the horizontal direction that is most likely to cause failure.

Any cordage used for test purposes shall have a diameter of 8 mm.

5.5 Hull drainage

If the boat is fitted with a transom integrated in the body of the boat, it shall be equipped with at least one drain-plug or one bailing system.

5.6 Towing device

All boats shall have, at their bow, a towing device suitable for securing a towline. See [7.2](#) for strength test.

5.7 Seating and attachment systems (where offered as standard or optional equipment)

There shall be no damage or malfunction to either the seating or to any related attachment systems, when tested in accordance with [Clause 7](#).

6 Safety requirements and test methods

6.1 Minimum area and maximum permissible number of persons

6.1.1 Requirement

The calculated seating area for each adult shall be at least 0,45 m² and for each child it shall be 0,23 m². The load rated for an adult shall be 75 kg, for a child 37,5 kg. Two children up to 10 years of age are considered as an adult. The inboard area of boats (inboard length × inboard width) intended for use by only one person shall be so designed, independent of the calculated seating area, that the appropriate seat pattern shown in ISO 25649-1:2017, Annex A can be placed inboard without over crowding.

For boats where the inboard area is restricted by equipment parts of the motor or sail kit, the usable inboard area for each person shall be verified by placing the seat patterns for adults and/or children on the usable area without overlapping. The patterns shall be distributed so that the persons sitting in their predetermined positions are not impeded and/or endangered by any equipment parts protruding/swinging into or installed inboard the boat.

Exclusions are described in [Annex A](#).

6.1.2 Testing

The dimensions for calculating the usable inboard area (m²) shall be determined vertically between the inboard walls with the hull inflated to working pressure. Where the inboard area has an irregular shape, the measurements of length and width shall be multiplied. Areas below the spray cover are considered as usable areas.

The permissible number of persons (adults/children) for boats designed for several persons is obtained by division of the total inboard area by 0,45 m² for adults or 0,23 m² for children. Boats shall not be labelled for more than two children. The resulting value shall be rounded down to the nearest integer or 0,5 m². For boats designed for one person only, the seat patterns are used as measuring aid or test criterion.

6.2 Static stability of the boat

6.2.1 Requirement

The boat equipped with the manufacturer's maximum rated motor (see [B.2.4](#)) shall not capsize when tested in accordance with [7.4.2](#).

Exclusions according to [Annex A](#).

6.2.2 Test method

The test shall be carried out with the motor fitted but without a fuel tank, battery or sail kit. The test load shall be evenly distributed over the test loading area of the boat, as shown in [Figure 1](#).

The total test load for a child, if applicable, shall be

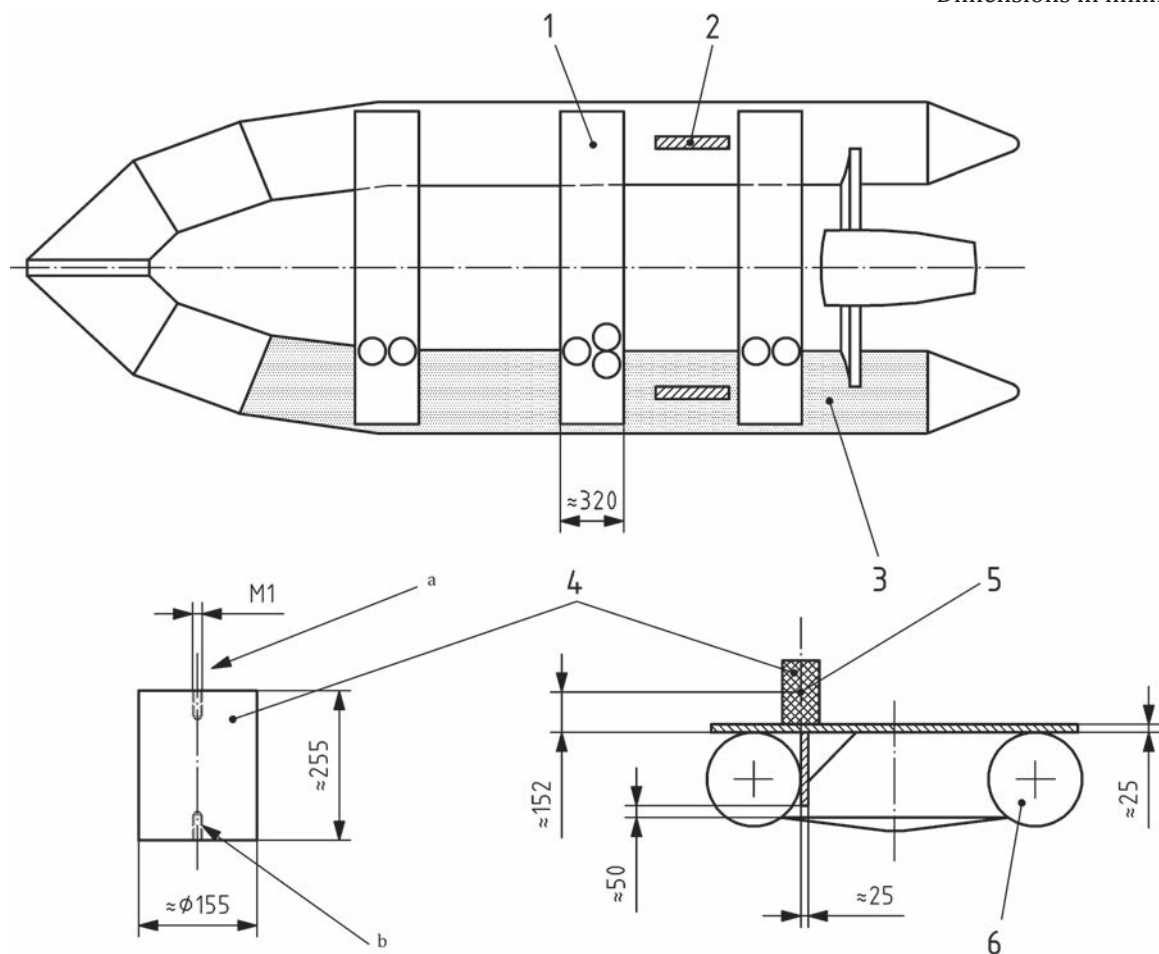
$$m_t = (0,67 \times n \times 75 \text{ kg}) + (0,67 \times 37,5 \text{ kg}) \quad (1)$$

where

n is the maximum permissible number of adults determined by the manufacturer (see [6.1](#)), i.e. 75 kg for each permissible adult and 37,5 kg for a child, if applicable.

NOTE The dimensions for a 37,5 kg steel test weight are given in [Figure 1](#).

Dimensions in millimetres



Key

- 1 typical load plate, e.g. timber
- 2 fitting or rowlock
- 3 test loading area
- 4 test weight, steel, 37,5 kg
- 5 centre of gravity of test load
- 6 buoyancy tube
- a For eyebolt.
- b For load-plate fastening bolt.

Figure 1 — Static stability test with three adults and a child

6.3 Dimensional stability when getting on and off the boat

6.3.1 Requirement

The inflated boat, ready-for-use, shall not buckle nor capsize when a person carrying luggage (combined 100 kg) is getting into or out of the boat at any accessible point of the floor of the inboard area, while the load capacity (evenly distributed over the usable inboard floor area) is fully utilized.

The boat shall be checked for its stability in shape when the boat is embarked by the first test person. The boat may deform up to a degree where function and safety is still maintained.

6.3.2 Testing

The boat shall be loaded with a mass of 75 kg (adult) or 37,5 kg (child) at any accessible point of the inboard floor area. The loading area shall be a circle with a diameter of 200 mm.

6.4 Maximum load capacity

6.4.1 Requirement

The maximum load capacity of the boat shall be calculated using the following equation:

$$m = \left(0,5 \times V \times 1\,000 \frac{\text{kg}}{\text{m}^3} \right) - M \quad (2)$$

m is the maximum load capacity in kg (total load weight on board including persons, equipment, outboard motor and fuel);

V is the volume of the buoyancy chambers in m^3 ;

M is the total mass in kg, of the boat as supplied by the manufacturer, inclusive of all equipment permanently installed and/or supplied with the boat such as hull, fittings and similar items but without outboard motor and fuel. Permanently installed engine(s) and drive systems shall also be included.

6.4.2 Testing

Proof of maximum load capacity, m , by calculation with Formula (2). The volume, V , shall be determined either by calculation or experimentally. For determination of the data (dimensions for calculation, gauging of volume by litres) the boat shall be inflated to the working pressure.

For determination of the volume, the uncertainty of measurement shall not exceed 3 %. The arithmetic mean of three measurements shall be taken.

For determination of the mass, an appropriate balance shall be used.

The determined volume and the mass of the boat shall be indicated in the test report.

6.5 Safety ropes and grab handles

6.5.1 Requirement

All boats shall be equipped with adequate means offering a firm hold to each of the permissible number of persons when occupying the seating positions provided or when outside in the water, even if the boat has capsized. All handholds shall be designed to ensure, by their nature and arrangement, that the permissible number of persons can hold them, even for a long period, without risk of injury.

The handholds and their assemblies shall conform to the requirements for hull fittings described in [5.2](#). Where safety ropes and grab handles also function as manual lifting or carrying devices, they shall also conform to the requirements of [5.3](#).

All boats shall have a properly affixed safety rope.

There shall be no failure/fracture of the handhold assemblies when tested as specified in [5.2.2](#).

6.5.2 Test method

Visual inspection and assessment.

Each handle and lifeline assembly fitting shall be loaded with a force of 500 N for 1 min in the direction most likely to cause failure. For practical assessment in the water, see [7.2](#).

6.6 Residual buoyancy specific for boats

6.6.1 Requirement

After failure of the largest buoyancy chamber, the residual buoyancy of the hull shall be at least 50 % of the manufacturer's rated maximum load capacity (see [6.4](#)).

6.6.2 Test method

The residual buoyancy shall be calculated or measured.

6.7 Manoeuvrability

6.7.1 Requirement

An inflated boat loaded to the maximum load capacity shall be capable, upon sudden deflation of any one of its buoyancy chambers, of being propelled purposefully by one of its intended means. Oars may be used as paddles.

6.7.2 Test method

The boat shall be propelled, with its air chamber most likely to cause failure deflated, in a generally straight line over at least 50 m in calm water.

7 Performance requirements and test methods for boats

7.1 General

The boat shall have passed at least the test in accordance with ISO 25649-1:2017, Clause 6. The boat shall be assembled in accordance with the manufacturer's instructions and inflated to the defined working pressure.

Testing shall be carried out in the order of [7.2](#) to [7.4](#) in conditions with an average wave height of 300 mm.

The coxswain and other crew members, if any, shall perform the tests by taking the seating positions offered as standard or optional equipment.

7.2 Strength and performance of the towing device for boats

7.2.1 Requirement

When examining the boat closely at the end of the test period, there shall be no structural failures on any part of the hull or boat components, such as the deck or thwarts, and including any boundary interface such as floor/hull.

During the test, there shall be no tendency for the bow to submerge or to lift in a manner likely to submerge the motor or overturn the boat.

7.2.2 Test method

The maximum permissible number of persons calculated in accordance with [6.1](#) shall be embarked.

The boat shall be towed for at least 15 min by its towing device (see [5.6](#)) to be designated by the manufacturer at a speed of not less than 4 knots with a towline of length equal to 3 times the boat length ($\pm 15\%$).

7.3 Rowing test (where applicable, see [5.4](#))

The boat shall be rowed for a distance of not less than 300 m in both the minimum loaded condition and the fully loaded condition according to manufacturer's declaration.

The rowlock system shall be examined during and on completion of the test, and the unrestricted movement of the oars shall be measured.

Exclusions according to [Annex A](#).

7.4 Water tightness test for boats

7.4.1 Requirement

The boat shall be closely examined at the end of the test. There shall be no evidence of water within the boat.

This test does not apply to boat equipped with a self-draining system.

7.4.2 Test method

It shall be ensured that there is no water within the boat at the beginning of the test. The boat shall be loaded to the maximum load capacity recommended by the manufacturer. The distribution of this load shall represent the boat fitted with a motor of the maximum power rating as specified by the manufacturer and passengers seated in their normal positions.

For testing, the boat shall be allowed to remain static in the water for 20 min.

8 Standard equipment and accessories for boats

8.1 Requirement

Where a pressure gauge is provided by the manufacturer to ensure the specified maximum working pressure, it should at least conform to class 2,5 (according to EN 837-1).

8.2 Testing

Visual inspection.

9 Marking

Boats according to this document shall be marked in accordance with ISO 25649-2 as far as applicable. All information shall be placed together in a position where they are well visible when the boat is in use. Information shall be grouped in consistent contents.

Additionally, given pictorial representation of the useable boat with significant contour lines and main dimensions shall be on the packaging.

10 Instructions for use for boats

See also relevant additional requirements in ISO 25649-2.

Each boat according to this document shall be supplied with instructions for use, easy to understand, sufficient to enable even an unskilled operator to correctly assembly and disassemble, operate, handle, maintain and store the boat. The texts describing difficult and complicated handlings shall be supplemented by explanatory drawings/pictures. The instructions for use shall be subdivided into groups as given below and shall contain at least the following information, with explanations where possible:

- a) General information about the boat and it's use:
 - 1) Descriptions of the boat, accessories and options of use (propelling by oars or paddles).
 - 2) Explanations of the terms “permissible number of persons” and “maximum working pressure”.
 - 3) Warning, not to perform any structural changes to the boat that could affect the safety.
 - 4) The minimum safety and performance requirements specified in this document does not release the user of an inflatable boat from his obligation to acquire the knowledge and skills required for navigating in water and to observe the respective regulations, since safety on the water is also a result of the interaction between coxswain, boat and water conditions.
- b) Instruction for assembling and disassembling the boat, descriptions, including drawings/pictures, of assembly and disassembly with information on:
 - 1) Preparation of the boat and its accessories for assembling;
 - 2) Mounting of floor and bracing parts;
 - 3) Mounting of devices for rowing;
 - 4) Inflation of the boat and maximum working pressures;
 - 5) Handling of inflation valves;
 - 6) Handling of pressure gauge or device for pressure assessment, see also ISO 25649-1:2017, 5.7;
 - 7) Positioning and fixing of the seats;
 - 8) Mounting and handling of protective devices, where available;
 - 9) Attachment of belaying lines fixtures.
- c) Instruction for care and storage of the boat:
 - 1) Thorough cleaning and drying of all parts of the boat, particularly after it has been used in salt water and after soiling by oil, indicating the permitted cleaning and preservative agents;
 - 2) Inspection of the hull and all its parts for detection of any damages due to mechanical strain, wear and ageing;
 - 3) Repair of smaller damages by the means provided on board (repair kit);
 - 4) Advice, when to bring the water boat or any essential equipment part into a professional repair shop for appropriate repair or replacement (e.g. large tears/cracks);
 - 5) Instruction for correct storage of the boat, its equipment and other accessories.
- d) Instruction for operation afloat, including the necessary warning notes and required supervision of children, advices and/or rules of behaviour with respect to:
 - 1) Correct use of the boat's equipment and accessories;
 - 2) Provision of oars or paddles;

- 3) Load distribution, secure stowing of items, taking and keeping the seating positions inboard (falling overboard);
- 4) Taking along of sharp and/or pointed items;
- 5) Stony shore, jetties, shallows (e.g. sandbanks, coral reefs, rock);
- 6) Provision of lifesaving means (e.g. life jackets, distress signals, spare parts);
- 7) Towing, being towed;
- 8) Failure of an air chamber;
- 9) Re-rightening of the boat;
- 10) Hazards arising from currents and winds;
- 11) Caution of offshore winds and currents (parental supervision of children).

11 Exclusions

According to [Table 2](#).

Table 2 — Exclusions

| No | Propelling means | Not applicable specifications depending on the propelling means | Combinations |
|----|---------------------------|--|--|
| 1 | Propelled by manual means | 5.2 ; B.2 ; B.1 (sailing test) | To be applied analogously for combinations of propelling means |
| 2 | Propelled by motor power | Annex B (sailing test) | |
| 3 | Propelled by sail | 5.2 ; B.2 | |

Annex A

(normative)

Inflatable canoes, kayaks and sit-on-top kayaks

A.1 Applicable requirements

In addition to the requirements detailed in this annex, inflatable canoes, kayaks and sit-on-tops shall conform to all the requirements of the main text of this document, excluding the following clauses:

- [5.4](#) Rowlocks and oars;
- [6.1](#) Minimum area and maximum permissible number of persons;
- [B.2](#) Applicable requirements for motorised boats;
- [6.2](#) Static stability of the boat;
- [7.3](#) Rowing test.

Sit-on-tops should be tested as far as requirements below are applicable.

A.2 Maximum permissible number of persons

A.2.1 Kayaks

For each permissible person, the minimum seating area shown in ISO 25649-1:2017, Annex A shall be provided. The number of permissible persons n (adult or child) is equal to the number of seat patterns, which can be placed on the floor of the boat without overlapping. Point Z of the patterns shall be placed vertically in line with the lower forward edge of the backrest (see ISO 25649-1:2017, Annex A).

A.2.2 Canoes

For each permissible person, the minimum seating/kneeling area shown in ISO 25649-1:2017, Annex A, shall be provided. The number of permissible persons n (adult or child) is equal to the number of patterns, which can be placed on the floor of the boat without overlapping.

A.3 Load capacity, stowage volume

The total mass of the number of persons determined in accordance with [A.2.1](#) and/or [A.2.2](#) shall not exceed the maximum load capacity (see [6.4](#)).

For calculation of the mass 75 kg for each adult and 37,5 kg for a child have to be used.

Canoes and kayaks shall provide a minimum inboard stowage volume, outside the seating area, of 25 dm³ per adult and 13 dm³ per child.

A.4 Backrest and footrest for kayaks

Kayaks shall be equipped with a backrest and a footrest for each permissible person. The footrest shall not entangle/entrap the feet of the occupants in the event of a capsizing.

A.5 Safety ropes

Safety ropes for all types of canoes and kayaks shall be fitted to both sides of the bow and stern areas only and shall not impede the normal operation of the boat.

A.6 Performance test for kayaks and canoes

The manoeuvre ability of the boat under given loading conditions shall allow a goal orientated straight forward course according to manufacturer's declarations.

Testing shall be performed by a practical test in water. The test course for propulsion straight forward shall be 100 m.

Test criteria:

- purposeful propulsion by its intended means in a straight line without hindrance to the operator(s) when paddling or canoeing, and
- purposeful propulsion without the seats and backrest becoming detached and without undue ingress and retention of water in the boat.

There shall be no structural damage of the boat.

Annex B

(normative)

Inflatable boat propelled by sail or motor

B.1 Applicable requirements for sailed boats

B.1.1 General

In addition to the requirements detailed in this annex, inflatable boats propelled by sail shall conform to all the requirements of the main text of this document.

B.1.2 Boards

B.1.2.1 Construction

Leeboards, centreboards and dagger boards shall be capable of being hoisted to the level of the boat bottom and of being fixed in their working position without the use of tools or devices.

Dagger boards shall be secured against accidental loss.

B.1.2.2 Strength and function of boards

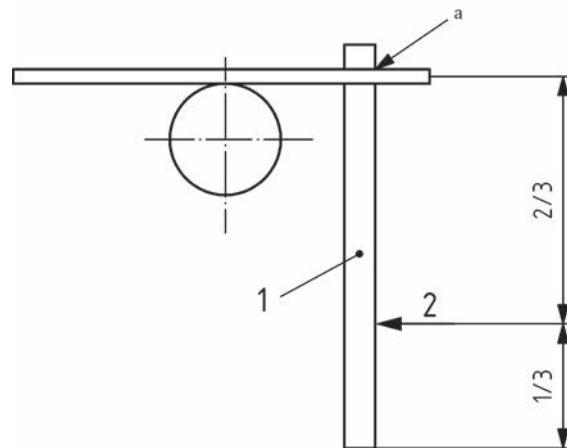
The attachment of any of the boards shall show no failure or permanent deformation when loaded with a lateral force of 80 N/m² of sail area.

For leeboards, the lateral force shall be applied on the vertical centreline 2/3 of its length down from the turning axis. See [Figure B.1](#).

For centreboards and dagger boards, the lateral force shall be applied at the mid-point of their exposed length underneath the boat bottom, l_x . See [Figure B.2](#).

B.1.2.3 Test method

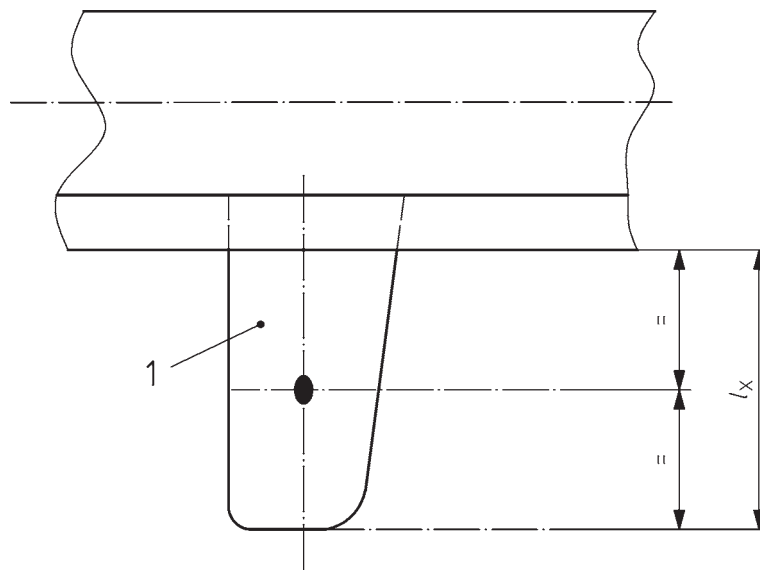
Boards shall be tested when fitted to the boat and in both directions. The load shall be applied once in each direction for 10 min.



Key

- 1 leeboard
- 2 lateral force
- a Turning axis.

Figure B.1 — Leeboard strength test



Key

- 1 centre/daggerboard
- l_x length underneath the boat bottom

Figure B.2 — Centre/daggerboard strength test

B.1.3 Standing and running rigging

Detachable masts and booms shall be capable of being securely jointed.

The minimum diameter of sheets shall be 8 mm.

Jibs and mainsheets shall be capable of being cleated by the helmsman in his seating position.

B.1.4 Sailing performance

B.1.4.1 Requirement

Boats propelled by sail shall be capable of sailing the test course as described in [Table B.1](#) and [Figure B.3](#) with no damage or malfunction. The test course from A to B proves the ability of the boat to sail against a true wind under a true tack angle of at least 60° , i.e. buoy B shall be approached from its windward side without tacking.

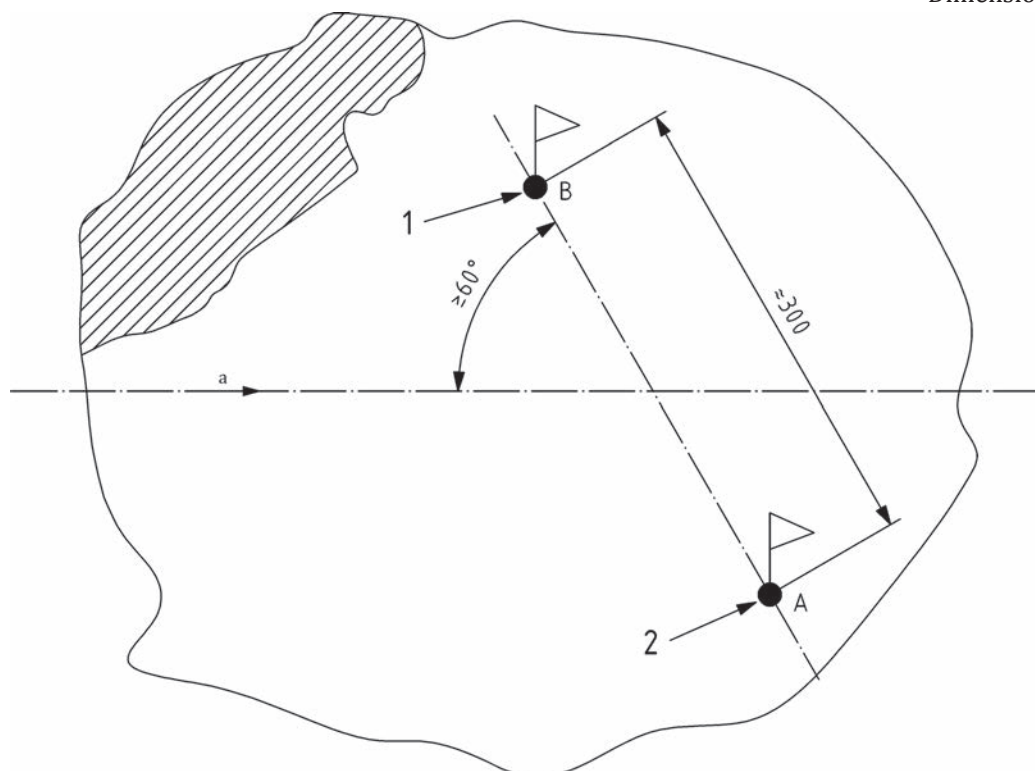
B.1.4.2 Test method

The test comprises two subtests [(a) and b)] with different load conditions (see [Table B.1](#)).

Table B.1 — Sailing test course

| Subtest | Wind force (Beaufort) | Sailing direction | Number of tests courses required | Load condition |
|---------|-----------------------|-------------------|----------------------------------|----------------|
| a) | 4 | A to B | 3 | 1 adult |
| b) | 4 | A to B | 3 | Maximum load |

Dimensions in metres



Key

- 1 buoy B
- 2 buoy A
- a True wind direction.

Figure B.3 — Sailing test course

B.2 Applicable requirements for motorised boats

B.2.1 General

In addition to the requirements detailed in this annex, inflatable boats propelled by motor shall conform to all the requirements of the main text of this document.

Exclusions according to [Annex A](#).

B.2.2 Transom (where applicable)

B.2.2.1 Requirement

The transom or motor mount and its attachment to the boat shall be designed to withstand, under normal use, the output power and torque of the motor specified by the manufacturer and the weight of such a motor.

B.2.2.2 Test method

Visual inspection during and after in-water performance tests as described in [B.2.5](#).

B.2.3 Motor-securing line attachment (only powered boats)

A means of attaching a motor-securing line shall be provided at an appropriate position.

B.2.4 Maximum motor power

For boats without a transom: $P_{\max} = 0,8 \times F(d)$

For boats with a transom: $P_{\max} = 1,2 \times F(d)$

where

P_{\max} is the maximum motor power rating, in kW, determined in accordance with ISO 8665;

$F(d)$ is the dimensional factor = $l \times b$

where

l is the overall length of the boat in m, from the bow to the extremity of the rear float (excluding handholds or other fittings);

b is the overall width of the boat in m (excluding handholds or other fittings).

B.2.5 In-water performance, if the boat is equipped with mechanical means of propulsion

B.2.5.1 Requirements

There shall be no structural failures in the form of fractures, cracks, tears, separations, etc. on any part of the hull or boat components, such as the deck or thwarts, and including any boundary interface such as floor/hull, deck/transom, buoyancy tube/hull, etc.

There shall also be no signs of abrasion that could result in subsequent structural damage or failure.

The boat shall not overturn and shall remain reasonably dry.

B.2.5.2 Test method

B.2.5.2.1 General

The boat shall be closely examined at the end of the test period.

The remote steering system shall be used, if it is supplied as standard equipment. If it is offered as optional equipment, the test shall be carried out using both tiller and remote steering system consecutively.

B.2.5.2.2 Testing with minimum load

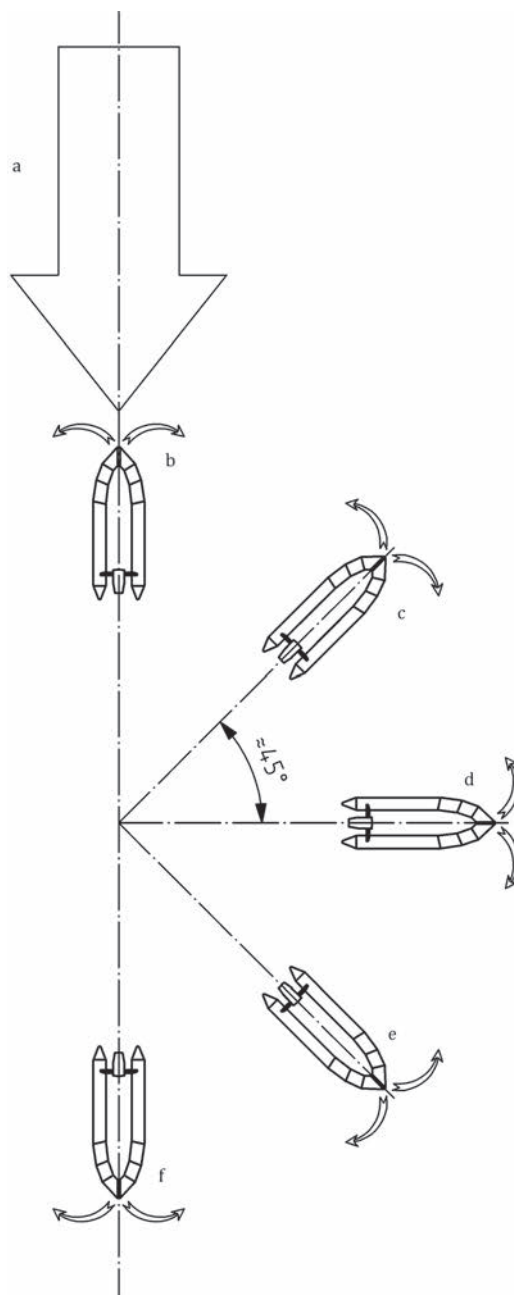
Only a coxswain shall embark. The total period of testing shall not be less than 45 min. With powered boats, the motor controls shall be set to develop maximum forward thrust.

The boat shall be headed directly upwind and then successively downwind on courses of approximately 45° separation (see [Figure B.4](#)). This will give a minimum of at least five separate courses encountering a head-on, bow quarter, beam, stern quarter and following sea condition. The boat shall be turned sharply to port and starboard towards the end of each course (see [Figure B.4](#)).

B.2.5.2.3 Testing with maximum load

The test described in [B.2.5.2.2](#) shall be repeated, but with the boat uniformly loaded with its maximum load capacity including the maximum permissible number of persons (see [6.1](#) and [6.4](#)).

All handholds shall be clearly seen to have satisfied the requirements of [6.5.1](#) and all seating and attachment systems to have satisfied the requirements of [5.7](#).

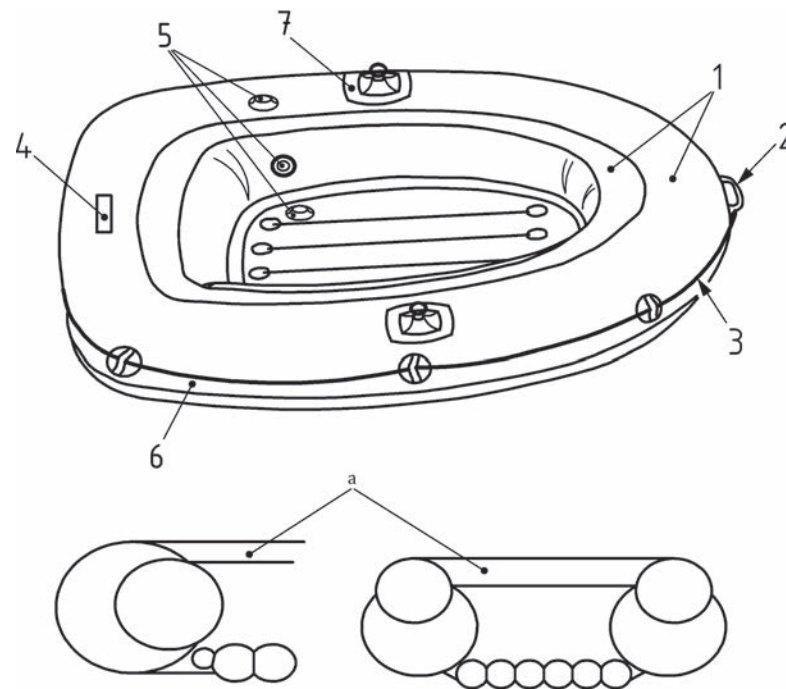


- a True wind direction.
- b Upwind course.
- c Bowquarter course.
- d Beam-wind course.
- e Sternquarter course.
- f Downwind course.

Figure B.4 — In-water performance test

Annex C (informative)

General arrangement of a typical boat with the hull made of non-reinforced material



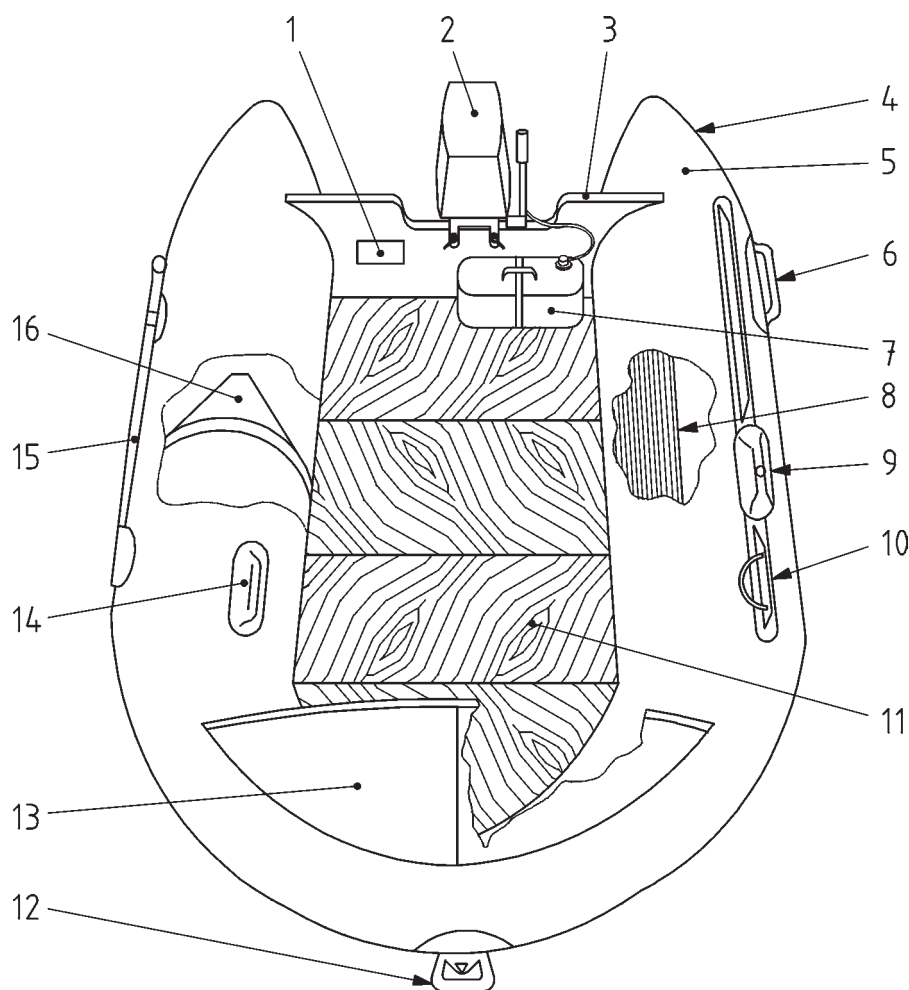
Key

- 1 buoyancy tubes
- 2 towing device
- 3 safety rope or lifeline
- 4 type plate
- 5 inflation valve
- 6 lifting/carrying device
- 7 oarlock
- a Example of a longitudinal partition.

Figure C.1 — Arrangement of a boat made of non-reinforced material

Annex D (informative)

General arrangement of a typical boat with the hull made of reinforced material



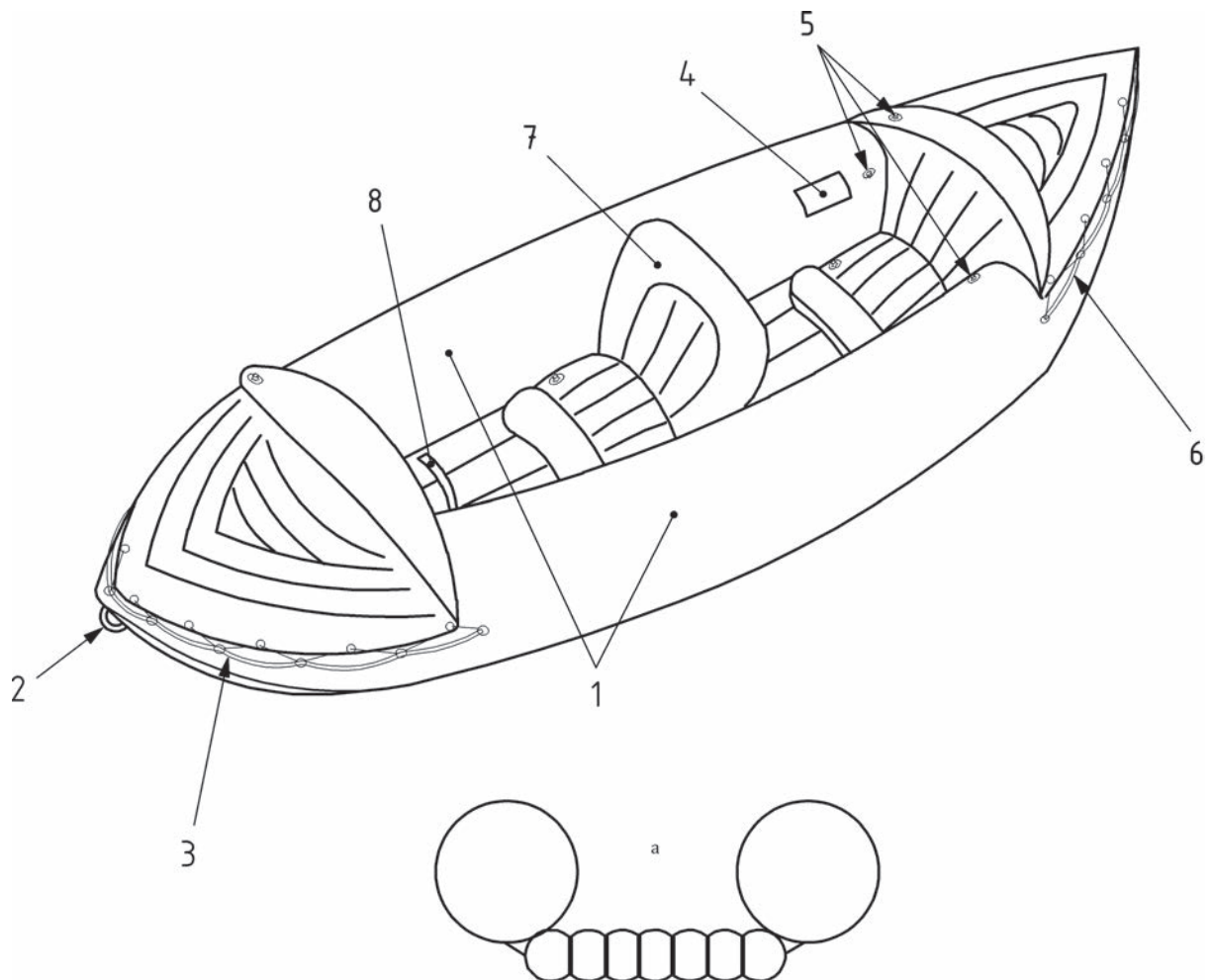
Key

| | | | |
|---|--|----|--|
| 1 | type plate | 9 | oarlock |
| 2 | motor | 10 | safety rope or lifeline |
| 3 | transom | 11 | inboard area |
| 4 | inflation valve | 12 | towing device |
| 5 | buoyancy tube comprising several buoyancy chambers | 13 | spray cover |
| 6 | lifting/carrying device | 14 | grab handle |
| 7 | fuel tank | 15 | paddle or oar |
| 8 | partition bulkhead — Example of a longitudinal partition | 16 | partition bulkhead — Example of a transverse partition |

Figure D.1 — Arrangement of a boat made of reinforced material

Annex E (informative)

General arrangement of a typical paddle boat/kayak



Key

- | | | | |
|---|-------------------------|---|--------------------------------------|
| 1 | buoyancy tubes | 6 | lifting/carrying device |
| 2 | towing device | 7 | backrest |
| 3 | safety rope or lifeline | 8 | footrest |
| 4 | type plate | a | Example of a longitudinal partition. |
| 5 | Inflation valve | | |

Figure E.1 — Arrangement of a paddle boat/kayak

Annex F (informative)

Examples of typical products forming Class E

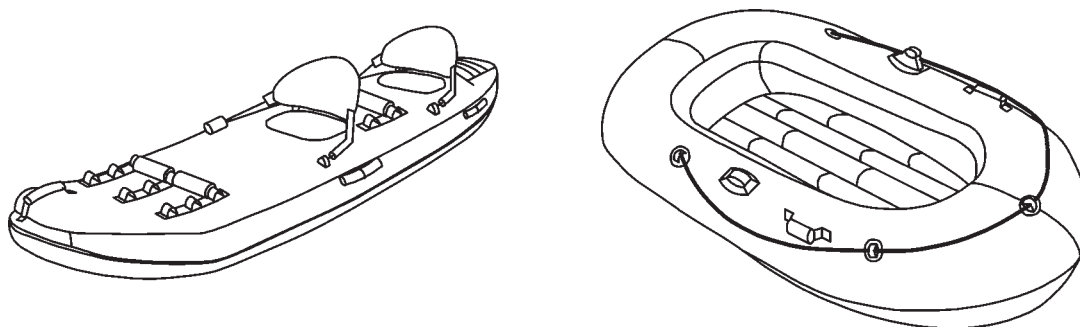


Figure F.1 — Examples of typical products forming Class E

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- [2] ISO 1431-1, *Rubber, vulcanized or thermoplastic — Resistance to ozone cracking — Part 1: Static and dynamic strain testing*
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- [13] EN 837-3, *Pressure gauges — Part 3: Diaphragm and capsule pressure gauges — Dimensions, metrology, requirements and testing*
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- [15] EN 13138-2, *Buoyant aids for swimming instruction — Part 2: Safety requirements and test methods for buoyant aids to be held*
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