



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**

Reference number
ISO 25649-5:2024(en)

Full document details: ISO 25649-5-2024

© ISO 2024  **Documents**
Document Sharing Hub



COPYRIGHT PROTECTED DOCUMENT

© ISO 2024

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

Page

Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Safety requirements and test methods	3
4.1 General	3
4.2 Test conditions	3
4.3 Design	3
4.3.1 General	3
4.3.2 Sizing, admissible number of users and maximum load capacity	4
4.3.3 Class C1 devices, space per person (passive user, including children)	4
4.3.4 Classes C2 and C3 devices, space per person	4
4.3.5 Grab handles	5
4.3.6 Quick release system for C1 towables	6
4.3.7 Buoyancy and load capacity	7
4.3.8 Residual buoyancy	7
4.3.9 Foot, leg and torso entrapment	7
4.3.10 Valves and other protruding parts	7
4.3.11 Accessible protruding parts, entanglement	8
4.3.12 Strength of towing device attachment	8
4.3.13 Towing system	9
4.3.14 Colour of towing rope	9
4.3.15 Floatability of towing rope	9
4.3.16 Fittings	9
4.3.17 Elasticity of towing rope	9
4.4 In-water performance	10
4.4.1 General	10
4.4.2 Selection of test subjects	10
4.4.3 Assessment panel	10
4.4.4 Selection of watercraft and towing personnel for testing	10
4.4.5 Test conditions, test course, duration of test, test speed, wind speed	10
4.4.6 Manoeuvres	11
4.4.7 Efficiency of drainage system for inflatable chambers designed with an external cover	11
4.4.8 Entrapment, entanglement, additional practical in-water test during capsizing	11
4.4.9 Capsizing device, practical in-water test	11
4.4.10 Residual buoyancy, additional practical in-water test	12
4.4.11 Pass and fail criteria	12
5 Required capabilities of the test persons being towed	12
6 Consumer information	13
6.1 General	13
6.2 Intended use	13
6.3 Responsibilities	13
6.3.1 General	13
6.3.2 Watercraft driver	13
6.3.3 Observer	13
6.3.4 Rider	14
7 Written warnings in the manual	14
7.1 General	14
7.2 Special user manual on quick release	14
7.3 Warnings	15

7.3.1	General	15
7.3.2	Special warning on C1 quick release	16
7.4	Instructions	16
8	Signals	17
9	Exclusion	17
Annex A (informative)	Examples of quick release design principles	18
Annex B (informative)	Examples of hand signals	23
Annex C (informative)	Examples of typical products forming Class C	26
Bibliography		28

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).

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not received notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

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.

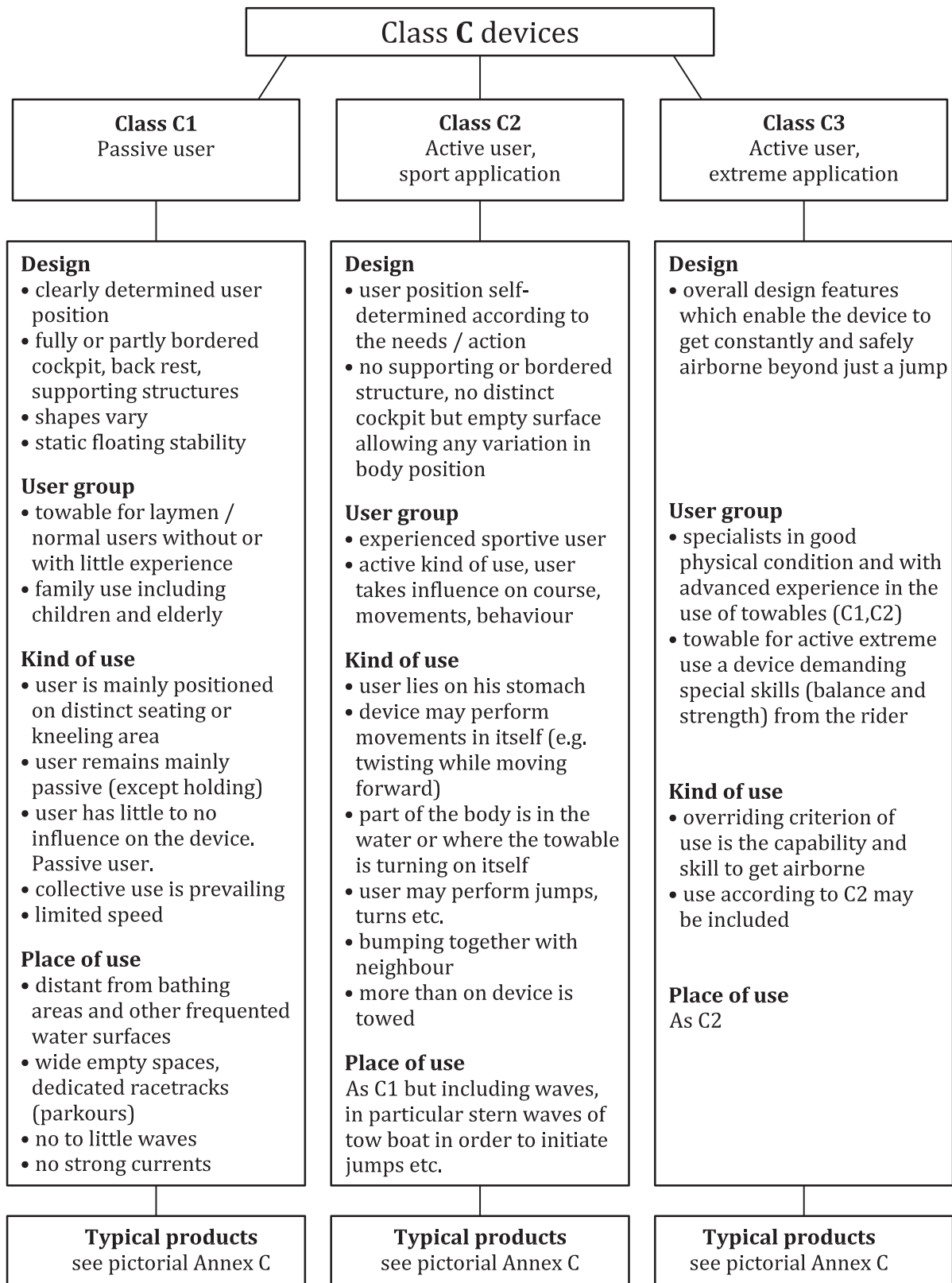


Figure 1 — Interior structure of Class C devices

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.