



**International
Standard**

ISO 25649-5

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

**Part 5:
Additional specific safety
requirements and test methods for
Class C devices**

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

*Partie 5: Exigences de sécurité et méthodes d'essai
complémentaires propres aux dispositifs de Classe C*

**Second edition
2024-10**



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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 document 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).

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For an explanation of 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 www.iso.org/iso/foreword.html.

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

This second edition cancels and replaces the first edition (ISO 25649-5:2017), which has been technically revised.

The main changes are as follows:

- update of the introduction;
- update of [Clauses 2, 3, 5](#) and [8](#);
- addition of requirements and test methods in [4.3.5](#) regarding foot and finger entrapments;
- update of [Annex B](#).

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

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

This document applies to floating leisure articles for dynamic use of Class C (see [Figure 1](#) for distinction between Classes C1, C2 and C3 products). Examples of Class C products can be seen in informative [Annex C](#).

Most technical requirements in this document are derived from the overriding property of the products to provide high speed rides when towed by fast motorboats. Thus, space per person and means to hold tight reliably and comfortably and without entrapment or entanglement is an important subject. This document also addresses safety requirements concerning towing ropes.

Safety and performance of the products are tested by practical tests under all conditions and manoeuvres, including the issue of a quick release in case of an emergency as well as residual buoyancy.

This document also includes requirements on comprehensive consumer information, including a set of non-verbal communication gestures.

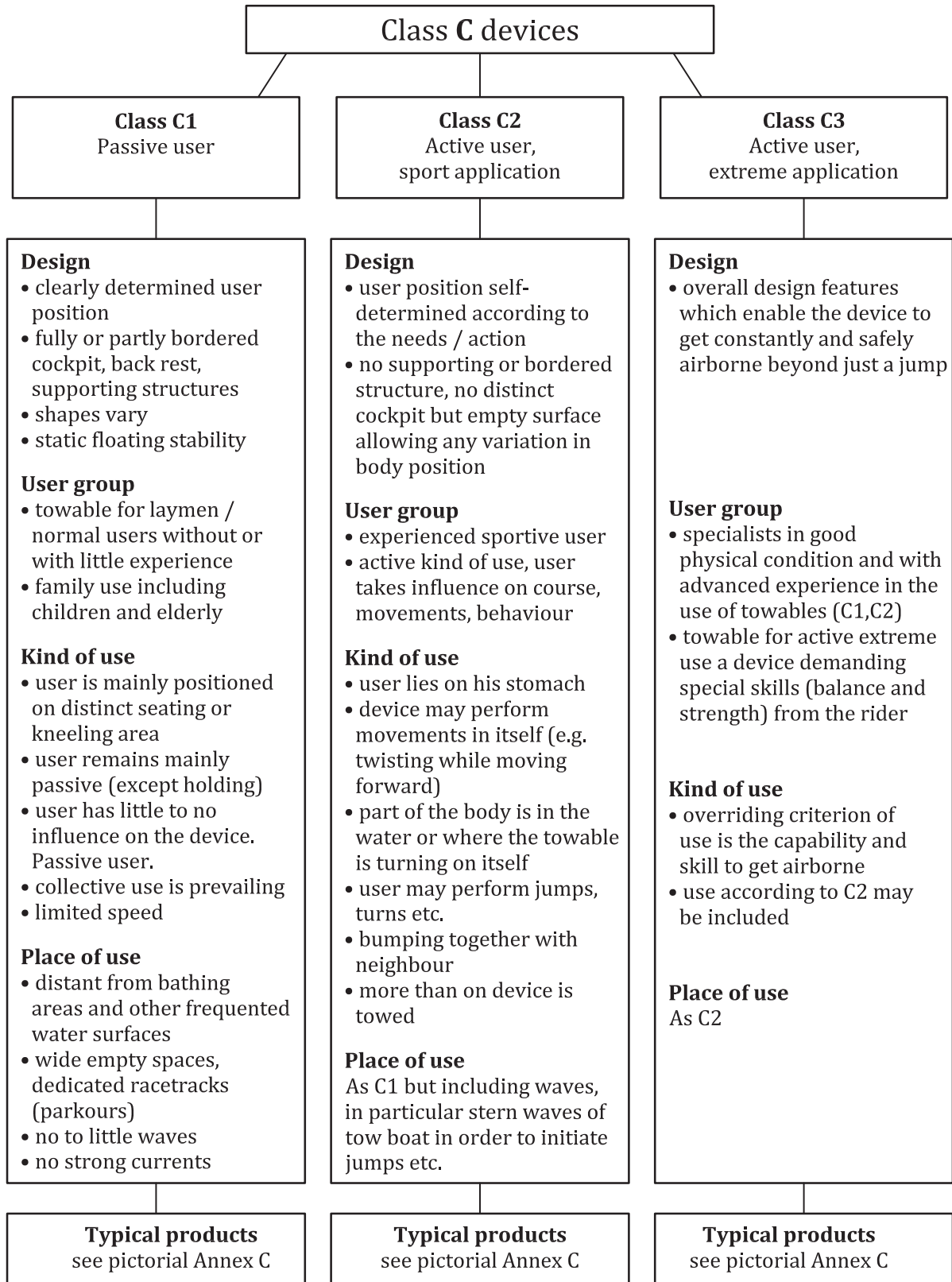


Figure 1 — Interior structure of Class C devices

The risk assessment for this document is shown in [Table 1](#).

Table 1 — Introductory risk analysis

Class	Typical products	Place of usage	Function; range of usage; target/age group	Type of movement/propulsion	Position of user with regard to the equipment, elevation above water	Predictable misuse	Partial risk related to water environment	Final risk	Protection aims standard/regulation
C (C1, C2, C3)	Tube riders with interior holding facility and closed cockpit; raft riders; board riders; banana riders (all to be towed by motor boats)	Sea shore or close to shore; lakes, rivers; large space for action is needed	Adolescents; adults; children accompanied by adults (minimum age group)	High speed movement; devices towed by motor boats; other means of propulsion	Users are sitting on or inside the device; elevation from water level approximately maximum 60 cm sitting height; kneeling, lying; standing	Use by non-swimmers; no use of PFD; excessive speed; improper load distribution/seating position; close vicinity to other users; overload; inadmissible number of passengers	Collision of persons in the case of capsizing; fall from the device; device turning; catapulting out of the device; impact through device; nose dipping; sudden stop; crash down of kite-type towables; rupture of the towing rope; entrapment or entanglement; nose dive; use of rumps	DROWNING	Age limits; warning notes; quick release; gripping; escape in case of danger; residual buoyancy; use of PFD; length, strength and elasticity of rope; reliability of quick release, user qualifications and capabilities

Floating leisure articles for use on and in the water —

Part 5:

Additional specific safety requirements and test methods for Class C devices

1 Scope

This document specifies additional specific safety requirements and test methods for Class C floating leisure articles for use on and in the water regardless whether the buoyancy is achieved by inflation or inherent buoyant material.

This document is applicable for Class C floating leisure articles as specified in ISO 25649-1:2024, Table 1.

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

- tube riders towable with interior holding facility and closed cockpit;
- raft riders towable;
- board riders towable;
- banana type towable.

NOTE 2 Typical places for application:

- distant from bathing areas and other frequented water surfaces, wide empty spaces, dedicated racetracks (parcours);
- no to little waves;
- no strong currents.

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 25649-1:2024, *Floating leisure articles for use on and in the water — Part 1: Classification, materials, general requirements and test methods*

ISO 25649-2:2024, *Floating leisure articles for use on or 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 terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1

residual buoyancy

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

3.2

personal floatation device

PFD

garment or device which, when correctly worn and used in water, will provides the user with a specific amount of buoyancy that will increase the likelihood of survival

[SOURCE: ISO 12402-5:2020]

3.3

means of re-embarkation

design feature that facilitates getting back on the floating leisure article from an in-water position, regardless whether the buoyant structure is fully inflated or any chamber is deflated

3.4

towable

floating leisure article (inflatable or inherently buoyant) for dynamic use towed by mechanical means

3.5

rider

user of the *towable* (3.4) positioned on the towed device

3.6

watercraft driver

person having the responsibility for the towed and the towing device (watercraft or towing device)

3.7

observer

additional person watching the *towable* (3.4) and *rider(s)* (3.5) with a clear line of site

3.8

tow rope

connection between towing device and the *towable* (3.4)

3.9

towing streamer

signal flag attached to the rear of the towing device according to relevant requirements

3.10

quick release system

means to release the *towable* (3.4) from the *tow rope* (3.8) manually or automatically in case of an emergency by triggering a release mechanism

3.11

available area

area on or inside a floating leisure article that can be used unrestrictedly for user accommodation when taking the intended posture(s)

3.12

inherent buoyant material

non-crosslinked (closed-cell) foam or other materials enclosed in (a) sealed compartment(s) in the hull that have a specific weight lower than 1 kg/dm³

Note 1 to entry: Floating leisure articles made from inherent buoyant material are considered buoyant structures (hull) achieving all or parts of their intended shape and buoyancy through soft foam, hard foam or sealed chambers filled with air, gas or granules.

3.13

raft rider

towable (3.4) designed as a floating structure where the *rider* (3.5) is fully or partly enclosed by surrounding walls forming an inner cockpit

3.14

board rider

towable (3.4) designed as a flat open floating structure without walls

Note 1 to entry: Hybrid designs are possible.

4 Safety requirements and test methods

4.1 General

Construction of a floating leisure article shall be such that it corresponds in terms of design, dimensions, safety, strength and durability to its intended use. The requirements set out in this document were chosen to ensure compliance of the above construction. When floating leisure articles provide buoyancy in several components, then requirements apply to all components. Floating leisure articles of Class C shall provide residual buoyancy if one air chamber fails. This residual buoyancy shall maintain the safety of the device even if its function is lost. The following safety requirements are therefore related to:

- design;
- sizing;
- materials;
- strength;
- performance;
- information.

Towables of all classes shall be designed in a way that the rider, when in the intended position(s), can always at least partially be seen by the observer for communication purposes by and with the observer.

Class C products shall be marked with the safety information markings, as specified in ISO 25649-2:2024, Table 8.

4.2 Test conditions

If not otherwise stated, all tests shall be carried out at an air temperature of $(20 \pm 3) ^\circ\text{C}$.

4.3 Design

4.3.1 General

With regard to design and shape, there is a certain number of constant types of towables, as described in the introduction. The entire product group of towables is however subject to continuous change in terms of shape and function. For that reason, the space-per-person requirements shall be applied in a way that satisfies safety and performance if these parameters depend on distinct body positions for which an available area should be provided. This applies in particular if use by children is included.

4.3.2 Sizing, admissible number of users and maximum load capacity

4.3.2.1 Sizing

Towables shall be sized according to their admissible number of passengers. The size shall be communicated to the user by applying, on the packaging and on the product, the safety information symbols “number of the users, adults/children” and “user’s body weight range ... to ...kg” as specified in ISO 25649-2:2024 (Figure 22 and Figure 24 respectively).

4.3.2.2 Test method

Testing shall be by visual inspection and application of template for sitting.

4.3.3 Class C1 devices, space per person (passive user, including children)

4.3.3.1 Class C1 tubes or other near-ring shaped devices

4.3.3.1.1 Requirements

Class C1 devices, tubes, etc. shall provide a closed cockpit with side walls (inflatable ring shaped tubes) entirely around the passenger if child use is included. The minimum available area shall allow a 6-year-old child to sit inside the device. This requirement is deemed to be met if the template for sitting according to ISO 25649-1:2024, A.1 fits into the available area.

4.3.3.1.2 Test method

Apply template for sitting as specified in ISO 25649-1:2024, A.1.

Check whether this template can be placed into the interior sitting area without the need to bend or fold it.

4.3.3.2 Class C1 bikes, bananas, etc. (user sitting in row on the product)

4.3.3.2.1 Requirements

Class C1 devices providing the available seat area in row shall have a seat length of 60 cm per person. If the device implies sitting in a line of more than one user, the sitting space for each user shall have at least a length of:

- 50 cm for a child, if the thighs follow the seat surface;
- 70 cm for an adult, if the thighs follow the seat surface.

4.3.3.2.2 Test method

Apply template for sitting as specified in ISO 25649-1:2024, A.1.

Check whether this template can be placed into the interior sitting area without the need to bend or fold it.

4.3.4 Classes C2 and C3 devices, space per person

Classes C2 and C3 devices are used in a much more diverse manner. There are no requirements with regard to minimum available areas for these categories.

4.3.5 Grab handles

4.3.5.1 Grab handles availability and strength

There shall be at least one grab handle for each admissible user. The handles or other means for holding shall be positioned in a way to allow holding when sitting on or in the intended user position(s).

Any handle used shall not have a gap between the handle and the surface of more than 30 mm. The gap shall not increase when pulled by a force of at least 300 N, thereby preventing hand or finger entrapment.

Grab handles shall meet the tensile test as specified in [4.3.5.2](#). Any means of holding on shall be designed to avoid entanglement or entrapment.

4.3.5.2 Test methods

Visual inspection and measurement are required.

To measure the strength of handles, start with the towable fully inflated and held rigidly near the handle attachments.

Use a rigid force applicator the width of the hand of a 50th percentile male (9 cm) and apply a tensile pre-load force of 50 N. Apply a tensile force of at least 1 kN.

4.3.5.3 Foot and fingers entrapments

4.3.5.3.1 Foot entrapment through handle opening

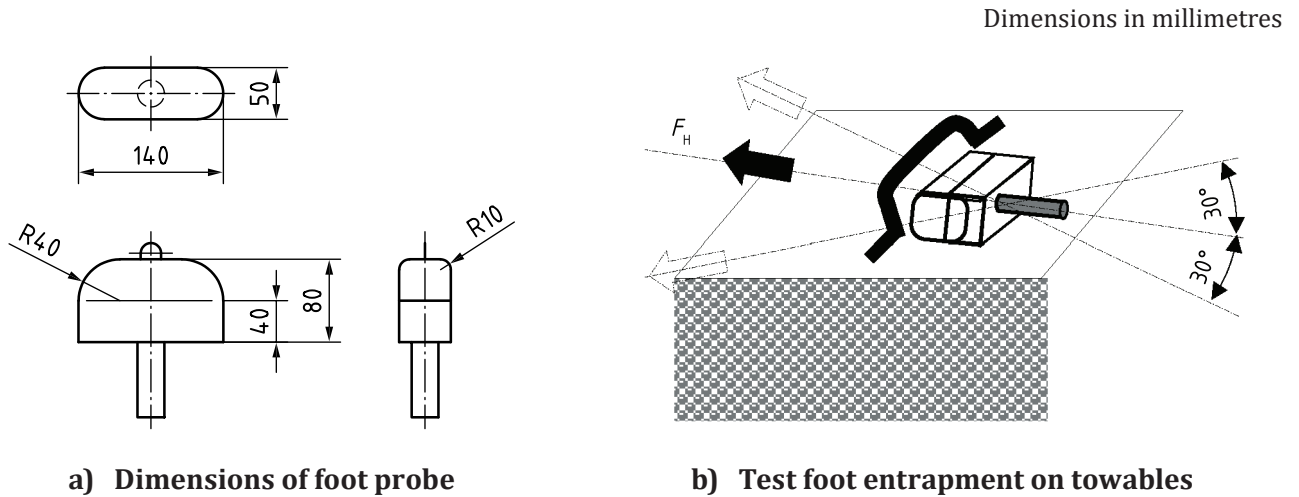
In order to avoid foot entrapment all handles attached to the towable shall not allow the passage of the foot probe as specified in ISO 25649-1:2024, 5.2.1.4.1 when this probe is pulled into the handle opening as shown in [Figure 2b](#)), under the test force F_H of 50 N.

4.3.5.3.2 Test method

Fully inflate the device. Apply foot probe (negative probe) as shown in [Figure 2b](#)) with regard to directions and pulling force.

The test probe shall be pulled following the contour and surface of the fully inflated device by applying a sliding movement parallel to the inflated device surface into the handle opening.

Test probe b), 3 years of age 5th percentile (smallest foot dimension).



Key

F_H pulling force (in N)

Figure 2 — Foot probe – child

4.3.5.3.3 Finger entrapment on handle components

In order to avoid entrapment of fingers, the inner diameter of hoses, tubes and other similar openings shall be < 8 mm or > 25 mm.

The test shall be performed according to [4.4](#).

4.3.6 Quick release system for C1 towables

4.3.6.1 Design requirements

The design of the quick release system shall indicate how to trigger it. The direction of triggering shall be permanently identifiable.

The part of the release system which is used for triggering, i.e. the triggering element, shall have a contrasting colour to the other parts of the release system surface.

The release system should be free from finger entrapments, squeeze and shear points. Edges that could come into contact with the user's hands during use or handling and maintenance should not be sharp, e.g. deburred, broken, rolled or processed with comparable techniques.

The space of activation shall not be restricted at any time by any part.

A release system ready for test for each test condition shall be an integral part of the C1 towable provided by the manufacturer and/or supplier.

This also relates to soft parts or components of the release system which can, while being gripped and used for triggering, deform and/or tilt and consequently obstruct the actual movement of triggering. While being triggered, no part or component of the release system should impact the user's hands.

4.3.6.2 Test methods

Quick release system test shall be performed as visual inspection and verification.

4.3.7 Buoyancy and load capacity

4.3.7.1 Requirements

During the practical test it shall be proven that the device provides sufficient buoyancy to meet all in-water performance tests also with the maximum number of admissible persons.

4.3.7.2 Test methods

The test shall be performed according to [4.4](#).

4.3.8 Residual buoyancy

4.3.8.1 Requirements

All floating Class C devices shall provide residual buoyancy after failure of the air chamber most likely to cause the biggest loss of buoyancy. The amount of residual buoyancy shall be not less than 60 N per admissible person. During the practical in-water tests, it shall be proven that each admissible person can get hold to the remaining structure (details see [4.4](#)).

4.3.8.2 Test method

Open the valve to deflate the chamber most likely to cause failure. Measure the residual buoyancy of the remaining structure to determine if the 60 N per person requirement is satisfied.

4.3.9 Foot, leg and torso entrapment

4.3.9.1 General

Requirements and test procedures as specified in ISO 25649-1:2024, 5.2 to 5.4 shall apply. In particular, if the harness system is attached at multiple points on the towable, the minimum gap size between harness and towable shall conform to the child torso probe requirements, in accordance with ISO 25649-1:2024, 5.3.

4.3.9.2 Handles, foot rest or knee straps for supporting the users during use

In order to avoid entrapment, handles shall not be positioned in areas intended for knee and/or foot rest of the user.

Handles should not have movable or rotating components.

Foot and knee supports shall be positioned in the ergonomically appropriate position to assist the user to obtain a safe and secure hold while being towed.

There shall be no loose rope ends, which could result in entanglement.

4.3.10 Valves and other protruding parts

4.3.10.1 Requirements

In order to avoid injury or hindrance, any protruding hard objects, e.g. valves, shall not be located in the area(s) intended to be occupied by the user(s).

4.3.10.2 Test method

Check whether action areas are free from any hindrance.

4.3.11 Accessible protruding parts, entanglement

Requirements and test methods as specified in ISO 25649-1:2024, 5.4 shall apply.

4.3.12 Strength of towing device attachment

4.3.12.1 Requirements

Materials and design shall guarantee that the maximum load specified does not damage the air chambers, the cover, or any other component of the complete system connecting the towing rope with the towed device.

4.3.12.2 Test method

The device shall be tested in a position such that the specified loads and load directions can be applied.

Grip the towable on the cover proximal to the towing system and apply tensile forces as specified below to the tow structure in the direction most likely to cause failure. A downwards force application of an angle of 45° shall be additionally applied if the device is designed to hydroplane or become airborne (Class C3 devices).

Class 1/Class 2:

1 person towable, 2 kN;

2 people towable, 2,5 kN;

3 people to 5 people towable, 3 kN;

6 people to 10 people towable, 6 kN.

All above nominal values shall be increased by a safety factor of 20 %.

Class 3:

1 person towable, 4 kN;

2 people towable, 5 kN;

3 people up to 5 people, 6 kN.

All above nominal values shall be increased by a safety factor of 20 %.

4.3.12.3 Quick release as integral part of the C1 towing system: static strength, release force, release time, unintended release

The towable in its ready for use condition shall be fixed in a way that the specified loads can be applied.

- There shall be no break or dysfunctional deformation if the complete quick release system including its attachment to the towable is loaded for 5 ± 1 s with a static load equal to the max. pulling force (6 kN) for the towable to be tested.
- It shall be possible to trigger the release system with a triggering force of ≥ 20 N and ≤ 150 N and with one hand only within ≤ 2 s.
- Under the same test conditions there shall be no triggering action up to a test load of 20 N.

NOTE Is not reasonable to have a series of quick release devices corresponding to each size of towable. In consideration of practicability, safety and simplicity the quick release strength requirement have been established in the sense of "ONE FOR ALL"-quick release device.

4.3.12.4 Testing

Testing shall be performed by force and time measuring devices, or by verification through visual inspection.

4.3.13 Towing system

The towing system connecting the means of propulsion (mostly a power-driven watercraft) with the towable shall meet the requirements in [4.3.14](#) to [4.3.17](#).

4.3.14 Colour of towing rope

4.3.14.1 Requirements

Towing ropes shall be conspicuous to all parties involved. This requirement is deemed to be met if the colour of the rope clearly contrasts with the water.

4.3.14.2 Test method

Testing shall be by visual inspection.

4.3.15 Floatability of towing rope

4.3.15.1 Requirements

The entire towing systems shall float when detached from both the boat and the towable.

4.3.15.2 Test method

Check whether the towing device does not sink when detached.

4.3.16 Fittings

4.3.16.1 Requirements

All fittings shall be corrosion resistant (supplier's certificate). There shall be no sharp edges, points or other deficiencies likely to cause injuries.

4.3.16.2 Test method

Check via tactile testing.

4.3.17 Elasticity of towing rope

4.3.17.1 Requirements

The towing rope shall not create a whipping effect when rupturing or being released from the towable. The elongation of the rope under the forces given in [4.3.17.2](#) shall be less than 4 %.

This requirement shall not apply to the shock absorber.

4.3.17.2 Test method

When a tow rope is provided, measure a length of the tow rope under a pre-load of 200 N. Increase the load to 2 kN. Measure the increase in length and calculate the percentage.

Alternatively, the elasticity of the rope may be proven by a supplier's certificate.

The test force shall be applied for 1 min.

4.4 In-water performance

4.4.1 General

Practical in-water tests aim to determine that towables are functional and create no safety risks to the user. Since such tests cannot be executed in an objective manner, a practical, i.e. to a certain extent subjective, test is applied. This approach is considered the state of the art for water sports devices and aids in determining if safety hazards exist, especially with C2 and C3 devices.

4.4.2 Selection of test subjects

Test subjects shall have experience with towable testing. The number of test subjects shall conform with the supplier's instructions for the device (see also body-related safety information symbol specified in ISO 25649-2:2024). The towable shall be tested with the manufacturer's recommended, minimum and maximum, number of riders.

In addition to the body weight and body size selection criteria, the capabilities required in [Clause 5](#) shall apply.

All test subjects shall wear immersion suits and adequate personal flotation devices during the in-water test. All test subjects testing Class C3 devices shall additionally wear head protection helmets.

4.4.3 Assessment panel

Subjectivity of the test shall be reduced by a collective assessment. For this purpose, a test panel as specified in ISO 25649-1:2024, 5.5.3 shall assess those requirements that cannot be assessed objectively. This applies in particular for requirements given in [4.4.6](#) to [4.4.10](#).

4.4.4 Selection of watercraft and towing personnel for testing

The watercraft shall be powerful enough to reach the maximum speed of use indicated on the product. It shall be equipped with all means for safe towing and testing. In addition to the boat driver, there shall be an observer.

4.4.5 Test conditions, test course, duration of test, test speed, wind speed

A large, unoccupied water area without floating or underwater obstacles or underwater currents. Test runs in relation to the true wind direction shall be as specified below.

Upwind course:

- direct heading to true wind;
- bow quarter, starboard (45° to true wind);
- bow quarter, port side (45° to true wind).

Downwind course:

- direct downwind heading;
- stern quarter, starboard (135° to true wind);
- stern quarter, port side (135° to true wind).

Beam wind course (90°):

- beam wind, starboard (90° to true wind);
- beam wind, port side (90° to true wind).

Duration of each test course ride shall be 10 min regardless of the number of test subjects on the towable. Test speed for all courses shall conform to the manufacturer's instructions. Wind speed shall be at least in accordance with the manufacturer's instructions for maximum allowable wind speed (see also [6.2](#)).

At the end of this cycle, a sudden speed reduction test shall be executed simulating an emergency stop of the towing boat or its stop due to engine failure. For this purpose, the maximum speed shall be reduced by putting the throttle immediately to idle speed (zero throttle) and letting the towable decelerate.

For pass and fail criteria, see [4.4.11](#).

4.4.6 Manoeuvres

The transition from each test run to the next, e.g. from 45° wind from left side to 45° wind from right side shall be performed by driving in a curve under maximum speed. The in-water test shall include for all devices one U-turn of 180° run under maximum speed.

In addition to the sheer test courses, it shall be guaranteed that the rides include all movements e.g. rotating and jumping for which the devices tested are purposely designed.

Where devices are fitted with a quick release, they shall be tested with and without a quick release mechanism under maximum allowable speed (see [Annex A](#)).

Class C3 devices that become airborne shall be tested as follows:

- flying downwind at maximum allowed wind speed;
- flying beam-wind at maximum allowed wind speed;
- starting and landing with maximum and minimum number of passengers.

For pass and fail criteria, see [4.4.11](#).

4.4.7 Efficiency of drainage system for inflatable chambers designed with an external cover

Towables of all classes shall be designed to prevent large quantities of water accumulating inside the device during use. This water shall drain away through efficient drainage systems.

This requirement is not applicable if water is intentionally taken in order to act as ballast for stabilization, etc.

For pass and fail criteria, see [4.4.11](#).

4.4.8 Entrapment, entanglement, additional practical in-water test during capsizing

The entire in-water test shall include a deliberate capsizing of the fully embarked towable (according to the manufacturer's instructions). It shall be demonstrated that during the capsizing, none of the test subjects become entrapped or entangled when slipping from the device into the water.

For pass and fail criteria, see [4.4.11](#).

4.4.9 Capsizing device, practical in-water test

The entire in-water test shall include a deliberate capsizing of the fully embarked towable (according to the manufacturer's instructions), in a stationary state and after repositioning. It shall be demonstrated that the towable is provided with means of re-embarkation to assist test subject to re-embark or, if the dimensions of the towable do not allow it, to at least hold on to the device.

For pass and fail criteria, see [4.4.11](#).

4.4.10 Residual buoyancy, additional practical in-water test

After deflation of the air chamber most likely to cause failure, it shall be demonstrated that all specified allowable users (test subjects) can hold onto the device in a way to keep their airways above water level even when not wearing a personal flotation device.

4.4.11 Pass and fail criteria

The assessment panel shall assess the fulfilment of all requirements specified in [4.4.6](#) to [4.4.10](#). In addition, the test criteria listed below shall be observed and positively assessed by this panel.

All points of the following checklist shall be assessed positively, otherwise the device is considered to have failed.

- a) Was (were) the test subject(s) able to use the towable safely in all functions listed by the manufacturer when informing the user about the intended use and speed (see instructions for use)?
- b) Were there any situations which may be assessed as near dangerous or near accidental in relation to the declared function of the towable (see [4.4.5](#))?
- c) Are there any complaints by the test subjects regarding space, slipperiness, grab handles, feet/leg support?
- d) Did the water drainage work effectively (if applicable)?
- e) Were users able to re-embark or to hold on to the towable (see [4.4.9](#))?
- f) Was there sufficient residual buoyancy and means to hold to the device for each admissible user (see [4.4.10](#))?
- g) Was there any damage?
- h) Did any abrasion occur to the protective clothing, at the fingers, feet, arms or knees?
- i) Was there safe deceleration of towed Classes C1 and C2 devices after sudden stop without collision with towing boat (see [4.4.5](#))?

In determining the result of the test, there shall be at least a majority decision.

5 Required capabilities of the test persons being towed

The required capabilities of the test persons being towed depend on the towed class devices, and shall be applied as follows.

- For Class C1, test persons shall have the ability to understand the process (ride), to swim, to hold themselves also under high speed and dynamic conditions (inclination, impacts, acceleration, etc.).

NOTE Children below the age of 6 years are not expected to have these skills.

- For Class C2, in addition to C1, test persons shall be experienced and familiar with similar water related devices, and have adequate physical strength and the ability to assess the related risks.
- For Class C3, in addition to C1 and C2, test persons shall have further experience in performing extreme actions and managing the device when lifting from the water surface, flying and landing.

In all cases of application, the test subjects shall wear an adequate personal flotation device.

6 Consumer information

6.1 General

The following apply to private and commercial use.

- a) Consumer information shall be in accordance with ISO 25649-2:2024 as far as applicable.
- b) The specific requirements listed in [Clause 7](#) shall be met.
- c) Safety information symbols shall be in accordance with ISO 25649-2:2024.

6.2 Intended use

The manufacturer shall describe in full detail the intended use of the various C Class devices C1, C2 and C3. As a minimum, the information related to the intended use shall include:

- a) the WARNING 'Never exceed the maximum number of riders or the maximum combined weight of riders'.
- b) the operating conditions:
 - maximum wind in Beaufort;
 - maximum wave height;
 - maximum speed (km/h, kn);
 - required towing rope;
 - maximum and minimum number of load and persons;
- c) the data related to:
 - type/model of device;
 - manufacturer;
 - category (C1, C2 or C3 including explanations of these categories).

6.3 Responsibilities

6.3.1 General

The watercraft driver is responsible for the safe operation and use of the towable.

NOTE Application of this document and this clause presupposes awareness of applicable legal requirements.

6.3.2 Watercraft driver

The driver shall:

- check that all possible adaptable devices are adapted for the rider;
- be sure the rider is properly mounted on or in the device before starting to accelerate;
- obey all driving and speed rules related to safety and to the towing area being used.

6.3.3 Observer

As towables require permanent observation, the use of jet skis as towing craft is not recommended.

The observer shall:

- agree upon communication signals (see [Clause 8](#)) with the rider;
- take care of necessary communication with the watercraft driver according to the circumstances;
- observe the rider constantly during towing.

6.3.4 Rider

The rider shall:

- make themselves familiar with the towable and understand the intended position of use;
- make themselves familiar with all signals and separation devices; see [Clause 8](#) (if applicable);
- understand the warnings, written text and/or safety information symbols published by the manufacturer.

7 Written warnings in the manual

7.1 General

The manual for Class C devices shall include at least the warnings listed below:

- a) Before using, please familiarize yourself with your new towable.
- b) Read all warnings and instructions printed on this manual and on your towable.
- c) Warnings and instructions vary from model to model, make sure to read and comply with all warnings and instructions shown on the towable.
- d) Follow the order of the inflation of air chambers printed on the towable.
- e) If the towable has an outer cover, install it in accordance with the manufacturer's instructions.
- f) Ensure that the towing line is attached in accordance with the manufacturer's instructions.
- g) Users of towables shall wear protective clothing against skin abrasion.
- h) For Class C3 towables, it is good practice for the user to wear an appropriate helmet. Class C3 users shall not be less than 14 years old.

7.2 Special user manual on quick release

The manufacturer shall provide information for use in written form at the point of sale with at least the following:

- a) a recommendation to become familiar with the correct use of the release system;
- b) warning to check the function of the release system before and after each use;
- c) maintenance and cleaning instructions, including detail on wear, tear and replacement;
- d) operating instructions outlining the main function(s) of the release system for which it is designed and tested, each accompanied with illustrations:
 - 1) how to attach the release system;
 - 2) how to trigger the release system;

- 3) how to reset the main release system;
- e) warning that safety procedures cannot be learnt during an emergency situation and thus the use of the release system requires training;
- f) information on compatibility with other systems, e.g. intended for rope and/or different means as connection point (connector);
- g) note on potential risks if the release system is not used as intended by the manufacturer.

7.3 Warnings

7.3.1 General

The warnings listed below shall be given in form of a label (see [Figure 3](#)) and be included in the user's instructions and printed on the Class C device in a position visible when the device is boarded.

For commercial use, ensure that the safety warnings provided by the manufacturer are made available to each rider.

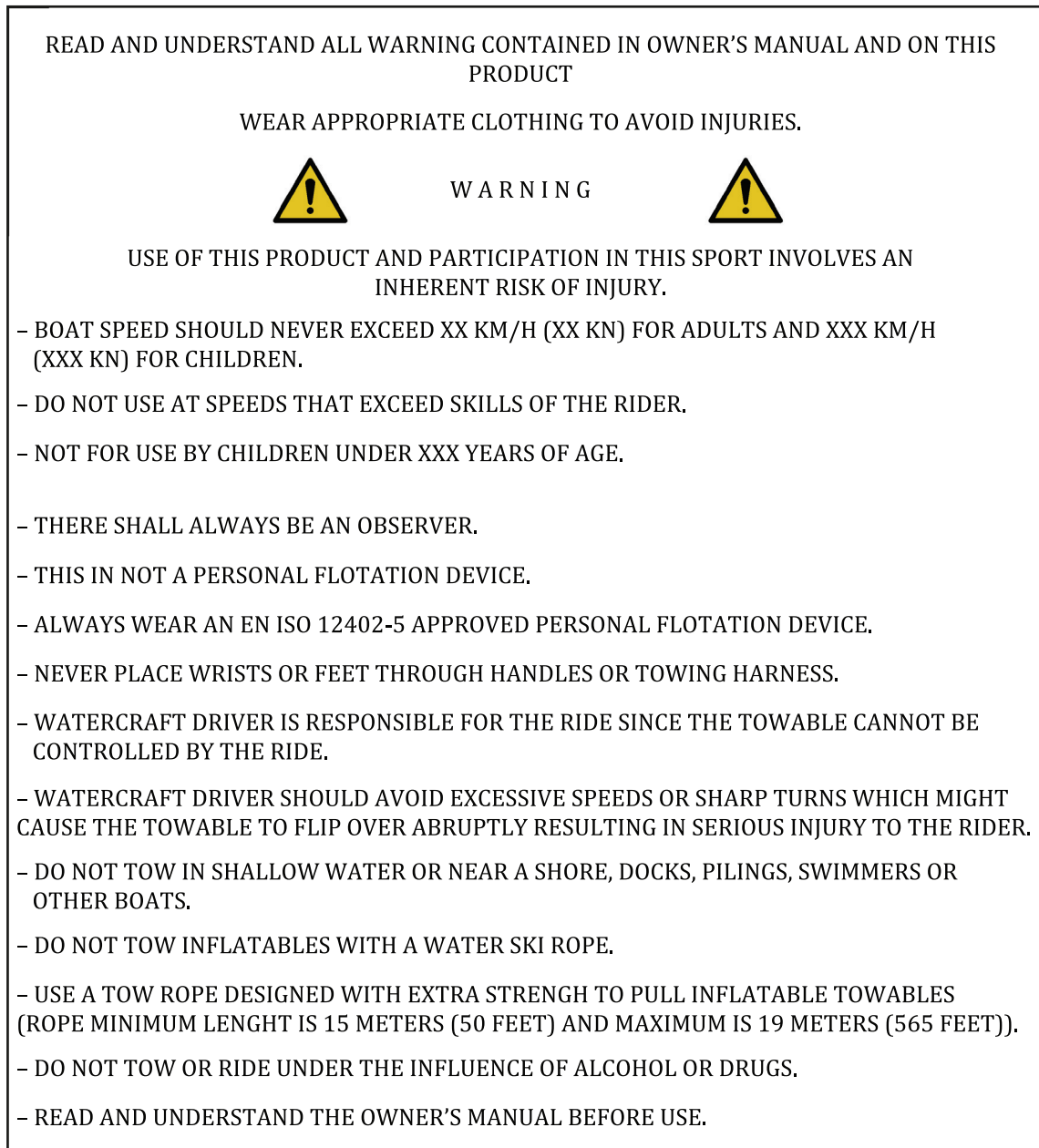


Figure 3 — Warning label (minimum content)

7.3.2 Special warning on C1 quick release

The release system shall be visibly and permanently marked at least with the following information:

- a) maximum pulling force;
- b) identification of the direction of the triggering operation.

7.4 Instructions

The instructions for Class C devices shall at least contain the following.

To reduce the risk of injury or death, follow these instructions.

- a) Only use your towable with a responsible and experienced watercraft driver.

- b) If the towable is designed for more than one person, then the riders shall take extra care to avoid contact with each other.
- c) Never strap or attach anyone to the towable or towable cover.
- d) Never put your feet or hands through handles or through the strapping of the towing rope attachment system.
- e) Never wedge your feet or hands under the towable cover or between the cover and the hull of the towable.
- f) Remove debris or obstacles that can present a safety hazard during recreational towing.
- g) Towing or using these devices can be physically demanding. Therefore, you shall know your own limits. Stop when you are tired and act responsibly.
- h) Use personal floatation device intended for towed use, as defined in ISO 12402-6.
- i) Check the towing rope and connectors for frays, cuts, sharp edges, knots between the fixing fittings, or wear before each use. Discard rope if any such condition exists or if rope appears to be excessively worn. Such conditions can lead to rope breakage and personal injuries.
- j) Use only ropes designed for towables.
- k) The watercraft driver has overall responsibility for the safe operation and use of the towable.

Signal signs according to [Clause 8](#) shall be shown in the instructions for use.

8 Signals

Classes C1 and C2 devices shall be designed in a way allowing the rider to take off at least one hand from the gripping handles in order to allow communications with the observer via hand signals. Whenever such design is not possible, signal devices shall be applied which can be triggered without taking off a hand from the device. The signal device only indicates that something is wrong and that the rider demands to stop the ride. Otherwise, the hand signals with a more differentiated meaning as listed in [Annex B](#).

Alternatively, for the purpose of indicating an emergency situation, the red flag can be used.

9 Exclusion

Floating leisure articles of Class C covered by this document are exempted from requirements of ISO 25649-1:2024, 5.5.4.

Annex A

(informative)

Examples of quick release design principles

A.1 Quick release

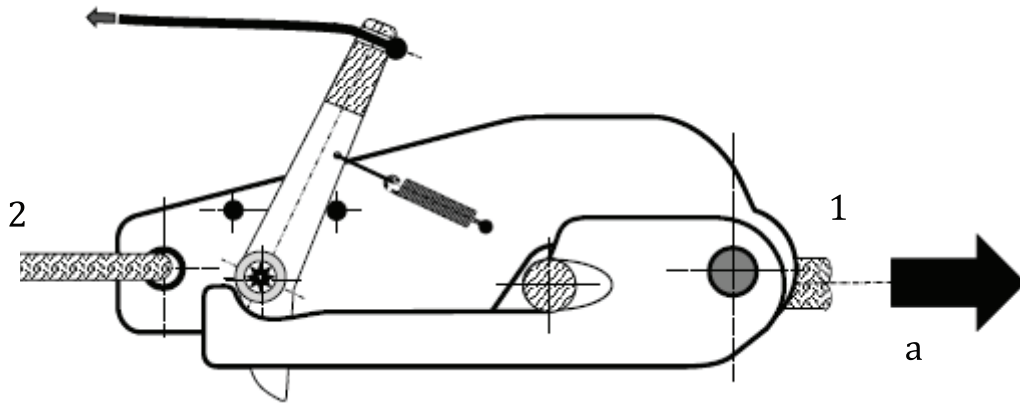
For Class C towables, a number of technical concerns including strength of device, release forces for the passengers, reaction speed, ease of handling, reliability etc. have been raised. Do we have appropriate technical devices to cope with the intended function of a quick release, to give those persons towed behind a fast motor boat and being totally, passively committed to driver's skills, behaviour and environmental circumstances a means of self-determination in case of an emergency?

A.2 Design principle 1, mechanical, vertical, lever ratio determines release force

The following characteristics and conditions should be taken into consideration for the leverage ratio:

- extreme high tensile forces possible;
- design for 16 mm rope diameter, other diameters possible on same device;
- release forces extreme low and adjustable if desired;
- impact resistant;
- immediate reaction if trigger line is activated;
- direct rope attachment;
- very rope friendly design by large bending radius;
- simple attachment and handling;
- easy to understand design for laymen;
- simple external control;
- robust design, appropriate for application of two devices simultaneously (extreme applications). Sample made from multiplex has been tested, function proven, Further development possible.

See [Figure A.1](#) for an example of quick release functional design principle

**Key**

- 1 tow boat
- 2 towable
- ^a no scale, only rough design, final samples deviate

NOTE This figure shows only functional principles.

Figure A.1 — Example of quick release functional design principle

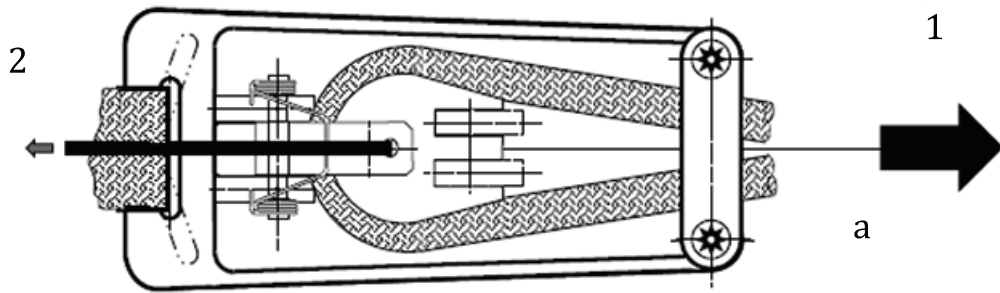
A.3 Design principle 2, mechanical, horizontal, component of pulling force provides locking force and determines release force

The following characteristics and conditions should be taken into consideration for the balanced rope holder:

- extreme high tensile forces possible;
- design for 16 mm rope diameter (other diameters possible on same device);
- release forces extreme low and adjustable if desired;
- immediate reaction if trigger line is activated;
- direct rope attachment;
- very rope friendly design by large bending radius;
- simple attachment and handling;
- easy to understand design for laymen;
- simple external control;
- robust design;
- double attachment harness of towable possible.

Sample made from multiplex has been tested, function proven, further development possible.

See [Figure A.2](#) for an example of quick release functional design principle– balanced rope holder.



Key

- 1 tow boat
- 2 towable
- ^a no scale, only rough design, final samples may deviate

NOTE This figure shows only functional principles.

Figure A.2 — Example of quick release functional design principle – balanced rope holder

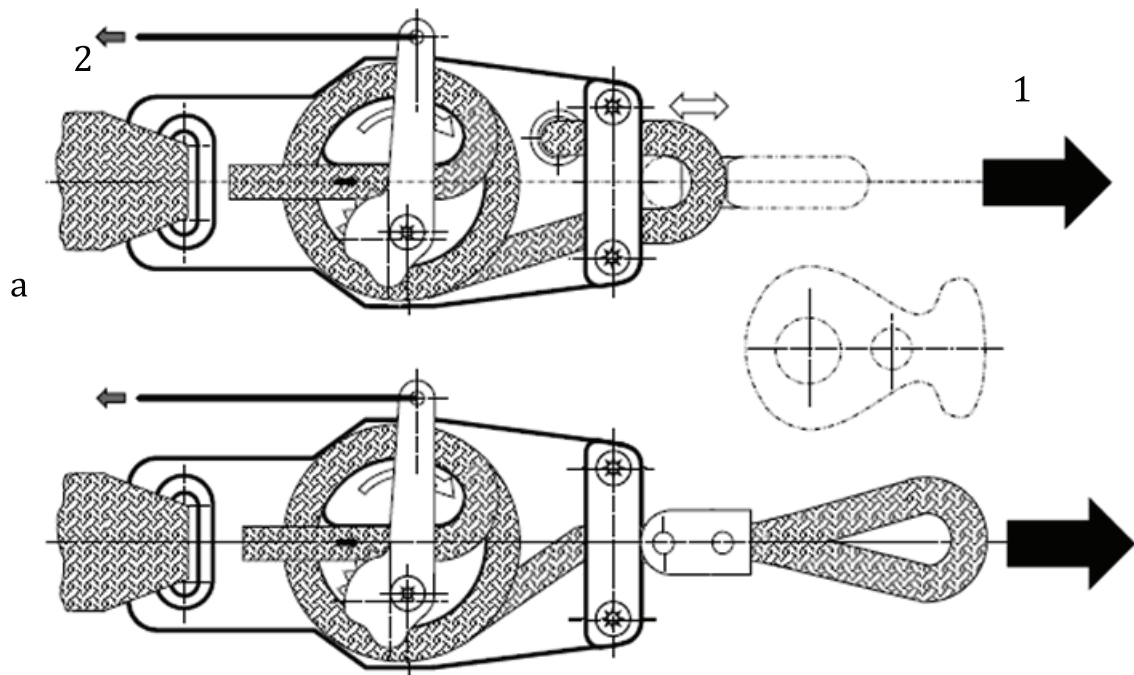
A.4 Design principle 3, horizontal, based on rope friction, fixed rope drum, application of a short release rope plus connector

The following characteristics and conditions should be taken into consideration:

- extreme high tensile forces possible;
- design for 10 mm release rope diameter (fixed rope diameter);
- release forces extreme low and adjustable if desired;
- impact resistant;
- reaction time if trigger line is activated including the decoiling process of release rope;
- rope attachment via release rope (short release rope is an integral component of the entire device);
- very rope friendly design;
- simple attachment and handling;
- easy to understand design for laymen;
- simple external control;
- robust design.

Sample made from multiplex has been tested, function proven, further development possible.

See [Figure A.3](#) for an example of quick release functional design principle – rope friction, fixed rope drum.



Key

- 1 tow boat
- 2 towable
- ^a no scale, only rough design, final samples may deviate

NOTE This figure shows only functional principles.

Figure A.3 — Example of quick release functional design principle – rope friction, fixed rope drum.

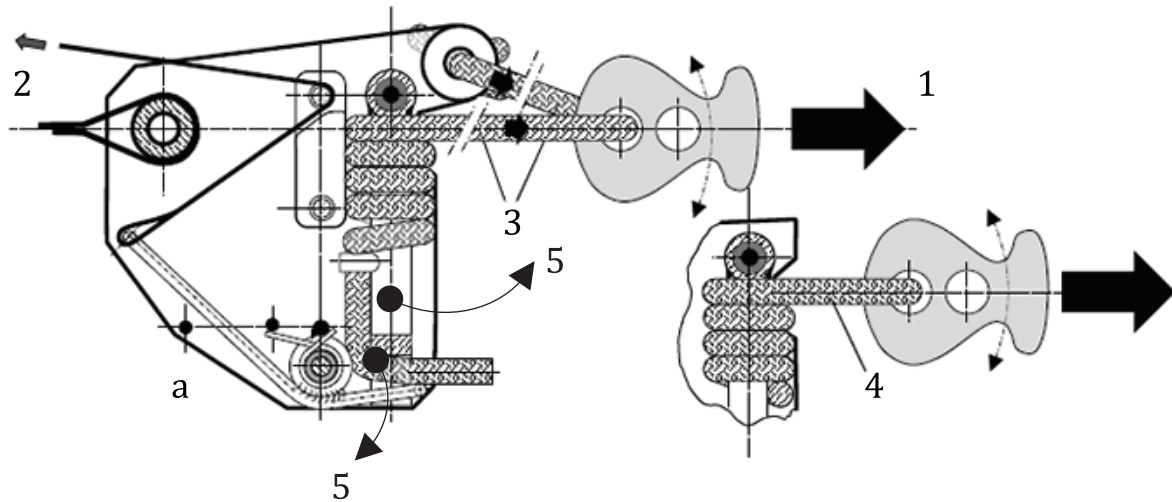
A.5 Design principle 4, vertical, based on rope friction and lever ratio, tilting rope drum, application of a short release rope, plus connector, tilting rope drum

The following characteristics and conditions should be taken into consideration:

- extreme high pulling forces possible;
- design for 10 mm rope diameter (fixed rope diameter);
- release forces extreme low and adjustable if desired;
- impact resistant;
- reaction time if trigger line is activated including the decoiling process of release rope;
- towing rope attachment via release rope and connector (short release rope is an integral component of the entire device);
- towing rope attachment and handling as known from existing devices;
- material: preferably metal, robust design.

Sample made from multiplex and stainless steel has been tested, function proven, further development possible.

See [Figure A.4](#) for an example of quick release functional design principle – rope friction and lever ratio, tilting rope drum



Key

- 1 tow boat
- 2 towable
- 3 release rope doubled; towing force per strand halved, smaller dimensions of release rope/QR
- 4 single release rope
- 5 if locking device moves downwards the rope cylinder swings to the horizontal and release rope can de-coil
- ^a no scale, only rough design, final samples may deviate

NOTE This figure shows only functional principles.

Figure A.4 — Example of quick release functional design principle – rope friction and lever ratio, tilting rope drum

Annex B (informative)

Examples of hand signals

B.1 Hand signals

The following illustrated signals (see [Figure B.1](#) to [Figure B.10](#)) are used to communicate between rider and the observer.



Figure B.1 — Faster: palm up



Figure B.2 — Slower: palm down or thumb down



Figure B.3 — Speed OK: thumb and forefinger in cycle symbol



Figure B.4 — Right turn: point to towable's right



Figure B.5 — Left turn: point to towable's left



Figure B.6 — Stop: palm facing towards the boat



Figure B.7 — Cut motor: forefinger pointing to the chin



Figure B.8 — Rider OK after fall: clasp hands over head



Figure B.9 — Pick me up or fallen rider: put up both arms



a) Circular motion with forefinger pointing downward



b) Tapping with the palm on the head

Figure B.10 — Back to drop-off area

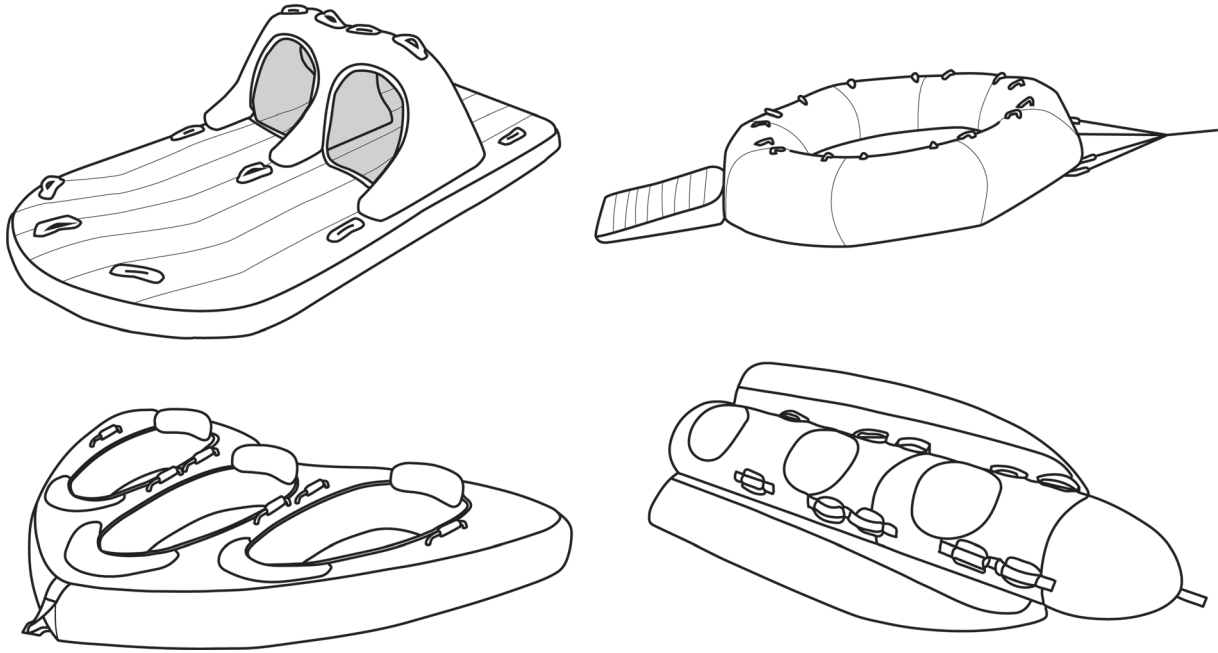
B.2 Signal devices

The watercraft shall be equipped with a towing streamer or flag in order to advise other watercrafts that towing is occurring.

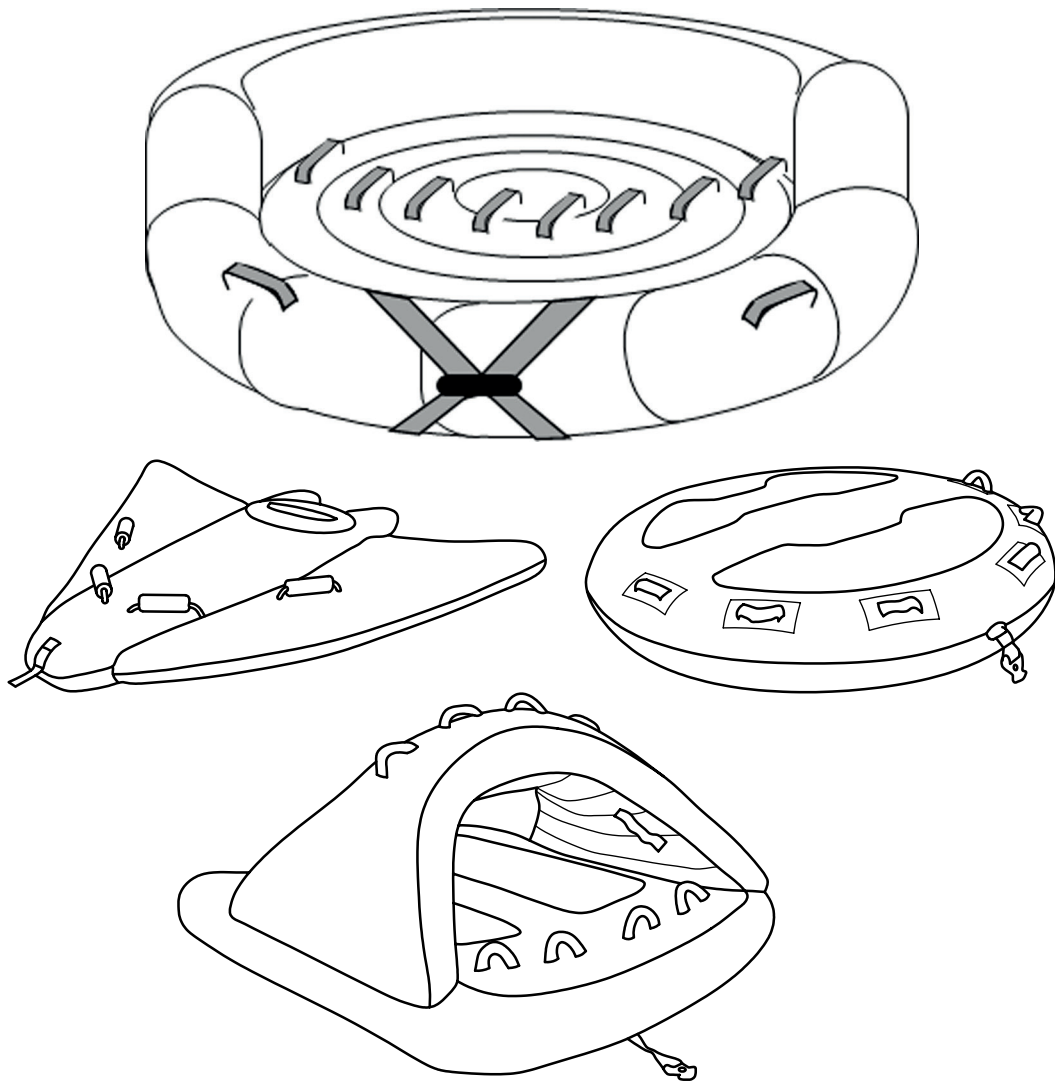
Annex C (informative)

Examples of typical products forming Class C

Examples of typical product forming Class C can be found in [Figures C.1,C.2](#) and [C.3](#)



Figures C.1 — Examples of typical products forming Class C1



Figures C.2 — Examples of typical products forming Class C2

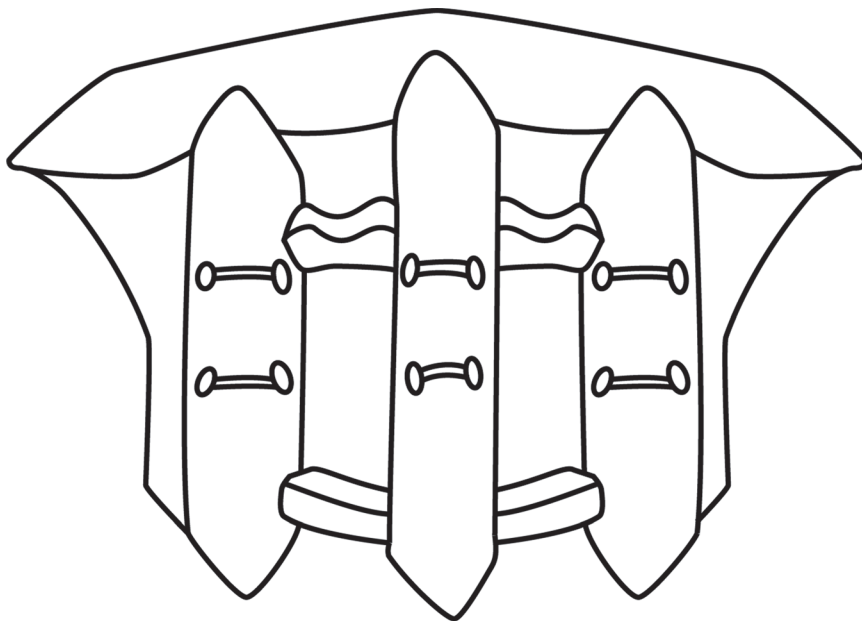


Figure C.3 — Example of typical product forming Class C3

Bibliography

- [1] ISO 6185-1, *Inflatable boats — Part 1: Boats with a maximum motor power rating of 4,5 kW*
- [2] ISO 6185-2, *Inflatable boats — Part 2: Boats with a maximum motor power rating of 4,5 kW to 15 kW inclusive*
- [3] ISO 6185-3, *Inflatable boats — Part 3: Boats with a hull length less than 8 m with a motor rating of 15 kW and greater*
- [4] ISO 12402-5:2020, *Personal flotation devices — Part 5: Buoyancy aids (level 50) — Safety requirements*
- [5] ISO 12402-6, *Personal flotation devices — Part 6: Special application lifejackets and buoyancy aids — Safety requirements and additional test methods*



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