
**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*



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ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

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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 25649-5 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).

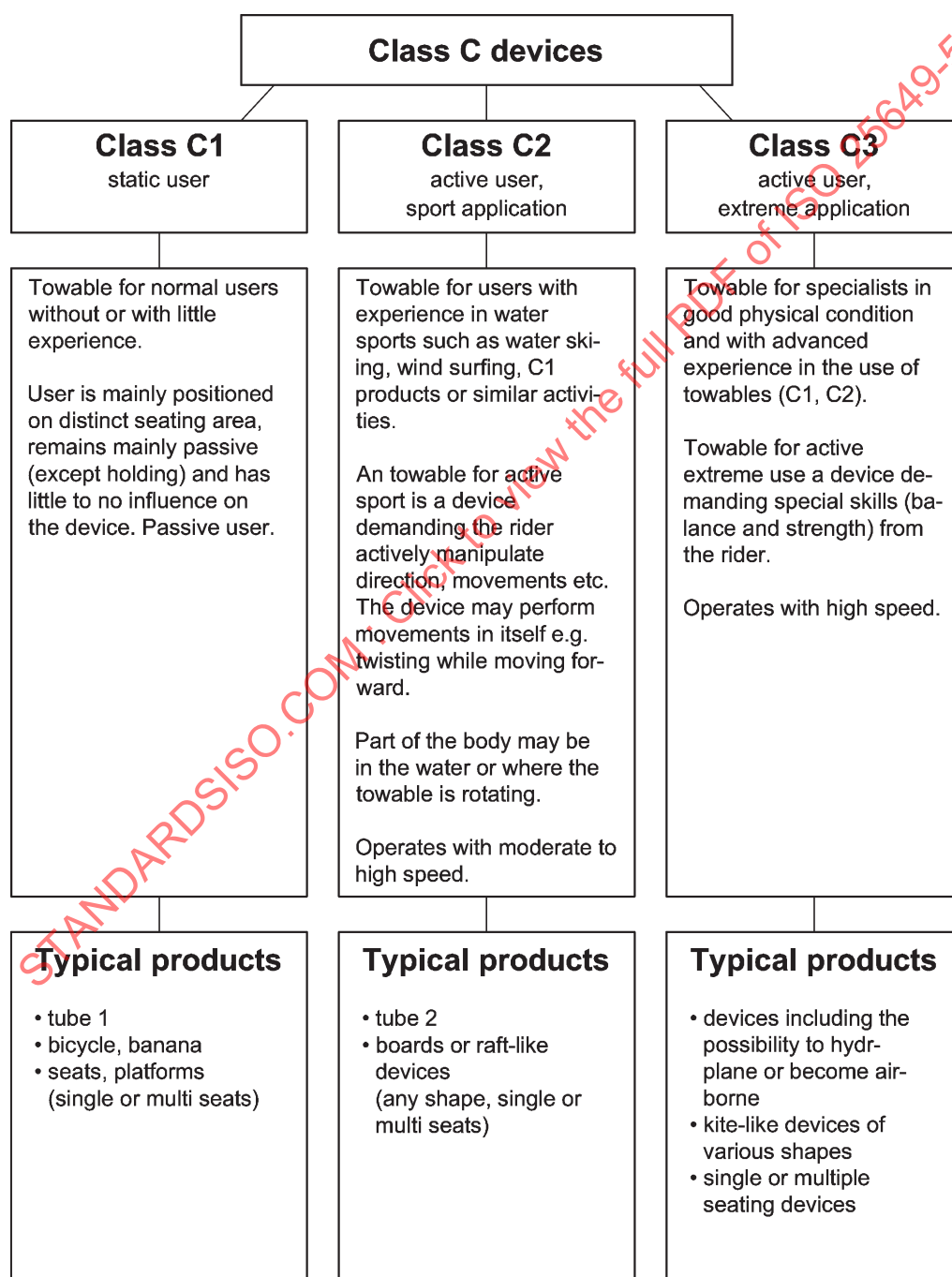
A list of all the parts in the ISO 25649 series can be found on the ISO website.

Introduction

The majority of technical requirements below is 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. Safety requirements concerning the towing rope form another content of the document.

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.

Comprehensive consumer information, including a set of non-verbal communication gestures complete the requirement profile of this document.



Risk assessment for entire Part 5 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 in regard to the equipment, elevation above water	Pre-dictable 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/ 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 about 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/entanglement; nose dive; use of rumps	DROWN-ING	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

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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 is applicable for CLASS C classified floating leisure articles for use on and in water according to ISO 25649-1 regardless of whether the buoyancy is achieved by inflation or inherent buoyant material.

This document is to be applied with ISO 25649-1 and ISO 25649-2.

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, *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 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 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

personal floating device

PFD

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

[SOURCE: ISO 12402-1:2005, 3.1]

3.3

application at high speed

application in which the floating device is towed rapidly through external means of propulsion (motor boat, towing installation, etc.)

Note 1 to entry: In accordance with intended use.

3.4

means to assist re-embarkation

means which helps the user to climb back on board of the floatable device from an in-water position regardless whether the buoyant structure is fully inflated or any air chamber is deflated

3.5

towable

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

3.6

rider

<floating leisure articles> user of the towable positioned on the towed device

3.7

water craft driver/operator

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

3.8

observer

<floating leisure articles> additional person observing the towed device in permanent eye contact

3.9

tow rope

connection between towing device and the towable

3.10

towing streamer

signalisation flag attached to the rear of the towing device according to national rules

3.11

quick release system

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

3.12

available area

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

3.13

multiple use product

any product that is intended to be used for more than one purpose (jumping, resting, climbing, etc.)

3.14**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: Inflatables 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.

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 for its intended use. The requirements set out in this document were chosen to ensure compliance with these considerations. 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, and
- 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.

In addition to this document, all requirements of ISO 25649-1 and ISO 25649-2 apply also for class C devices.

ISO 25649-1 and ISO 25649-2 are applicable as general parts. In individual cases, due to the unpredictability, variations and indeterminability of existing and future products, a corresponding choice shall be made.

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**

Design and shape of towables have constituted a certain number of constant types like as described in the introduction. The entire product group of towables is however subject of permanent change in terms of shape and function. For that reason, the space per person requirements shall be applied for in a way to satisfy 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 safety information symbol “number of the users, adults/children” and “user’s body weight range ... to ...kg” as specified in ISO 25649-2 on the packaging and on the product.

4.3.2.2 Test method

Visual inspection, application of seat template.

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

4.3.3.1 C1 tubes or other near-ring shaped devices

4.3.3.1.1 Requirements

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 six year old child to sit inside the device. This requirement is deemed to be met if the seat template according to ISO 25649-1:2017, A.1, fits into the available area.

4.3.3.1.2 Test method

Apply seat template as specified in ISO 25649-1:2017, 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 C1 bikes, bananas, etc. (user sitting in row on the product)

4.3.3.2.1 Requirements

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 line of more than one user, the sitting space for each user shall have at least a length of:

- child = 50 cm if the thighs follow the seat surface;
- adult = 70 cm if the thighs follow the seat surface.

4.3.3.2.2 Test method

Apply seat template as specified in ISO 25649-1:2017, 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 C2 and C3 devices, space per person

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

4.3.5 Grab handles, availability and strength

4.3.5.1 Requirements

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 using 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.

Diameter of any tubes or pipes used are only allowed <8 mm or >25 mm to ensure that no finger gets entrapped.

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. For measuring strength of handles, apply the test method as given in ISO 6185-1:2001, 6.7.2. The pulling force shall be at least 1 kN.

4.3.6 Buoyancy and load capacity

4.3.6.1 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.

4.3.6.2 Test methods

See practical test in [4.4](#).

4.3.7 Residual buoyancy

4.3.7.1 Requirements

All floating class C devices shall provide residual buoyancy after failure of the air chamber most likely to cause failure. 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](#)).

4.3.7.2 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.

4.3.8 Foot, leg and torso entrapment

4.3.8.1 General

Requirements and test procedures as specified in ISO 25649-1:2017, 5.2 to 5.4, apply. In particular, if the harness system is attached at multiple points on the towable, the minimum gap size between harness and towable shall comply with the child torso probe requirements (see ISO 25649-1:2017, 5.3).

4.3.8.2 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.

4.3.9 Valves and other protruding parts

4.3.9.1 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).

4.3.9.2 Test method

Check whether action areas are free from any hindrance.

4.3.10 Accessible protruding parts, entanglement

Requirements and test methods as specified in ISO 25649-1:2017, 5.4, apply.

4.3.11 Strength of towing device attachment

4.3.11.1 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.

4.3.11.2 Test method

The device shall be tested in a position that the specified loads and load directions can be applied. Apply tensile forces as specified below 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 (C3 devices).

Class 1/Class 2:

1 people towable, 2 kN;

2 people towable, 2,5 kN;

3 up to 5 people towable, 3 kN;

6 up to 10 people towable, 6 kN.

Class 3:

1 people towable, 4 kN;

2 people towable, 5 kN;

3 up to 5 people, 6 kN.

4.3.12 Towing system

The towing system connecting the means of propulsion (mostly a motor boat) with the towable shall meet the requirements in accordance with [4.3.13](#) to [4.3.16](#).

4.3.13 Colour of towing rope

4.3.13.1 Requirements

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

4.3.13.2 Test method

Testing by visual inspection.

4.3.14 Floatability of towing rope

4.3.14.1 Requirements

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

4.3.14.2 Test method

Check whether the towing device does not sink when detached.

4.3.15 Fittings

4.3.15.1 Requirements

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

4.3.15.2 Test method

Check via tactile testing.

4.3.16 Elasticity of towing rope

4.3.16.1 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 [4.3.16.2](#) shall be less than 4 %.

Tow ropes with elastic components are exempt from this requirement.

4.3.16.2 Test method

When a tow rope is provided, measure a defined and measured length of the rope under a pre-load of 200 N. Increase the load to a value of 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 to be state of the art for water sports articles and 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 in water sports such as water skiing, wind surfing or similar activities. The number of test subjects shall comply with the supplier's instructions for the device (see also body related safety information symbol specified in ISO 25649-2).

In addition to the body weight/body size selection criteria, the following capability requirements apply:

C1/C2 devices: Test subjects shall have experience in water sports such as water ski, wind surfing, C1 products or similar activities.

C3 devices: Test subjects shall be specialists in good physical condition and with advanced experience in the use of C1, C2 towables.

All test subjects shall wear immersion suits and adequate flotation devices during the in-water test. All test subjects testing 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 25649-1:2017, 5.5.3, shall judge those requirements that cannot be objectively assessed. 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 as defined in [3.8](#).

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).

Down wind course:

- direct down wind 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 comply with 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 towing decelerate.

Pass/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, jumping, etc. 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.

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/landing with maximum / minimum number of passengers.

Pass/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 acts as ballast for stabilization, etc.

Pass/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.

Pass/fail criteria, see 4.4.11.

4.4.9 Re-embarkation, 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). It shall be demonstrated that the towable is designed to allow the test subjects to re-embark onto the device. The first person who re-embarked may assist others to do so.

Pass/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 flotation device.

4.4.11 Pass/fail criteria

The assessment panel shall judge the satisfaction 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 items of the check list below need a positive assessment or the device fails:

- 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 from the water onto 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 class 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

C1 Ability to understand the process (ride), to be able to swim, to be able to hold oneself 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.

C2 In addition to C1: Experienced user familiar with similar water related devices, adequate physical strength and the ability to assess the related risks.

C3 In addition to C1 and C2: The user has built up further experience in performing extreme actions and managing the device when lifting from the water surface, flying and landing.

In all cases of application, it is recommended that the test subjects wear an adequate personal flotation device.

6 Consumer information

6.1 General

The following applies to private and commercial use.

Consumer information shall be in accordance with ISO 25649-2 as far as applicable.

The specific requirements listed in [Clause 7](#) shall be met.

Safety information symbols to be applied (see ISO 25649-2).

6.2 Intended use

The manufacturer shall describe in full detail the intended use of all class C devices. As a minimum, the information related to the intended use shall include.

- a) The WARNING: Do not use the towable with more riders than indicated by the manufacturer!
- b) The operating conditions:
 - maximum wind in Beaufort;
 - maximum wave height;
 - maximum speed (km/h, kn);
 - required towing rope;
 - maximum/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 All local regulations apply.

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/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.

- Agree upon communication signals (see [8.1](#)) with the rider.
- Take care of necessary communication with the watercraft driver according to the circumstances.
- The rider shall be under constant observation during towing.

6.3.4 Rider

- Make yourself familiar with the towable and understand the intended position of use.
- Make yourself 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 your 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 as well as a cold water suit (wet or dry).
- h) For C3 towables, it is good practice for the user to wear an appropriate helmet. The age of C3 users shall not be less than 14 years.

7.2 Warnings

The warnings listed below shall be given in form of a label (see [Figure 1](#)) 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.

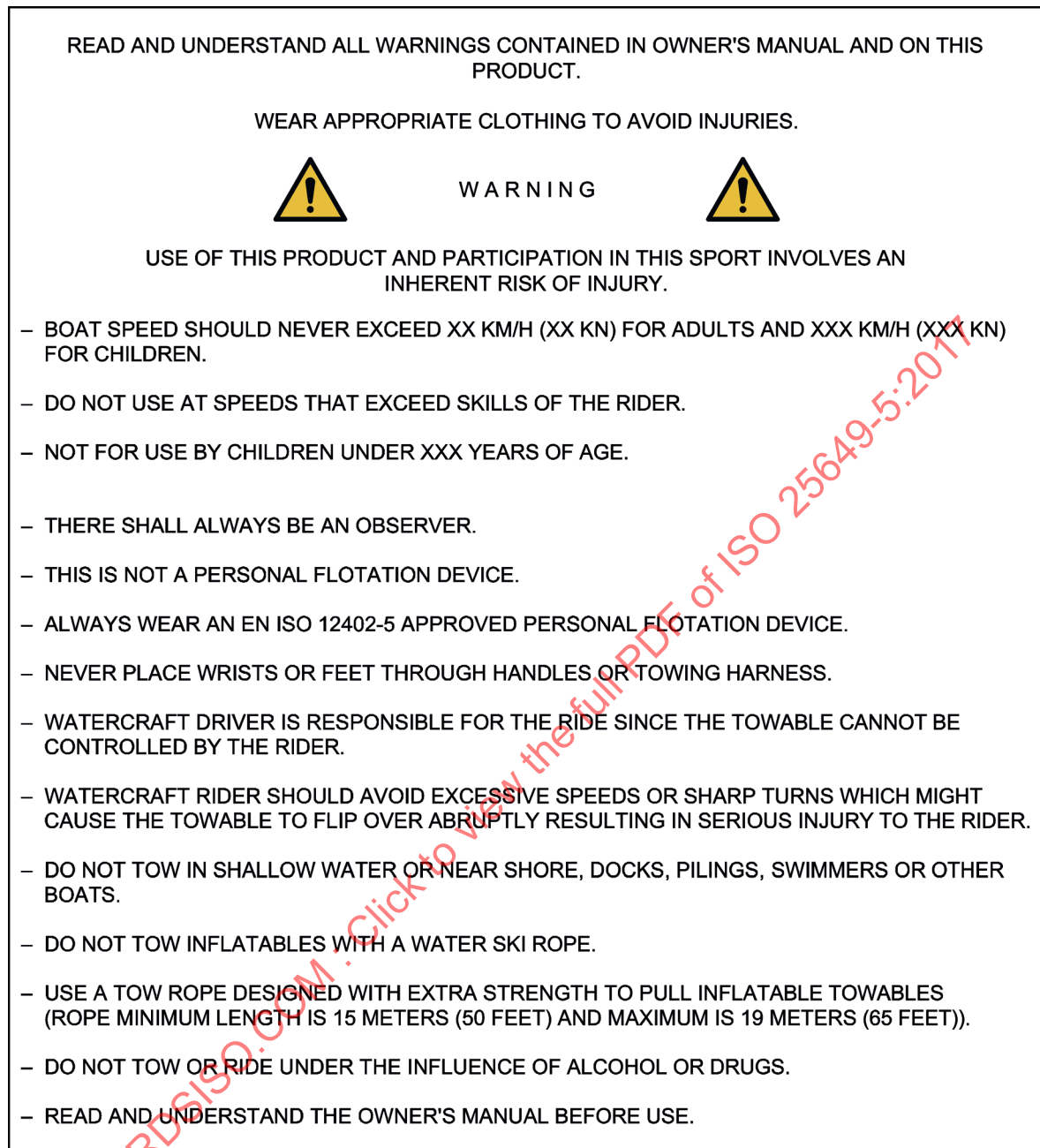


Figure 1 — Warning label (minimum content)

7.3 Instructions

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

To reduce the risk of injury or death, follow these guidelines:

- 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 are to 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 might present a safety hazard during recreational towing.
- g) Towing or using these devices can be physically demanding. Therefore you should know your own limits. Stop when you are tired and act responsibly.
- h) 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 may lead to rope breaks and personal injury.
- i) Use only ropes designed for towables.
- j) Signal signs according to [8.2](#) shall be shown in the instructions for use.
- k) The watercraft driver has overall responsibility for the safe operation and use of the towable

8 Signals

8.1 General

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 indicates the only meaning that something is wrong and the rider demands to stop the ride. Otherwise the hand signals with a more differentiated meaning as listed below apply.

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

8.2 Hand signals

The following illustrated signals (see [Figure 2](#) to [Figure 11](#)) are used to communicate between rider and the observer.



Figure 2 — Faster: palm up



Figure 3 — Slower: palm down or thumb down