

ISO/FDIS 25649-1

ISO/TC 83

Secretariat: DIN

Date: 2024-~~05-13~~07-31

Floating leisure articles for use on and in the water —

Part 1: Classification, materials, general requirements and test methods

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

Partie 1: Classification, matériaux, exigences et méthodes d'essai générales

ISO/FDIS 25649-1

<https://standards.iteh.ai/catalog/standards/iso/231a1458-f700-4b76-9b40-bbdd889c27a8/iso-fdis-25649-1>

FDIS stage

© 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
E-mail: copyright@iso.org
Website: www.iso.org

Published in Switzerland

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO/FDIS 25649-1](https://standards.iteh.ai/catalog/standards/iso/231a1458-f700-4b76-9b40-bbdd889c27a8/iso-fdis-25649-1)

<https://standards.iteh.ai/catalog/standards/iso/231a1458-f700-4b76-9b40-bbdd889c27a8/iso-fdis-25649-1>

Contents

Foreword.....	vi
Introduction.....	viii
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	2
4 Classification and criteria to distinguish floating leisure articles from aquatic toys	4
4.1 Classification.....	4
4.2 Test method for measurement	5
4.2.1 General requirements.....	5
4.2.2 Test method for measurement of the largest dimension (D_L).....	6
5 General safety requirements and test methods related to all classes.....	9
5.1 General.....	9
5.2 Body entrapment.....	9
5.2.1 General.....	9
5.2.2 Requirements on body entrapment.....	12
5.2.3 Test procedure	12
5.2.4 Depths of gaps and openings.....	12
5.2.5 Measuring method	12
5.3 Torso entrapment on safety line with regard to children	12
5.3.1 Requirements.....	12
5.3.2 Test method	13
5.4 Accessible protruding parts causing entanglement.....	13
5.4.1 Requirements.....	13
5.4.2 Test method	13
5.5 Human subject testing.....	14
5.5.1 General.....	14
5.5.2 Test panel	14
5.5.3 Assessment panel.....	14
5.5.4 Positioning and posture of test subjects for testing floating stability (if applicable)	15
5.5.5 Basic test postures	15
5.6 Design working pressure	15
5.6.1 Requirements.....	15
5.6.2 Test method	16
5.7 Load bearing components	16
5.7.1 Requirements.....	16
5.7.2 Test method	16
5.8 Towing device.....	16
5.8.1 Requirements.....	16
5.8.2 Test method	16
5.9 Valves and valve adapters	16
5.9.1 Requirements.....	16
5.9.2 Test method	17
5.9.3 Numbering of air chambers.....	17
5.10 Edges, corners and points.....	17
5.10.1 Requirements.....	17
5.10.2 Test method	17
5.11 Shearing and crushing points.....	17
5.11.1 Requirements.....	17

5.11.2	Test method	17
5.12	Strength of the hull and test conditions.....	17
5.12.1	Requirements.....	17
5.12.2	Pressure test.....	18
5.12.3	Heat test (not applicable to Class D devices).....	19
5.12.4	Air tightness test for inflatables made from unsupported material.....	19
5.12.5	Air tightness test for inflatables made from reinforced or fabric covered material	20
5.13	Buckles and other fixings.....	20
5.13.1	Requirements.....	20
5.13.2	Test methods.....	20
6	Material requirements and test methods.....	20
6.1	General.....	20
6.1.1	Requirements.....	20
6.1.2	Test method	20
6.2	Chemical requirements for materials making up the hull, unsupported or reinforced.....	21
6.2.1	General.....	21
6.2.2	Resistance to mineral oil.....	21
6.2.3	Resistance to chlorinated salt water	21
6.3	Physical requirements.....	21
6.3.1	Resistance to cold.....	21
6.3.2	Resistance to heat.....	21
6.4	Mechanical requirements of unsupported hull materials.....	22
6.4.1	General.....	22
6.4.2	Resistance to puncturing.....	22
6.5	Mechanical requirements for reinforced hull materials.....	22
6.5.1	General.....	22
6.5.2	Adhesion of coatings, if applicable	22
6.6	Other materials.....	23
6.6.1	Wood.....	23
6.6.2	Metal and synthetic material parts.....	23
6.7	Threads.....	23
6.7.1	Requirements.....	23
6.7.2	Test method	23
7	Durability of warnings and markings.....	23
7.1	Resistance to perspiration	23
7.1.1	Requirements.....	23
7.1.2	Test method	23
7.2	Resistance to chlorinated salt water	23
7.2.1	Colour fastness.....	23
7.2.2	Test liquid.....	24
7.2.3	Apparatus	24
7.2.4	Test method	24
7.3	Adhesion of markings.....	24
7.3.1	Requirements.....	24
7.3.2	Test method	24
7.4	Requirements on repair means.....	24
Annex A	(normative) Templates.....	25
A.1	Space per person, templates for lying/sitting; adult/child.....	25
A.1.1	Lying.....	25
A.1.2	Sitting.....	26
A.1.3	Template application and overhang.....	27
A.2	Template material.....	27

Annex B (informative) Examples of openings.....	28
B.1 Rationale.....	28
B.2 Common types of design features to be considered for entrapment	28
B.2.1 Examples of openings and gaps.....	28
B.2.2 Type D, functional openings, gaps, etc.....	31
B.2.3 Type E, three dimensional arrangements	31
B.2.4 Type E, labyrinths.....	32
B.2.5 Type E, enclosing spaces (inflatable caverns).....	32
Annex ZA (informative) Relationship between this European Standard and the safety requirements of Directive 2001/95/EC aimed to be covered.....	34
Bibliography	35

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

[ISO/FDIS 25649-1](#)

<https://standards.iteh.ai/catalog/standards/iso/231a1458-f700-4b76-9b40-bbdd889c27a8/iso-fdis-25649-1>

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 25649-1:2017), which has been technically revised.

The main changes are as follows:

- update of the introduction;
- update of [Clause 2](#);
- in [Table 1](#), Class E^b, deletion of the exclusion indicated in footnote a) in the classification for “Not an aquatic toy”);
- addition of the new [4.2](#) for device with or without added component;
- modification of [Figure 1](#);
- measurements in [Figure 6](#) and [Figure 7](#) updated to include buoyancy aid;
- in [5.5.2](#), modification of the maximum body weight for Subject 1 – male;
- in [5.12.2.1](#), modification of the test procedure;

— update of the Bibliography.

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.

iTeh Standards
(<https://standards.iteh.ai>)
Document Preview

ISO/FDIS 25649-1

<https://standards.iteh.ai/catalog/standards/iso/231a1458-f700-4b76-9b40-bbdd889c27a8/iso-fdis-25649-1>

Introduction

0.1 Motives, problems, risk assessment, methods

Investigations in statistical data related to drowning accidents and near-drownings create a new awareness about the enormous relevance of drownings in many countries.

Drowning is among the ten leading causes of death of children and young people in the world. Due to the absence of precise data, there is no information on the relation between drowning accidents and the involvement of certain products. Such links can only be shown for a limited number of products among the wide range of products related to water activities. Consumer protection needs to rely on conclusions by risk analysis, experience and analogy to known cases. Considerations based on probability and the precautionary principle are also important in addressing the problem. Beyond the statistical deficiencies, relations between certain products and an increased risk of drowning are plausible. A risk analysis (see [Table 1](#)) shows in ISO 25649-3 to ISO 25649-7 what the partial and final risks are.

Until now, standardization has addressed the risks through a wide series of standards aiming at the protection against drowning and at covering products used in leisure activities on and in the water. There are standards covering the relevant products for activities such as playing in the water, water sports, boating, diving, learning to swim and even the emergency devices as buoyancy aids and life jackets. Beyond these traditional activities and products, there is an increasing tendency for creating and marketing new products. These aim to increase pleasure and entertainment on the water but also to increase speed, action and thrill with new activities such as “tubing” or “white water rafting”. Some new products are traditional core products that have been partially modified, some are derived from traditional products but have been further developed into something new. Additionally, there is a clear trend to bring formerly land-based playground equipment on the water. The use of the word “amphibiation” is justified as in many cases the original function of the product is maintained, i.e. the product can be used both on land and water. Typical examples for amphibiated products are modifications of inflatable boats into bathing rafts or the further development of the earlier swim-ring into a flotation seat. Other examples are inflatable trampolines, climbing installations on the water and inflatable floating armchairs and sun loungers including a mini bar and sun shade. This trend is clear and likely to continue.

The nature of these new products provides an equal or even higher risk potential than the original core products. In parallel, the number of these products override the number of core products. In cases of collective use, the frequency of use is considerably increased, which in turn increases the likelihood of accidents, including drownings. Drowning is the final risk of the activities related to the mentioned products. Other somewhat lesser evils – partial risks – are likely to happen independently or in combination with the final risk.

With regard to safety-related standardization, an evident discrepancy emerges between the core products and the huge number of new products forming what the experts call the “grey zone”. Standardization in the past has focused on the core products, while “grey zone products” have not been considered and investigated, thus remaining excluded from the scopes of related standards. A systematic risk analysis or an investigation of the role of these new products in drowning accidents was never made. This has changed in recent times, with the triggering incident being the swim seat case, involving aquatic toys and related products and negligence. Today, what matters more than a disturbing gap in the series of existing standards, is the presence of several coincidences:

- the main user groups of these products are children and adolescents who in turn are the main victims of drowning;
- the main areas where drowning happens are the same areas where such products are used (rivers, lakes, pools, bathing beaches);

- the risks can be easily identified and partly proven, and the increase in numbers and frequencies of accidents were already mentioned.

0.2 Equal risk, equal requirement

- Safety-related standardization covering products used in leisure activities on and in the water aims at:
- achieving equality of technical rules from equality of risks (risk-/rule-alignment);
- closing the standardization gap (i.e. completeness);
- setting clear boundaries between the product areas in order to avoid incorrect certification (e.g. unjustified CE-Mark);
- avoiding individually established testing procedures by the various test houses in the absence of a unified technical rule.

0.3 Risks and need for prevention

The following are considerations around the risks and the need for prevention.

- Relevance of drowning is proven (age groups, places, partly product involvement).
- The increase in the frequency of use and in the number of products likely contributes to accidents.
- Theoretical risk analysis shows additional risks below the final risk of drowning.
- Plausibility and likelihood of harm to users is evident, so is the probability of adequate safety standards to avoid or minimize this.
- Positive contribution to the basic problem of parental supervision is needed and claimed with regard to children activities, but is often weak, not existing or neglected.
- Safety provided by a product design that ensures the highest possible level of technical security does not exempt parental supervision for young children.
- There is a trend to bring more and more former land-based products on the water, as well as trends to adventure activities increasing the thrill of water related leisure activities and entertainment.
- There is a need for prevention.

0.4 Body entrapment, human test subjects and USA anthropometric data

This document includes test procedures based on human test subjects. The anthropometric data for the worst-case human test subject – the heaviest and biggest person representing the 95th percentile of a population – have been derived from European body measurement data. The international worst-case regarding body dimensions is constituted by the USA-population. The 95 % body weight for the USA population needs to be increased from 90 kg to 110 kg and the Body Mass Index (BMI) should be specified between 35 and 40. This corresponds to a body height of 170 cm to 175 cm. Accordingly, the rigid test probe needs to be modified.

Floating leisure articles for use on and in the water —

Part 1: Classification, materials, general requirements and test methods

1 Scope

This document specifies general safety requirements and test methods related to materials, safety and performance for classified floating leisure articles for use on and in water.

This document is not applicable to:

- aquatic toys (use in shallow waters/use under supervision);
- inflatable boats with a buoyancy > 1 800 N;
- buoyant aids for swimming instructions;
- air mattresses that are not specifically designed or intended for use on the water (e.g. velour bed, self-inflating mattress and rubberized cotton air mattress);
- floating seats for angling purposes;
- surf sports type devices (e.g. body boards, surf boards, stand-up-paddles boards);
- water ski, wakeboard or kite surfing board;
- devices made from rigid materials e.g. wood, aluminium, hard or non-deformable plastic;
- devices that are kept in shape by permanent air flow;
- rings intended for use on water slides;
- wading devices.

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 105-A02:1993, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour*

ISO 105-A03:2019, *Textiles — Tests for colour fastness — Part A03: Grey scale for assessing staining*

ISO 105-E03:2010, *Textiles — Tests for colour fastness — Part E03: Colour fastness to chlorinated water (swimming-pool water)*

ISO 105-E04:2013, *Textiles — Tests for colour fastness — Part E04: Colour fastness to perspiration*

ISO 105-X12:2016, *Textiles — Tests for colour fastness — Part X12: Colour fastness to rubbing*

ISO 868:2003, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness)*

ISO 1817:2022, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 2411:2017, *Rubber- or plastics-coated fabrics — Determination of coating adhesion*

ISO 3696:1987, *Water for analytical laboratory use — Specification and test methods*

ISO 25649-2:2024, *Floating leisure articles for use on and in the water — Part 2: Consumer information*

ISO 25649-3:2024, *Floating leisure articles for use on and in the water — Part 3: Additional specific safety requirements and test methods for Class A devices*

ISO 25649-4:2024, *Floating leisure articles for use on and in the water — Part 4: Additional specific safety requirements and test methods for Class B devices*

ISO 25649-5:2024, *Floating leisure articles for use on and in the water — Part 5: Additional specific safety requirements and test methods for Class C devices*

ISO 25649-6:2024, *Floating leisure articles for use on and in the water — Part 6: Additional specific safety requirements and test methods for Class D devices*

ISO 25649-7:2024, *Floating leisure articles for use on and in the water — Part 7: Additional specific safety requirements and test methods for Class E devices*

EN 71-1:2014+A1:2018, *Safety of toys — Part 1: Mechanical and physical properties*

EN 13138-3:2021, *Buoyant aids for swimming instruction — Part 3: Safety requirements and test methods for swim seats into which a user is positioned*

EN 16051-1:2012, *Inflation devices and accessories for inflatable consumer products — Part 1: Compatibility of valves and valve adapters*

3 Terms and definitions

ISO/FDIS 25649-1

<https://standards.iteh.ai/catalog/standards/iso/231a1458-f700-4b76-9b40-bbdd889c27a8/iso-fdis-25649-1>

For the purposes of this document, the terms and definitions given in EN 16051-1:2012 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

buoyancy

resultant upthrust of a body when totally submerged in water with its uppermost part just below the water surface

Note 1 to entry: For the purpose of measuring, the buoyancy of boats (see ISO 25649-7) is measured as the volume of any chamber which forms the inflatable hull, including *components* (3.4) that are permanently fixed to it. This buoyancy is measured by calculation or water filling and measuring the amount of water.

3.2

residual buoyancy

provision of remaining *buoyancy* (3.1) in case of a defect of any buoyancy chamber