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Floating leisure articles for use on and in the water —

Part 4: Additional specific safety requirements and test methods for Class B devices

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

Partie 4: Exigences de sécurité et méthodes d'essai complémentaires propres aux dispositifs de Classe B

Reference number
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Foreword

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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 25649-4 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

0.1 General

Class B devices are marketed and used for the purpose of activities in the water. In distinction to other floating devices they are characterized by a typically partly immersed position of the user inside the device.

In case of Class B1 products, i.e. the swim seat for children above three years of age (36 months), user's position might be such that in case of very young users (non swimmers four years and above) the body is kept afloat und laterally supported by a surrounding inflatable structure which provides a relatively tight fit between user and buoyant structure. This in turn incorporates the potential risk of body entrapment in case of a capsizing.

Class B1-type products for children below three years of age (36 months) are dealt with in EN 13138-3.

The development of new products in this area is progressing. Beyond the classical swim seat rafts for more dynamic action on and in the water different body postures and extended user groups have been developed.

Class B2 products do not provide this kind of support to the user. Even if they have the circumferential buoyant structure in common with the Class B1 products — and thus the entrapment risk if this fit becomes too tight — flotation of the user depends on his ability to hold himself by hands or body inside the very loosely surrounding buoyant structure.

Both classes of products include also adult use. Activities may range from passive floating to actions like wave surfing, tubing, balancing, swinging, etc. The devices are linked with the identified risks given in Table 1.

Standardization is aiming for more safety with regard to all foreseeable uses.

Dealing with a partly intentionally immersed human body leads to the question of loads to be applied for appropriate testing. For the purpose of this standard load resulting from the body weight is set with 75 % of the body weight of the heaviest foreseeable or specified user even when in certain circumstances this immersed body weight may be reduced to roughly 10 %. In cases where the devices can be used for sitting on top (e.g. big rings) the maximum body weight out of the stipulated user group is assessed as adequate.

It should be noted that this document is not related to the one and only technically clearly determined product but to a whole diverse product group including two major design principles B1 and B2 as laid down in the classification, see Clause 4, for Class B floating leisure articles.

0.2 Child testing

See Annex A and ISO 25649-1:2017, Clause 4, as alternative. Use of Class B products includes children from four years of age and above. Some essential requirement ensuring safety in use and in dangerous situations which may occur — e.g. a capsize — cannot be simulated and verified via the application of forces or other instrumental procedures but only by practical testing involving human test subjects or test dummies which sufficiently represent the envisaged user groups. Children in testing increase the nearness to real life situation but may lead to subjective results. An increased number of test cycles are an appropriate means to get an average result which makes the subjective test more objective. The application of test dummies reduces the nearness to real life situation but increases reproducibility of testing. Costs and expenses are high in the beginning (production costs) but may pay off in long term in comparison to the expense of repeated provision and operation of human test subjects. The worst alternative is to eliminate certain requirements if they cannot be verified for the reason of lacking either test dummies or human test subjects.

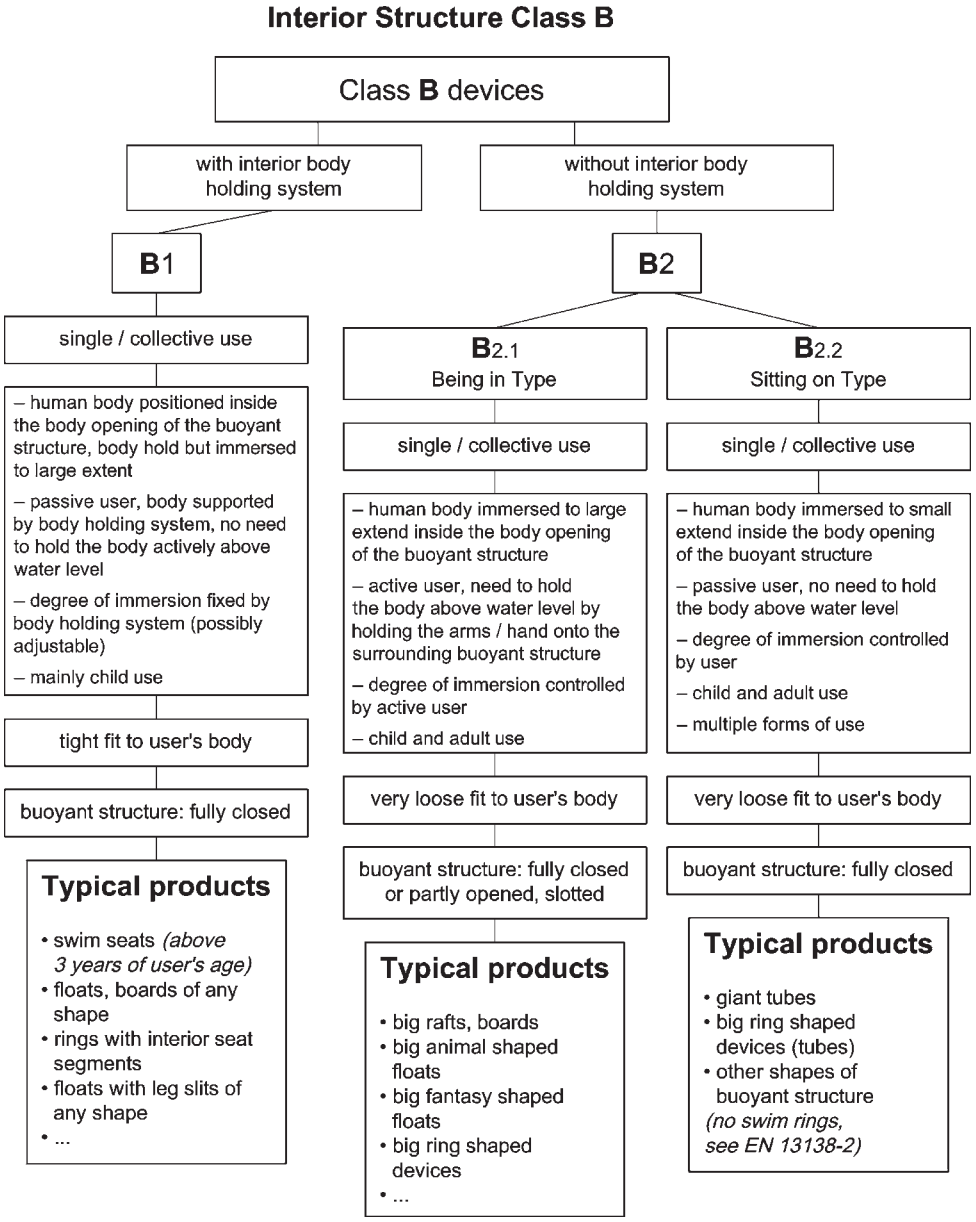
It goes without saying that any involvement of human test subjects and thus in particular child testing is accompanied with all necessary precautions, surveillance and safety measures.

This document refers amongst others to children as test subjects. The anthropometric requirements related to these test subjects are based on children five years and nine years of age with a body height of 126 cm and 149 cm and a body weight of 25 kg/38 kg. Children of 14 years of age and above can be represented by the smallest adult female person representing the fifth percentile of the anthropometric range.

In order to provide in all cases an alternative to child testing the anthropometric data of relevant manikins are specified for optional application in Annex A.

Table 1 — Introductory risk analysis

No.	Typical products	Place of use	Function; range of usage; target/age group	Type of movement/ propulsion	Position of user in regard to the equipment, elevation above water	Predictable misuse	Partial risk related to water environment	Final risk	Protection aims standard/ regulation
B (B1, B2)	Floating structures with circumferential buoyancy chambers around user's body, body opening with or without interior body holding system, various body postures	Depending on age group and capability to swim: pool, close to shore, lake, pond	Children; adolescents; large variety with regard to age and use (max. 16 years to 18 years); no infants	Mainly drifting; propulsion only by swimming strokes; third party acting, moving by hand paddling, action in waves for adolescents	In-water position; main parts of body are below the water surface; no elevation above water level, sitting kneeling, standing, laying	Dangerous distance from bank/ shore; use in currents and/or dangerous offshore winds; use by non-swimmers (B2); capsizing (B1); wrong size allocation (user wedged in device); lack of supervision	Capsizing, entrapment, entanglement; capsizing in combination with entrapment can lead to fatal accidents; drifting away through currant or wind	**DROWNING**	Avoidance of entrapment/ entanglement; floating stability; residual buoyancy; warning notes; easy escape in the case of capsizing; adult supervision; suitable sizing system



NOTE 1 Rings and ring shaped tubes dealt with in this document are in no case swim rings as means to learn to swim (see EN 13138-2) but water leisure articles for hanging in or sitting on.

NOTE 2 The minimum length or width is 1,2 m and the corresponding diameter is ≥1,2 m (see EU guidance document No 7,2014-01,on the application of the directive on the safety of toys used in and on the water).

Floating leisure articles for use on and in the water —

Part 4:
Additional specific safety requirements and test methods for Class B devices

1 Scope

This document specifies safety requirements and test methods related to materials, safety, performance and consumer information for classified floating leisure articles for use on and in the water according to ISO 25649-1.

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

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

Class B devices provide a buoyant structure with one or more body openings into which the user is positioned partly immersed.

NOTE 1 Typical products forming Class B (see Annex B):

— floating rafts with interior body holding system ("swim seats") mostly in circular or square shape, fantasy shape for playing purposes;

— floating fantasy shaped structures with one or more openings to host a child's body, with or without body holding system;

— floating with slits or openings to put legs through any shape;

— floating rings with interior seat segments inside the circular body opening.

NOTE 2 Typical places for application:

— pools;

— protected areas of lakes, ponds;

— protected area sea shore (no offshore winds, no 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.

EN 13138-3:2007, *Buoyant aids for swimming instruction — Part 3: Safety requirements and test methods for swim seats to be worn*

EN 13138-4:2007, *Buoyant aids for swimming instruction — Part 4: Test manikin for in water performance testing of buoyant aids to be worn*

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

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

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

3.3
device providing static floating stability
product designed in such a way that the user has floating stability without needing their own skills

Note 1 to entry: One or several users can be safely on or in the device even if the weight is not evenly distributed.

Note 2 to entry: In accordance with intended use.

3.4
device to be balanced by the user
product of which the upright floating depends on user's skill and sense to balance it

Note 1 to entry: In accordance with intended use.

3.5
escape
easy and complete separation between the user and the device in case of capsizing of the device or system without hindrance through any part or feature of the floating device

3.6
swim seat
buoyant device intended to introduce the user to the aquatic environment and to build water confidence as a pre-requisite to learning to swim, which provides safety for the user but no guarantied protection against drowning

Note 1 to entry: Swim seats are learning aids and need not be mistaken with aquatic toys as defined in EN 71–1.

[SOURCE: EN 13138-3:2007, 3.13]

3.7
body holding system
system which is constituted by any means inside the circumferential buoyant structure which supports the users body

Note 1 to entry: The body holding systems enable the user(s) to stay in the partly immersed position without need to hold himself for not slipping through the opening into the water. The body holding system might be designed to allow a sitting, kneeling, standing or lying posture. It might be integrated in the interior opening of the buoyant structure or added as a separable component.

3.8
integral part of the device
part of the device without which the system or component does not function and can therefore not arbitrarily be used or omitted

3.9
multiple use product
any product that is intended to be used for more than one purpose (jumping, resting, climbing, etc.)

3.10
inherent buoyant material
non-crosslinked (closed-cell) foam or other materials enclosed in (a) sealed compartment(s) in the hull which have a specific weight less than fresh water

Note 1 to entry: An inflatable made of 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 Class B devices shall be such that it corresponds in terms of design, dimensions, safety, strength and durability for its intended use. The requirements set out in ISO 25649-1 were chosen to ensure compliance with these considerations. Where class B devices are provided in several components, the requirements apply to all components. These components shall be permanently attached if the contribute indispensably to safety and performance.

With regard to general material and design requirements Class B devices shall meet the requirements set out in ISO 25649-1 as far as applicable.

In individual cases, due to the unpredictability, valence and in determinability of existing and future concrete products, a corresponding choice shall be made.

4.2 Sizing

4.2.1 Sizing of B1 devices, fit to user's body and test probes

4.2.1.1 Requirements

The child's torso and thighs shall be represented by test probes representing the anthropometrically relevant 95th percentile, male body dimensions of the labelled age/weight group. The probes shall slip easily through the body or leg openings respectively (see Figure 1).

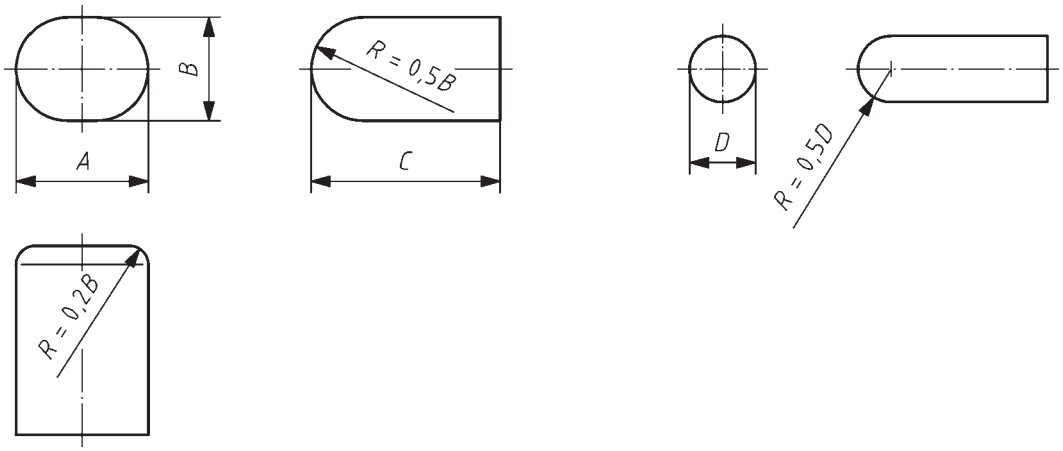
Sizing of class B1 devices shall be in accordance with the range of body weights and age groups as specified in Table 2 (sizing safety information symbols see ISO 25649-2).

Table 2 — Minimum dimensions for interior body openings

Body weight kg	Age range years	Torso probe dimensions $A^a \times B^a \times C^a$ mm × mm × mm	Thigh probe diameter D^a mm (mm)
22 to 25	4 to 5	260 × 210 × 400	168[a] (140[c])
28 to 34	6 to 8	310 × 240 × 450	192[a] (160[c])
38 to 48	9 to 11	330 × 250 × 500	222[a] (185[c])
54 to 61	12 to 13	350 × 260 × 550	264[a] (220[c])
69 and above	14 and above	The 14 year child user may be represented by the human adult test subject 4 as specified in ISO 25649-1:2017, 5.5.2, Table 2. The same Table 2 can be consulted for test subjects above 14 years of age (test persons 3 and 4).	

[a] Anthropometric data + 20 % safety margin (applicable test value).

[c] 95[th] percentile, male, oldest child of age range.



Key

A, B, C torso probe dimensions, in millimetres (mm)

D thigh probe diameter, in millimetres (mm)

R radius, in millimetres (mm)

Figure 1 — Test probes for torso and thighs

The material of the probe in Figure 2 and Figure 3 shall be a rigid material (for example wood or plastic).

The interior size of the device corresponds to the relevant body weight as specified in Table 2. This size [designated user(s)] shall be labelled on the product and on the packaging. It shall comprise the body weight by applying safety information symbols: “user’s body weight range” and “size designation for interior size”. The safety information symbols: “risk of getting entrapped if size is not appropriate” and “avoid entrapment ensure loose fit” of ISO 25649-2 shall be applied additionally.

4.2.1.2 Test method

Application of torso and leg probes, check whether the required safety information symbols have been applied by visual verification.

NOTE The body opening for users up to 14 years are given in Table 3 only to avoid body entrapment and provide space for action. As there is no longer need for body support they can be seen as minimum dimensions for the biggest user of the range. Adult use can be foreseen for therapeutic use and other applications.

4.2.2 Sizing of B2.1 (Being in type) devices, loose fit to body

4.2.2.1 Requirements

The interior space of class B2.1 devices shall be such that in any case the biggest designated user will still keep a very loose fit to his body and will in no case get entrapped by the surrounding buoyant structure (see also 5.5). Devices shall be labelled with the safety information symbols: "user's body weight range" and if appropriate with: "max. load capacity" for max. load and body weight. Sizing shall be in accordance with Table 3 (see also A.7.1 for anthropometric data).

4.2.2.2 Test method

Application of torso probes, visual verification checks whether the required safety information symbols have been applied.

4.2.3 Sizing of B2.2 (Sitting on type) devices, loose fit to the body

4.2.3.1 Requirements

The interior space of B2.2 devices is deemed to prevent the user from sagging in and thus body entrapment, if appropriate requirements a), b) and c) are met.

a) the interior space dimensions are in accordance with Table 3 and labelled according to this document (safety information symbol: "size designation for interior size");

b) safety information symbols: "risk of getting entrapped if size is not appropriate", "avoid entrapment ensure loose fit" and "user's body weight range" have been applied;

c) entrapment shall not be permitted. The sizing of devices shall be designed accordingly. The intended user shall be able to slip vertically through the opening or shall not be able to become entrapped when sagging down into the opening from a "SIT ON POSITION".

NOTE If B2.2 devices are equipped with a bottom (sheet, mesh, etc.), ISO 25649-3 applies.

Table 3 — Sizing for the inner opening of "Being in" (B2.1) and "Sitting on" (B2.2) devices

No.	Size	Smallest interior dimension mm	Max. body weight kg	Age orientation years
1	x-small	310[a] (260)	25	Child, 4 to 5
2	Small	370[a] (310)	34	Child, 6 to 8
3	Medium	370[a] (330)	48	Child, 9 to 11
4	Large	400[a] (348)	61	Child,11 to 13
5	x-large	440[a] (360)	69 to 100	Adult, 14 and above
6	xx-large	500[b]	69 to 120	Adult, 14 and above

[a] 95th percentile, male × 1,2 = min. inner diameter (the dimension are rounded and harmonized).

[b] Obese adult persons, biggest available clothing size, for more extreme body built warning shall be obeyed.

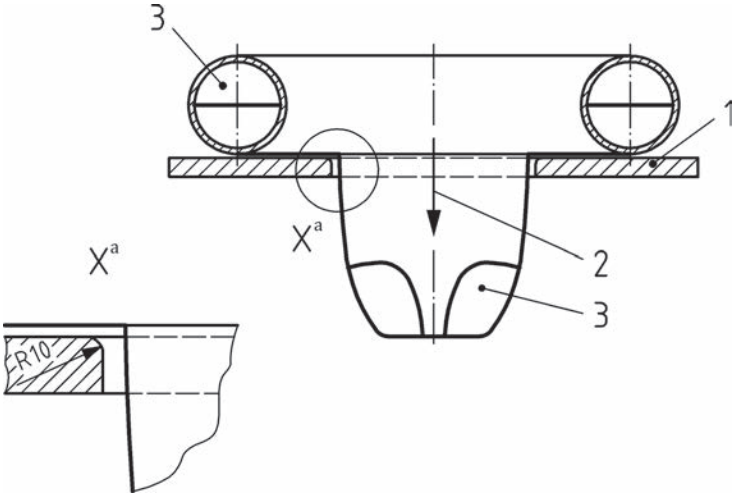
4.2.3.2 Test method

Measurement of inner width by test probes according to Table 3.

4.3 Strength of entire device B1

4.3.1 Requirement

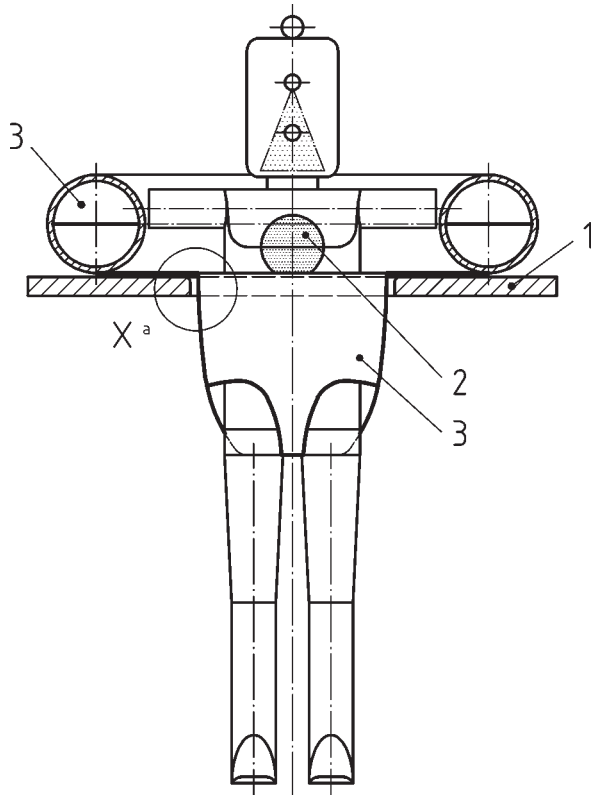
When tested in accordance with 4.3.2 no part or component of the B1 device e.g. body holding system, straps, seat pants or their attachment to the buoyant structure (welding seams) shall break or show any deficiency compromising safety. Loads shall be applied according to Figure 2 for the vertical force or according to Figure 3 for the load application.



Key

1 test board, opening in compliance with the contour of B1 device to be tested
2 load (body mass of max. designated user)
3 B1 device (swim seat)
a Radius of test board's upper edge.

Figure 2 — B1, strength of entire device, load application by single load



Key

1 test board, opening in compliance with the contour of B1 device to be tested

2 load, test dummy according to max. designated user

3 B1 device (swim seat)

[a] Radius of test board's upper edge (see Figure 2).

Figure 3 — B1, strength of entire device, test dummy application

4.3.2 Strength of entire device B1, Test method

Place the device on an appropriate even surface in a way that the buoyancy structure is completely supported and the body holding system hangs freely downwards where applicable. Load the body holding system with a dead weight representing the body mass of the maximum user of the designated body weight range. Load duration: 10 min, ambient temperature 20 °C. Alternatively the test dummies as specified EN 13138-4:2007, Annex B, may be applied as near to reality load where applicable.

4.4 In-water performance of class B1 devices

4.4.1 In water behaviour, static floating stability of B1 devices for children of four years to five years and six years to eight years

4.4.1.1 Requirements

With the appropriate loading device in position as specified 4.4.1.2 Class B1 products for children up to five years or up to eight years of age shall not capsize when subjected to the test as specified in 4.4.1.2. Alternatively the test manikins and test procedures as specified in EN 13138-4:2007, Annex B, may be applied for products for this age group.

4.4.1.2 Testing by load application (B1, mechanical testing)

4.4.1.2.1 General

Testing shall comprise the following test sequences:

a) device fully inflated and load applied asymmetrically inside the device (tangentially) at the inner wall or in case of neighboured chambers at the inner wall of the outer buoyancy chamber at the place most likely to cause to failure (see Figures 4 and 5);

b) air chamber most likely to cause failure deflated (residual buoyancy), device loaded at the centre line of each body opening but at a distance d from centre point of the body opening. The load *L* shall represent 75 % of the body weight and the distance *d* = 25 % of the body width of the biggest allowable user of the stipulated age range. Body weights: see Table 3; body sizes: according to symbol *e* in EN 13138-4:2007, Table B.1.

4.4.1.2.2 Test board(s)

Material: wood or similar rigid material.

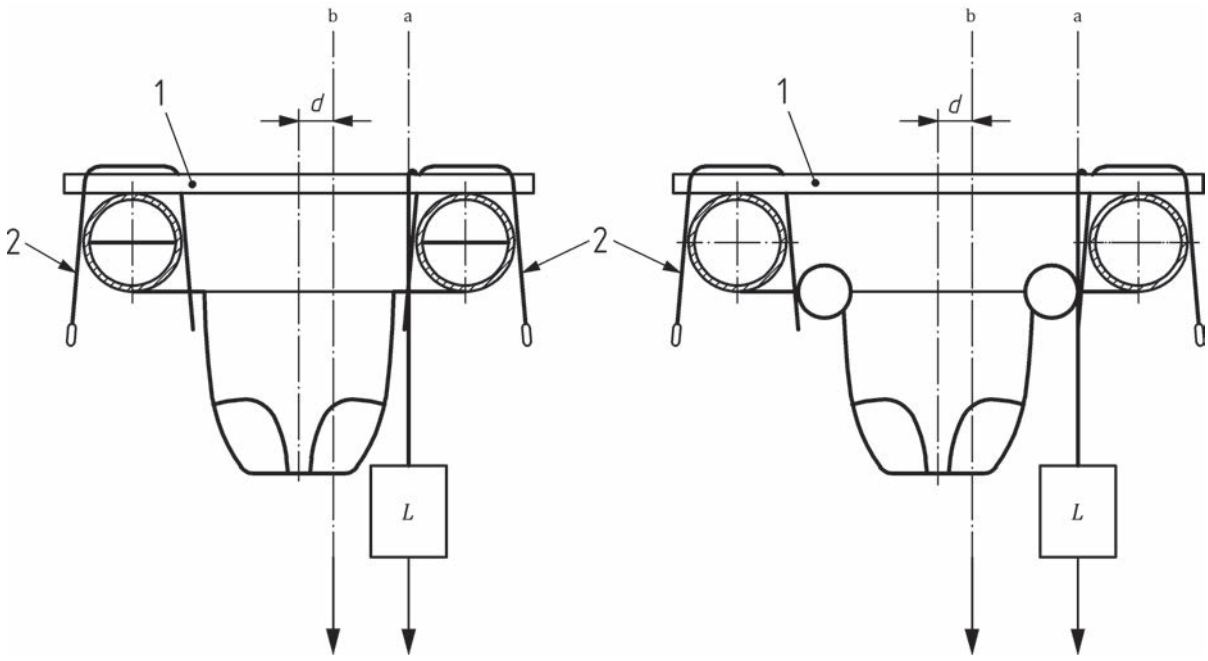
Dimensions: adjustable in length, fixed width of 200 mm, rounded edges.

Features: adjustable straps for attachment to buoyant device (including single and multiple user devices), means to attach a load (steel) by hanging it vertically on the board at any place.

4.4.1.2.3 Load application for B1 devices

The diversity of the product group makes complete anticipation of load configurations impossible. In cases where the load application board cannot be applied as shown in Figure 4 and Figure 5 a device and/or application ensuring the same effects shall be chosen. The figures show the load application for B1 single seaters.

EXAMPLE 1 Device for sitting posture as one possible embodiment of B1 products (mainly child use).



Key

1 test board

2 attachment strap

L load, 75 % of body weight (steel)

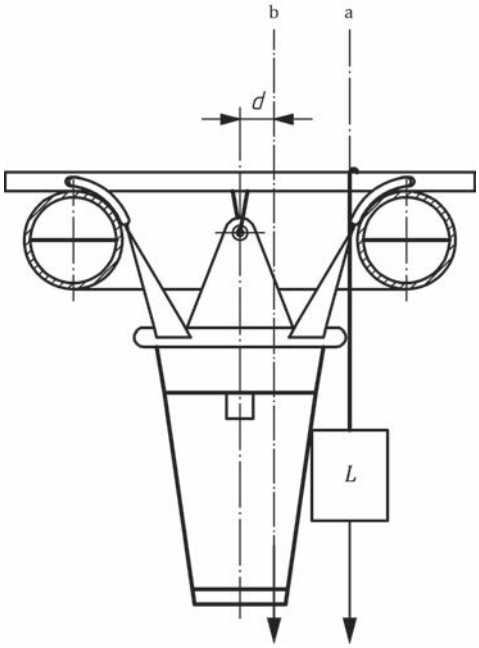
d distance from centre point on centre line

a Load application when fully inflated.

b Load application after failure of one air chamber.

Figure 4 — Test board and load application, B1 devices (Example 1)

EXAMPLE 2 Device for standing posture as another possible embodiment of B1 products (children and adolescents use).



Key

L load, 75 % of body weight

d distance from centre point on centre line

a Load application when fully inflated.

b Load application after failure of one air chamber.

Figure 5 — Test board and load application, B1 devices (Example 2)

4.4.2 In water behaviour, static floating stability of B1 devices for children of above eight years of age (test panel of human test subjects, device fully inflated)

4.4.2.1 Requirements

When tested in accordance with 4.4.2.2 Class B1 devices shall keep the intended user(s) safely afloat with at least the head above water level without any needed intervention of the user (passive person). During test sequences [see 4.4.2.2, a), b), c)], including deliberate tilting, the device shall stay in or come back to a stable and safe floating position.

The use of children as human test subjects is critical. Therefore testing of devices intended for children of four to five years (25 kg) and six years to seven years of age (30 kg) should be done by mechanical testing as specified in 4.4.1. Alternatively the manikin test sequence as specified in Annex A may be applied. For children above seven years (30 kg) human test subject testing is considered to be responsible. Testing should be performed by either using human test subjects in accordance with ISO 25649-1:2017, 5.5 and Table 2 or by applying the test manikins and test procedures as specified EN 13138-4:2007, Annex B.

4.4.2.2 Test method (human test subjects)

Select test subjects in accordance with ISO 25649-1:2017, 5.5. Embark test subject(s) representing the biggest person(s) of the designated range of users (see Table 3) in a way to simulate the most onerous load distribution in terms of number of users and their action which might cause capsizing.

Action to be undertaken by test subjects/test staff:

a) being in the device, check by test panel for proper fit to the body on all crucial points being in the device, the test panel should asses the fit of the device and that it is correct for the intended

age group. Where a device is over or under size and there is a risk of entrapment or unexpected abandonment, the device should fail;

b) being in the device, the assessment panel should determine that the device provides sufficient floatation for the user such that the face and mouth can be kept clear of the water when the user is passive and in calm water;

c) being in the intended position and leaning out as far as possible from this position, hands reaching outwards as to grab something distant on the water surface;

d) being in the device, device tilted by test staff to an angle of 60° from the horizontal and released;

e) being in the device, additional load of 10 kg at the most onerous place, representing an outside third party holding to the device, attached to the point most likely to cause failure.

Where child subjects under the age of eight years are used for in water testing, the assessment panel shall ensure that there is adequate additional lifesaving support to ensure that a child is not put at risk in the event of the failure of a device. In addition, the assessment panel shall confirm, prior to the start of testing, that there is compliance with all local and national legislation and Codes of Practice relating to the use of children in a work related environment.

Visual inspection regarding fit and safe floatation in calm water by assessment panel.

4.4.3 In water behaviour, dynamic stability for B1 devices intended for children of four years to five years and six years to seven years of age (30 kg)

4.4.3.1 Requirement

With the appropriate loads in position as specified in Table 3 and 4.4.1.2 each Class B1 device shall not capsize. Alternatively the test manikins and test procedures as specified in EN 13138-4:2007, Annex B, and the procedures as specified in A.8.3 may be applied.

4.4.3.2 Test method

Apply loads in accordance with the weight/age range of the product as required.

NOTE Alternatively Annex A can be applied.

Assessment by assessment panel.

4.4.4 Residual buoyancy and retention of function of Class B1 devices (children up to seven years, 30 kg)

Class B1 of floating articles for children of three years to five years (36 months to 60 months) and six years to seven years of age (single and collective use) shall at least provide a residual buoyancy which is sufficient to keep all permissible users in static stable floating conditions if the air chamber most likely to cause failure has been deflated. If the device is made up of several independent components this requirement applies for each of them. This requirement is deemed to be met if the device meets the requirements concerning floating stability in 4.4.1.2, b).

Alternatively A.7.1 (but with the air chamber most likely to cause failure deflated) applies. It shall be demonstrated that the test manikins shaded head area as specified in EN 13138-4:2007, Annex B, is kept clearly out of the water.

Assessment by assessment panel

4.4.5 Escape from the B1 device (body entrapment, leg/foot entanglement)

4.4.5.1 Requirements related the age group four years to five years

B1 devices for this age group shall meet the requirements concerning leg and foot entrapment/entanglement as set out in ISO 25649-1.

4.4.5.2 Requirements related the age groups six years and above

B1 devices for this age group shall meet the requirements concerning leg and foot entrapment/entanglement as set out in ISO 25649-1. Body entrapment is deemed to be avoided if the relevant requirements concerning sizing (see Table 3 and marking, see safety information symbols: "size designation for interior size", "risk of getting entrapped if size is not appropriate", "avoid entrapment ensure loose fit", "user's body weight range") have been met.

4.5 In-water performance of class B2 devices

4.5.1 In water behaviour, static floating stability of B2 devices for children up to five years and six years to seven years

4.5.1.1 Requirements

With the appropriate loading device in position as specified 4.5.1.2 Class B2 products for children up to five years or six years to seven years of age shall not capsize when subjected to the test as specified in 4.5.1.2. Alternatively the test manikins as specified in EN 13138-4:2007, Annex B, and test procedures as specified in Annex A (manikin testing) may be applied for products for this age group. Class B2 products which do not meet these requirements shall be labelled as devices to be balanced by the user(s) (see safety information symbol "device provides floating stability/device requires balancing" in ISO 25649-2).

4.5.1.2 Testing by load application (B2, mechanical testing)

4.5.1.2.1 General

Testing shall comprise the following test sequences:

a) device fully inflated and load applied asymmetrically inside the device (tangentially) at the inner wall or in case of neighboured chambers at the inner wall of the outer buoyancy chamber at the place most likely to cause to failure (see Figure 6 to Figure 8);

b) air chamber most likely to cause failure deflated (residual buoyancy), device loaded at the centre line of each body opening but at a distance d from centre point of the body opening. The load L shall represent 75 % of the body weight and the distance d = 25 % of the body width of the biggest allowable user of the stipulated age range. Body weights: see Table 3; body sizes: according to symbol e in EN 13138-4:2007, Table B.1.

4.5.1.2.2 Test board(s)

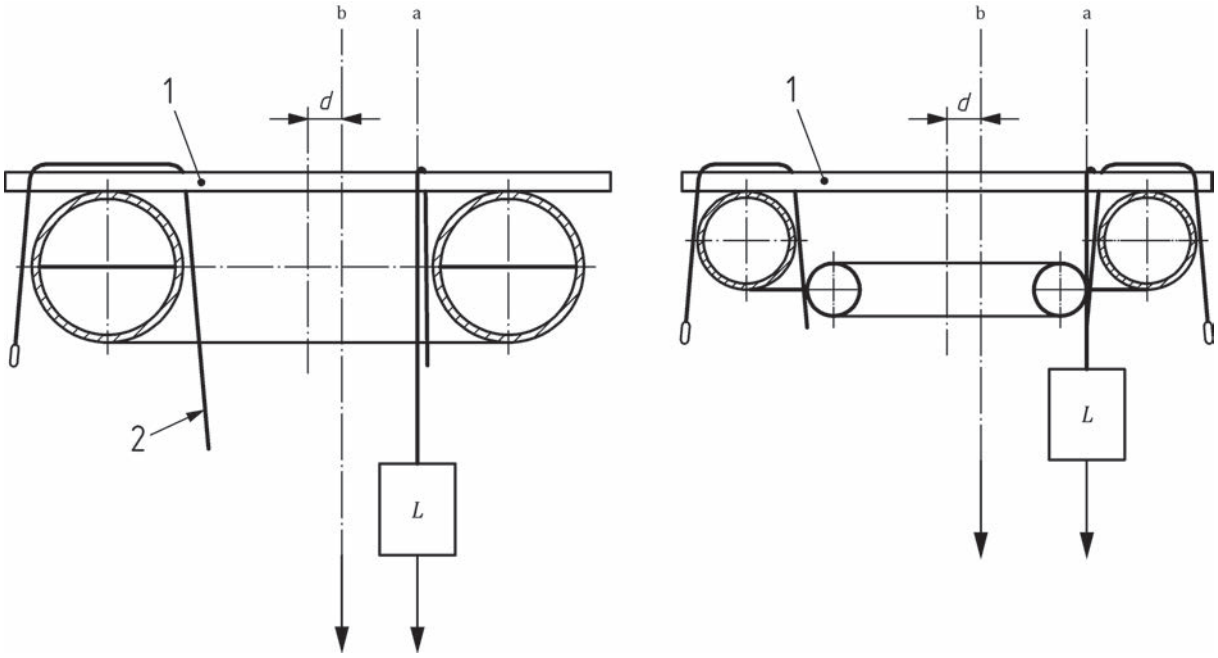
Material: wood or similar rigid material.

Dimensions: adjustable in length, fixed width of 200 mm, rounded edges.

Features: adjustable straps for attachment to buoyant device (including single and multiple user devices), means to attach a load (steel) by hanging it vertically on the board at any place.

4.5.1.2.3 Load application for B2 devices

EXAMPLE 1 GIANT RING as one embodiment of B2 products (adolescent and adult use).

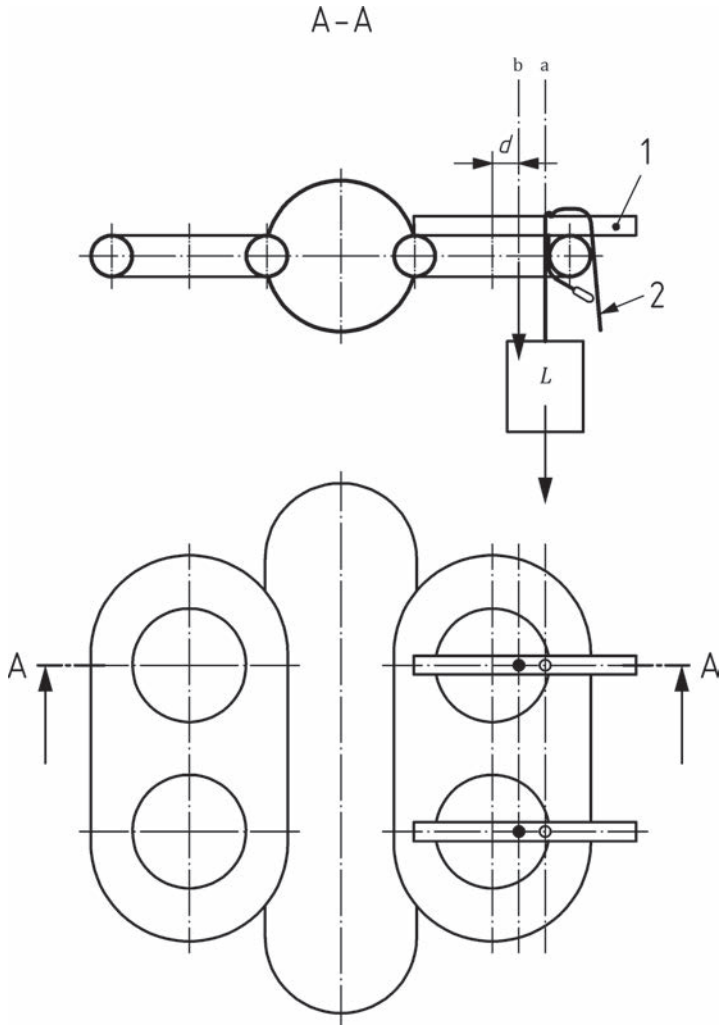


Key

1 test board
2 attachment strap
L load, 75 % of body weight
d distance from centre point on centre line
a Load application when fully inflated.
b Load application after failure of one air chamber.

Figure 6 — Test board and load application, B2 devices (Example 1, Ring)

EXAMPLE 2 BUTTERFLY as another embodiment of B2 products (child use, multiple seater).

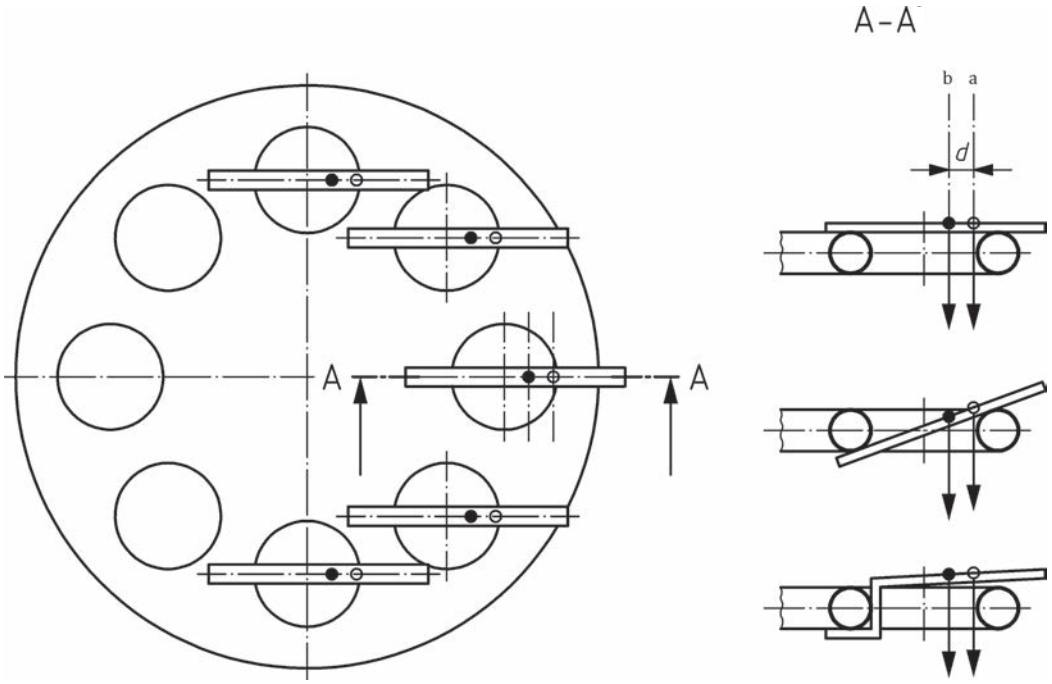


Key

1 test board
2 attachment strap
L load, 75 % of body weight
d distance from centre point on centre line
a Load application when fully inflated.
b Load application after failure of one air chamber.

Figure 7 — Test board and load application, B2 devices (Example 2, Butterfly)

EXAMPLE 3 DISK as a further embodiment of B2 products (child use, multiple seater).



Key

d distance from centre point on centre line

a Load application when fully inflated.

b Load application after failure of one air chamber.

Figure 8 — Test boards and load application, B2 devices (Example 3, DISK)

4.5.2 In water behaviour, static floating stability of B2 devices for children of above seven years of age (30 kg)

B2 devices related to this age group are exempted from floating stability requirements.

NOTE Since the above stipulated user group is supposed to be swimmers and considering behavioural attitudes of this age group floating stability is not seen as a necessary safety feature.

4.5.3 Residual buoyancy and retention of function of Class B2 devices for children of three years (above 36 months) up to five years (60 months) and six years to eight years (72 months to 96 months) of age

4.5.3.1 Requirement

Class B2 floating articles for children of three years (above 36 months) up to five years (60 months) and six years to eight years (72 months to 96 months) of age (single and collective use) shall at least provide a residual buoyancy which is sufficient to keep all permissible users in static stable floating conditions if the air chamber most likely to cause failure has been deflated. If the device is made up by several independent components this requirement applies for each of them. This requirement is deemed to be met if the device has met the requirements concerning floating stability in 4.5.1.2.1 b).

4.5.4 Escape from the B2 device (body entrapment, leg/foot entanglement)

B2 devices shall meet the requirements concerning leg and foot entrapment/entanglement as set out in ISO 25649-1. Body entrapment is deemed to be avoided if the relevant requirements concerning sizing (see Table 3) and marking (see safety information symbols: “size designation for interior size”, “risk of

getting entrapped if size is not appropriate", "avoid entrapment ensure loose fit", "user's body weight range") have been met.

5 Exclusions

The following sub-classes/products dealt with in document are exempted from the general requirements included in ISO 25649-1 and ISO 25649-2 as listed below:

— Towing device (see ISO 25649-1:2017, 5.8);

— Inflatable devices of type B may display the safety information at a location starting within 200 mm from an inflation valve.

Annex A
(informative)

Optional manikin testing for swim seats as one possible embodiment of class B1 devices, requirements

A.1 General

Swim seats for children up to three years (36 months) are dealt with in EN 13138-3. Swim seats are products for non-swimmers. This document aims to safeguard that swim seats for children above three years provide an equal level of safety as established by EN 13138-3.

Anthropometric data from which manikin dimensions are developed is under continuous review. It is recommended to use a manikin representing age five years (60 months, 25 kg) and a manikin representing age seven years (84 months, 30 kg) in order to cover the whole range below adult testing. As the range and diversity of products expands, additional manikins designed in accordance with contemporary specifications may become necessary.

Anthropometric data from which manikins 18 kg to 30 kg (four to seven years) are given in EN 13138-4:2007, Annex B.

A.2 Fit and positioning

B1 devices, swim seats, should be examined by the assessment panel for adequate fit and positioning of the user inside the device. When tested in accordance with A.7.1, there should be clear evidence that the device provides support to hold the passive user's body in a reasonable upright position. The user's body should be represented by the appropriate manikin as specified by the manufacturer's weight/age declaration in accordance with the relevant B1 device as specified in Table 3.

A.3 In-water behaviour, static stability

With the appropriate manikin according to EN 13138-4:2007, Annex B, in position B1 swim seats should not capsize when subjected to the test in calm water in accordance with A.7.2. The mouth and nose air passages, marked by shaded head area, should always remain above water level.

A.4 In-water behaviour, static stability, capsizing under extreme condition (performance level 1 and 2)

When deliberately tipped to an angle as specified in Table A.1 the B1 swim seats should meet one of the three requirements as specified in Table A.1.

Table A.1 — Floating stability and escape, performance levels

Requirement	Performance level 1 (minimum requirement, applicatory)	Performance level 2 (optional)
Floating stability, self-righting and hold of manikin	— self-righting after being tipped continuously up to an angle not to exceed 120° for the manikin or 85° for the device	— self-righting after being tipped continuously up to an angle not to exceed 100° for the manikin or 80° for the device
Tilting to all four sides or tilting to the side most likely to cause failure	— test manikin not lost, shaded head area above water level after self-righting	— test manikin not lost, shaded head area above water level after self-righting
Escape (complete capsizing)	Complete escape when tested in accordance with EN 13138–3:2007, 5.6.5	Complete escape when tested in accordance with EN 13138–3:2007, 5.6.5
New safe floating position after escape outside or inside the device	No new safe floating position (manikin sinks to the ground)	New safe floating position outside swim seat with shaded head area above water level outside swim seat

A.5 Escape from the swim seat (body entrapment, leg/foot entanglement)

When tested in accordance with Table A.1, B1 swim seats should meet one of the two requirement options as specified in Table A.1, rows 2 and 3. There should be no entrapment or entanglement of legs or feet or any other part of manikin's body.

A.6 In-water behaviour, static stability, retention of function

B1 devices (swim seats) should retain their intended function and safety if the buoyancy chamber most likely to cause failure has been fully deflated.

Anthropometric data from which manikins 18 kg to 30 kg (four to seven years) are given in EN 13138-4:2007, Annex B.

A.7 Test methods

A.7.1 Testing fit and positioning

a) Fully inflate all air chambers of the device in accordance with manufacturer's instruction and place it on the water.

NOTE There can be cases where rigid structure of manikin can complicate test procedures. In such cases the assessment panel will be required to make a decision on the performance of the device.

b) Position manikin according to manufacturer's instruction.

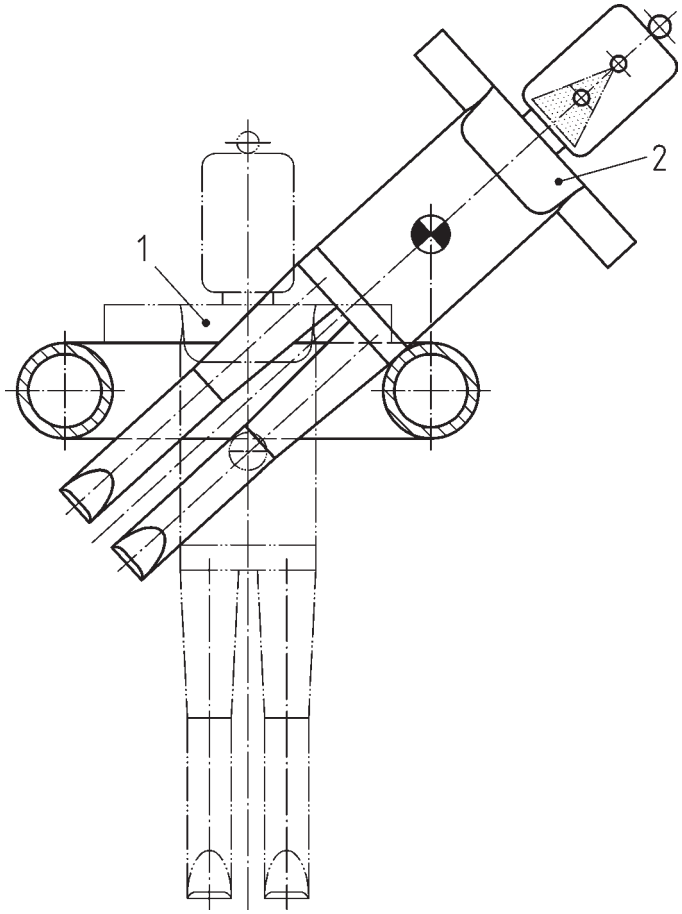
Verification by assessment panel:

c) Check whether the manikin can be positioned and is supported in a reasonable upright posture.

d) Check whether the manikin is not wedged in the seat in a way likely to cause entrapment.

A.7.2 Testing static stability in calm water

Place the appropriate manikin according to EN 13138-4:2007, Annexe B, inside the seat in the position as shown in Figure A.1. The centre of the gravity of the manikin should be collinear with the vertical axis of the outer buoyancy chamber. It may be necessary to secure the feet of the test manikin to prevent from falling out of the device. Check whether the seat does not capsize and shaded head area remains above water level.



Key

1 intended position

2 position inside swim seat but most likely to cause failure

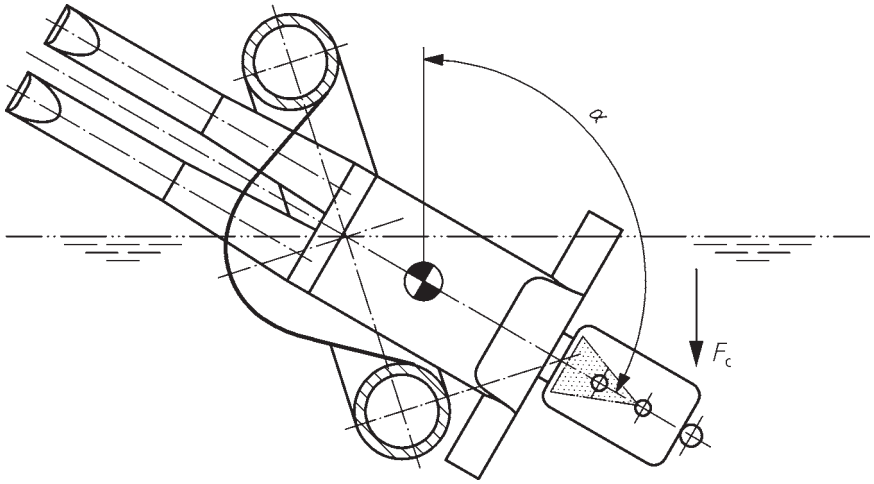
Figure A.1 — Positioning of manikin when testing static and dynamic stability

A.7.3 Testing dynamic stability

See EN 13138-3:2007, B.2.

A.7.4 Testing, performance level 1 (self righting)

For the force application and tipping angle at self righting test see Figure A.2.



Key

α 120°

F_C force, in kilonewtons (kN)

Figure A.2 — Force application and tipping angle at self righting test

Position B1 device in test pool with a min. depth of water of 1,5 m.

a) Position appropriate manikin as specified in EN 13138-4:2007, Annex B, in the intended position into B1 device.

b) Tip the manikin deliberately by exerting a torque via force F_C until centre line of manikin has reached the specified tilting angle. F_C should be applied at the ring nut on manikin's head by using one hand only in order to allow free movement of manikin's body.

c) Release force and check whether swim seat holds manikin and self rights back into a position keeping the manikin's with shaded head area above water level.

NOTE The torque is meant to simulate extreme but foreseeable dynamic effects like higher breaking waves which can arise in open waters due to ship/boat traffic or other external effects like a third child acting on the swim seat.

A.7.5 Escape test

A.7.5.1 Performance level 1

A.7.5.1.1 User groups three years to five years (36 months to 60 months) and six years to seven years (72 months to 84 months) of age

Testing for this category of users should be performed in accordance with EN 13138-3:2007, B.2.2.

A.7.5.1.2 User groups above seven years (84 months) of age

a) See A.7.3.

b) Capsize the B1 device deliberately by exerting a torque via force F_C until manikin slips off. F_C should be applied on the ring nut at manikin's head by using one hand only in order to allow free movement of manikin's body.

c) Check whether the manikin escapes from the device.

Tip the swim seat as described above to angles more than 120 ° until complete and irreversible capsizing occurs. Check whether requirements set out in Table A.1, performance level 1, are met.

A.7.5.2 Performance level 2

A.7.5.2.1 User groups three years to five years (36 months to 60 months) and six years to seven years (72 months to 84 months) of age

Testing for this category of users should be performed in accordance with EN 13138-3:2007, B.2.2. The relevant manikin should be in accordance with EN 13138-4:2007, Annex B.

A.7.5.2.2 User groups above seven years (84 months) of age

a) See A.7.3.

b) Capsize the B1 device deliberately by exerting a torque via force F_C until manikin slips off. F_C should be applied on the ring nut at manikin's head by using one hand only in order to allow free movement of manikin's body.

c) Check whether the manikin escapes from the device and comes back to a new safe floating position.

Tip the swim seat as described above to angles more than 120° until complete and irreversible capsizing occurs. Check whether requirements set out in Table A.1, performance level 2, are met.

Annex B
(informative)

Examples of products forming Class B

Examples of products forming Class B are shown in Figure B.1 to Figure B.3. All given figures represent products for users above three years (36 months) of age.

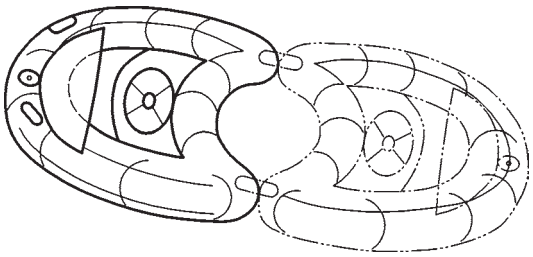


Figure B.1 — Example of typical product forming Class B.1

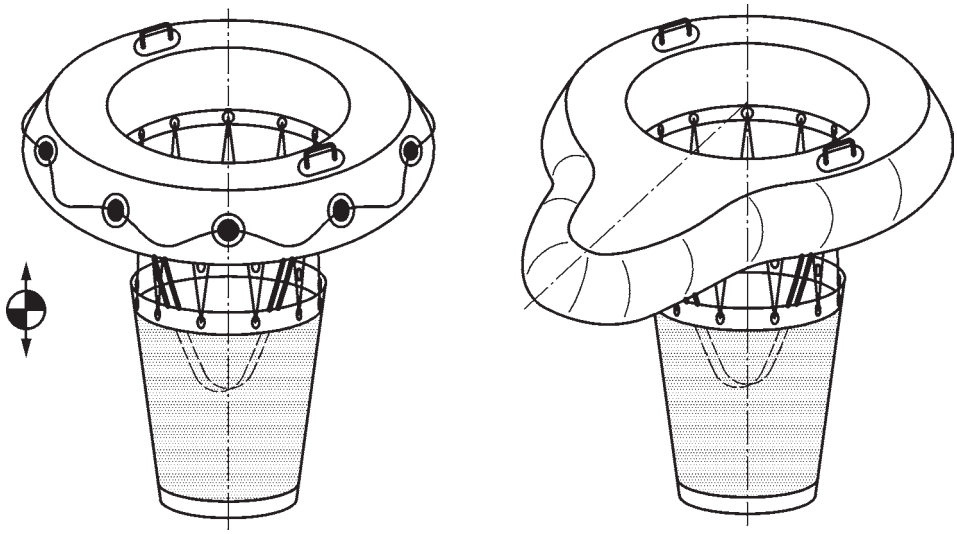


Figure B.2 — Example of typical product forming Class B.1

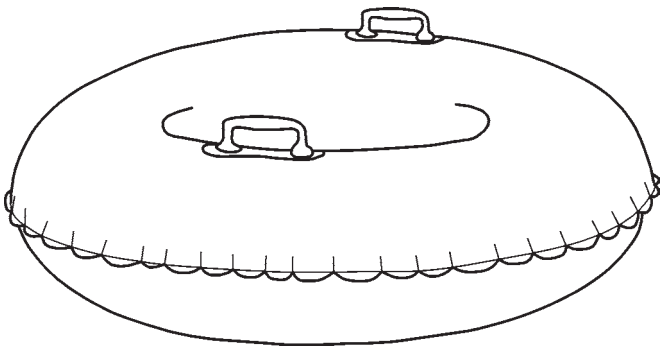


Figure B.3 — Example of typical product forming Class B.2.1

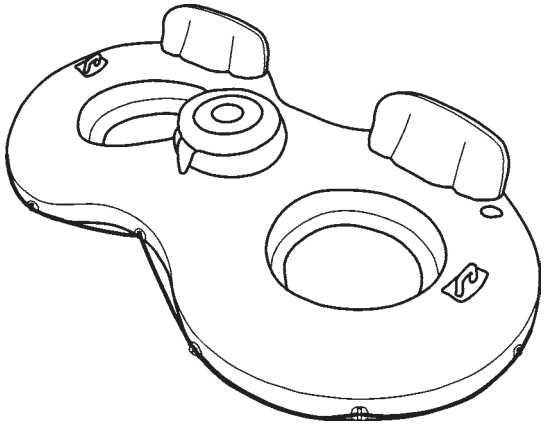


Figure B.4 — Example of typical product forming Class B.2.2

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[1] ISO 6185-1:2001, *Inflatable boats — Part 1: Boats with a maximum motor power rating of 4,5 kW*

[2] ISO 6185-2:2001, *Inflatable boats — Part 2: Boats with a maximum motor power rating of 4,5 kW to 15 kW inclusive*

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1) Withdrawn.

ICS 97.220.40

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