BS EN 13138-3:2014

BSI Standards Publication

Buoyant aids for swimming instruction

Part 3: Safety requirements and test methods for swim seats to be worn

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National foreword

This British Standard is the UK implementation of EN 13138-3:2014. It supersedes BS EN 13138-3:2007 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee SW/136/8, Swimming pools and aquatic equipment.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Auftriebshilfen für das Schwimmenlernen - Teil 3: Sicherheitstechnische Anforderungen und Prüfverfahren für Schwimmsitze, die am Körper getragen werden

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Foreword

This document (EN 13138-3:2014) has been prepared by Technical Committee CEN/TC 162 “Protective clothing including hand and arm protection and lifejackets”, the secretariat of which is held by DIN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2015 and conflicting national standards shall be withdrawn at the latest by June 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 13138-3:2007.

Annex K provides details of significant technical changes between this European Standard and the previous edition EN 13138-3:2007.

This European Standard is one of a series consisting of three standards dealing with buoyant devices for swimming instructions for the various stages of the learning process.

- EN 13138-1, *Buoyant aids for swimming instructions – Part 1: Safety requirements and test methods for buoyant aids to be worn*

- EN 13138-2, *Buoyant aids for swimming instructions – Part 2: Safety requirements and test methods for buoyant aids to be held*

- EN 13138-3, *Buoyant aids for swimming instructions – Part 3: Safety requirements and test methods for swim seats*

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

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

The entire process of learning to swim is considered to include two stages:

— getting familiar with the water environment and movements in it;

— acquiring skills in standard swimming strokes.

Buoyant aids for swimming instructions (in brief: swimming device(s)) are intended to assist users (in particular children) to learn to swim. The design and purpose of the devices are related to the above stages.

Swimming devices are intended to give the user positive buoyancy in the water while maintaining the correct body position for swimming. However, it should not be assumed that standard conformity of the devices will by itself eliminate the risk of drowning as this depends also on the behaviour of the user and any supervision.

Although this European Standard sets performance requirements to ensure that swimming devices perform appropriately, it is essential that the devices are used correctly and under constant and close supervision. It is important to ensure that they are securely fitted to the appropriate size of user and that when correctly fitted, they cannot become displaced. Swim seats however should allow immediate escape in case of capsizing. Therefore the use of these devices is recommended to be restricted to water out of standing depth of the user.

The highest degree of protection against drowning can only be achieved by using lifejackets. It is essential that there is a clear distinction between devices intended to preserve life and those which are intended only to assist buoyancy for the user when learning to swim. As swimming devices are not life preservers, they should only be used in swimming pools and other situations free from current, tides and waves.

The bulk storage of some types of swimming devices could, under certain conditions, result in a potential fire hazard. The perceived risk of such a hazard was evaluated against the actual risk to the user from materials treated with certain known toxic fire retardant chemicals. However, the fire hazard is less of a problem to the user than the risk associated with the swimming devices being put in the mouth, especially by children. For this reason, flammability requirements do not apply to this European Standard.

For the above reasons and to differentiate these devices from aquatic toys, advisory safety measures, including marking, warning notices and user instructions are included in this standard.

The range both of the design and function of buoyant aids for swimming instruction varies considerably and for this reason, the standard for swimming devices has been prepared in three parts, namely devices that are intended to allow the user to become familiar with water (passive user), devices that are worn (active user) and those devices that are held by the user to improve swimming strokes.

Part 1 of this European Standard is only for devices that are securely attached to the body (class B devices = for an active user). They are intended to introduce the user to the range of swimming strokes.

Part 2 of this European Standard is for devices that are held either in the hands or by the body (class C devices = for an active user) and are intended to assist with improving specific elements of the swimming stroke. For adult beginners or more advanced users they can also be used for further stages of the process to learn to swim.

Part 3 of this European Standard deals only with swim seats to assist children up to 36 months in their first attempts to learn to swim (i.e. to get familiar with the "in water environment" and moving through it). The child is positioned inside the buoyant structure, which provides buoyancy and lateral support to the body, thereby keeping the child's head above water level (class A devices = for a passive user).

Swim seats allow young children to experience the water environment and being moved through it. Movements of lower limbs and arms are possible. The use of swim seats does however not replicate any form of a correct swimming stroke.

Swim seats complying with this standard provide a stable, floating position for a child sitting in the swim seat and avoids entrapment in case of capsizing. Children in swim seats do however require very close parental supervision. Overload beyond specified body weight, breaking waves and violent external forces are remaining risks that can cause capsizing. Use of these devices in water that is of the child's standing depth will increase the risk of capsizing and will hinder or block the escape from the seat in case of emergency.

Buoyant swimming aids should be only a class A or a class B or a class C device.

1 Scope

This part 3 of EN 13138 specifies safety requirements for design, sizing, materials, strength and in-water performance as well as provisions for marking and the information supplied by the manufacturer for swim seats. It also specifies the relevant test methods. This standard is not applicable to products covered by EN 13138-1 and EN 13138−2.

This part 3 of EN 13138 applies only to devices into which the user is placed and which have either inherent buoyancy or can be inflated or a combination of both. It only applies to Class A devices intended to introduce the user to the range to the water environment. These devices are only intended for children aged up to 36 months with a body mass less than or equal to 18 kg. It does not apply to Class B or Class C devices, to pull buoys, swim rings, lifebuoys, buoyancy aids, lifejackets or aquatic toys.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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

EN 71-3, *Safety of toys — Part 3: Migration of certain elements*

EN 15649-1:2009+A2:2013, *Floating leisure articles for use on and in the water — Part 1: Classification, materials, general requirements and test methods*

EN 15649-2:2009+A2:2013, *Floating leisure articles for use on and in the water — Part 2: Consumer information*

EN 20105-A02, *Textiles — Tests for colour fastness — Part A02: Grey scale for assessing change in colour (ISO 105-A02)*

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

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

EN ISO 105-X12, *Textiles — Tests for colour fastness — Part X12: Color fastness to rubbing (ISO 105-X12)*

EN ISO 3696:1995, *Water for analytical laboratory use — Specification and test methods (ISO 3696:1987)*

EN ISO 12402-9:2006, *Personal flotation devices — Part 9: Test methods (ISO 12402-9:2006)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
buoyancy
resultant upthrust of a swimming device when totally submerged in fresh water with its uppermost part just below the water surface

3.2
inherent buoyancy
upthrust provided by material which is less dense than water or by sealed chambers that are not inflatable and are filled with air or gas

3.3
buoyant aid for swimming instruction (in brief 'swimming device')
garment or device which when worn or held correctly will provide the buoyancy required to become familiar with movement through the water, assist with learning to swim or to improve swimming strokes

3.4
minimum buoyancy
least buoyancy required by the standard

3.5
original buoyancy
buoyancy provided by the complete device when first tested

3.6
class A device
buoyant device in which the child is in contact with the water positioned inside the buoyant structure so that it will keep the passive user in a stable floating position where the base of the chin is at or above the surface of the water. This device is intended to allow the user to become familiar with the water environment

3.7
class B device
buoyant swimming device intended to be worn, to be securely attached to the body and to introduce the active user to the range of swimming strokes

3.8
class C device
device intended to be held either in the hands or, by the body and to assist with swimming strokes and/or improving specific elements of the strokes

3.9
device to be worn
device having either inherent buoyancy or may be inflated to provide buoyancy and which is securely attached to the body in such a way that it cannot be accidentally removed and so as to provide the user with buoyancy

3.10
device to be held
device held either in the hands or by the body and provides buoyancy whilst it is being held by the user

3.11
conditioning
process to which the complete device shall be submitted that includes immersion in chlorinated swimming pool water and storage in cold and hot conditions and comprising a number of cycles, to simulate the conditions to which the device is likely to be subjected in normal use and storage

3.12
component
sub group of the entire device which contributes to either buoyancy, function or safety

3.13
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. Swim seats provide safety for the user but do not guarantee protection against drowning

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

3.14
swim seat system
all integrated components (parts) of a swim seat which contribute to stable floating conditions and to safety during normal use or after an emergency capsizing

3.15
escape
complete separation between the test dummy and the swim seat in case of a deliberate capsizing of the swim seat or swim seat system

3.16
assessment panel
group of three people who are appointed by a test house, all of whom are experienced in assessing buoyant swimming devices

3.17
kick board
buoyant device designed to be held in the hands or by the arms in order to support the body in the water to assist the user to improve swimming strokes

4 Classification

4.1 General

Buoyant swimming devices shall be classified according to Table 1:

Table 1 — Classification of buoyant devices

Class	Description
A	Device in which the child is positioned inside the buoyant structure and is in contact with the water. This device is intended to allow the user to become familiar with the water environment and movement through it. The device will keep the passive user in a stable floating position so that the base of the chin is at or above the surface of the water.
B	Buoyant swimming device intended to be worn, to be securely attached to the body and to introduce the user to the range of swimming strokes.
C	Device intended to be held in the hands or by the body to assist with swimming strokes.

4.2 Categorization

The requirements given in Table 2 were chosen to ensure compliance between swim seat sizes and manikin in all relevant test procedures.

Table 2 — Values for categorization

Age years	Mass (equivalent to age)[a]	Manikin
≤ 1	≤ 11 kg	I
> 1 to 2	> 11 kg to 15 kg	II
> 2 to 3	> 15 kg to 18 kg	III

5 Safety requirements

5.1 General

Construction of a buoyant swimming device shall be such that it corresponds in terms of design, dimensions, safety, strength and durability for its intended use. The requirements set out were chosen to ensure compliance with these considerations. Where buoyant swimming devices are provided in several components, the requirements apply to each of the components as specified in the relevant paragraphs below.

Buoyancy may be provided by inherent buoyancy materials, by inflatable chambers or by both. Where buoyancy is not inherent, devices shall have a minimum of two independent chambers safeguarding function and to allow the user to maintain the airway above water level at all times if one chamber fails. A device shall be only Class A or Class B or Class C.

These products shall be manufactured in bright colours that are in contrast to the water surface so as to be visible at all times and at any angle when in use. Wholly transparent or materials in any shade of undecorated blue in the visible areas when in use are not acceptable.

For safety reasons and to assist in supervising children when in the water, the visible areas of these products when being used shall be clearly visible from the water's edge or the poolside when the water is crowded, moving or may not be clear. Where criteria cannot be objectively assessed, they shall be subject to evaluation by the assessment panel.

The assessment panel shall agree, by at least a 2:1 majority or by unanimity, that the device is visible when worn in the water.

5.2 Design

5.2.1 Avoidance of similarities to aquatic toys

5.2.1.1 Shape

Design and appearance of swim seats shall not evoke the impression of being an aquatic toy.

Inflatable buoyancy chambers or buoyancy chambers filled by air or inherently buoyant material shall be limited in number and volume to the functional needs of providing sufficient buoyancy and safety. There shall be no toy elements or above water level structures like e.g. animal imitations, car or boat structures or other elements evoking the character of an aquatic toy and no wind catching structures e.g. canopy or sun-shade.

5.2.1.2 Special features

Special features or equipment, like handles etc., shall not impair the safety of the device. Requirements given in 5.6, in water behaviour, shall be met with and without detachable equipment.

5.2.2 Innocuousness

Class B devices shall be of a design and construction such that they cannot cause harm to the user.

5.2.3 Edges, corners and points

Buoyant swimming devices shall be of a design such that they cannot cause harm to the user. Edges and corners of hard and rigid materials shall be chamfered or rounded.

Round edges or corners shall have a minimum radius of 1 mm and where a chamfer is part of the design, it shall be of (45 ± 5)° and at least 1 mm in width. There shall be no barbs or other sharp points or features. Testing shall be by measurement and tactile assessment in accordance with Annex F.

5.2.4 Buckles, zippers and other fixings

If buckles, zippers or other detachable fastening devices are used as parts of the entire device in order to attach the device to the body or in order to connect functional parts or components they shall require at least two simultaneous or sequential actions for their release or opening in order to prevent unintended opening. Where one single action can be applied and relies on pressure for release, it shall be necessary to apply a force of at least 50 N. Testing shall be in accordance with Annex E.

Buckles for seat depth adjustment are exempted from this requirement.

Verification shall be executed by the assessment panel according to Annex D in the context of the relevant opening/closing system.

5.2.5 Small parts

Attached small parts shall withstand a pull of (90 ± 2) N in the direction most likely to cause failure without becoming detached from the device. Parts, not including foam fragments, which can become detached shall not fit wholly into the small parts cylinder, testing of which shall be in accordance with EN 71-1.

5.2.6 Valves and stoppers

Inflatable class A devices shall be fitted with valves guarantying sealing even when the stopper is entirely removed . Stoppers shall be connected to the body of the valve. The protrusion of the valve, and stopper shall not catch a test chain when tested in accordance with EN 15649-1:2009+A2:2013, 5.5.

The valve shall ensure that, with an opened stopper, inflatable devices when tested in accordance with Annex D shall after a period of 2 min retain at least 75 % of their original buoyancy.

Testing shall be by inspection and measurement in accordance with the procedures in EN ISO 12402-9:2006, 5.5.9.

5.3 Sizing

Sizing of swim seats with regard tom body weight of the user shall be in accordance with the range of body weights and age groups as specified in Table 2.

The size of the device shall be indicated on the product (see Clause 7) and by marking the relevant box(es) according to Figure 3 by ticking in a [✓].

The size of the leg holes, when tested in accordance with Annex I, shall not allow the probe to pass through.

Where the design requires this, adjustment devices shall enable the body holding system, e.g. seat pants, to vary the position of the user in vertical direction in a way that also small users (5. percentile) and medium-sized users (50. percentile) of the designated user group can adopt a position where their centre of gravity is on the same height level in relation to the buoyant structure as the one constituted by the relevant manikin representing the 95. percentile user.

The adjustment shall be either stepwise, e.g. SMALL, MEDIUM, LARGE, sliding or otherwise. The adjustment mechanism shall enable the user to control and recognize the degree of adjustment e.g. by marking adjustment positions and shall prevent the user from setting higher sitting positions than the one determined by the relevant test manikin (95.percentile) which constitutes the reference for medium and small body sizes.

Seat depth adjustment shall not compromise the leg hole dimensions according to Annexe I.

NOTE It is provided that the swim seat has met all in water requirement thus the sitting position of the 95.percentile manikin constitutes the right reference position.

Testing shall be by measurement in accordance with Annex J.

5.4 Materials

5.4.1 Thread

To sew load bearing components, only threads manufactured from synthetic materials whose properties correspond to polyester or polyamide fibres shall be used.

5.4.2 Resistance to puncturing

Where buoyant swimming devices incorporate air filled buoyancy chambers, the chambers shall remain airtight when tested in accordance with the procedures given in Annex H.

5.4.3 Resistance of foam and other inherent buoyant material to water absorption

When tested in accordance with the procedures given in EN ISO 12402-9:2006, 5.5.5, the material sample shall lose no more than 10 % of its original buoyancy. The materials shall be tested using a new and conditioned sample of the inherent buoyant material.

5.4.4 Resistance of foam and other inherent buoyant materials to compression

Class A devices manufactured from foam or other inherently buoyant materials shall be capable of withstanding compression and other movements in normal use without sustaining permanent loss of buoyancy. When tested following conditioning in accordance with 6.1, 3 new, pre-conditioned samples of the buoyant material not used in other tests shall not lose more than 10 % of its buoyancy for each sample product.

5.4.5 Migration of certain elements

Swimming devices shall conform to the requirements given in EN 71-3. A new and unconditioned complete device shall be tested.

5.4.6 Resistance to chlorinated salt water

After conditioning according to the procedures in 6.1, the entire deflated device shall be tested for change in colour and damage. The change in colour shall be tested according to EN 20105-A02 and shall be step 3 on the grey scale or better. Inflatable devices, after being dried, shall be orally inflated to their maximum volume and inspected for air leakage. All devices shall be inspected to ensure markings remain legible.

5.4.7 Material used for markings

5.4.7.1 General

The tests described in 5.4.7.2 to 5.4.9 shall not apply where the markings are debossed onto or moulded into the device as illustrated in Figure 1.

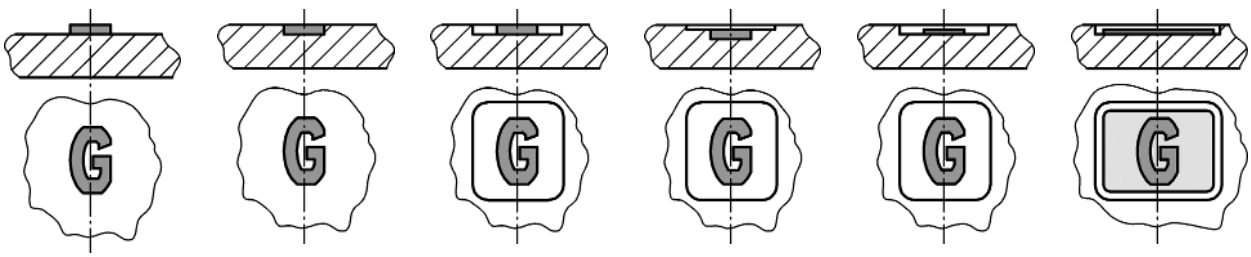


Figure 1 — Illustration of marking techniques on and in foam structures

5.4.7.2 Resistance of the markings to saliva

When tested in accordance with the procedures in Annex C, the change in colour of the markings on the grey scale shall be 3 or better when assessed according to EN 20105-A02.

5.4.8 Resistance of the markings to perspiration

When tested in accordance with EN ISO 105-E04 the change of colour of the markings on the grey scale shall be 3 or better when assessed according to EN 20105-A02.

5.4.9 Adhesion of markings

When tested in accordance with the procedures in EN ISO 105-X12 (wet and dry, 100 cycles) the markings shall not be damaged and shall remain legible in all details when assessed by the assessment panel.

5.5 Strength

5.5.1 Strength of entire seat

When tested in accordance with B.3 no part or component of the seat e.g. straps, trousers or its attachment to the buoyant structure (welding seams) shall break or show any deficiency compromising safety.

5.5.2 Seam strength and durability of inflatable devices

The device shall remain airtight after being submitted to a cyclic pressure test according to the procedures given in Annex G.

5.6 In-water performance

5.6.1 Residual buoyancy

Where buoyancy is not provided by inherently buoyant material but by inflatable air chambers or a hybrid system of inherent buoyant material in combination with inflatable air chambers the swim seat shall have a buoyancy system which provides sufficient residual buoyancy if any air chamber fails. If this buoyancy system is made up by several components this requirement applies for each of them. In the event of the failure of the air chamber most likely to cause failure the performance of the device, when tested in accordance with 5.6.4, shall ensure that the manikin’s airways are always above the water.

Swim seats providing buoyancy by filling materials such as granules, air sacs or similar shall ensure that the manikin’s airways are always above the water after complete removal of the filling material from a buoyancy chamber most likely to cause failure.

If the buoyancy is provided in different separate components (parts), the functional requirement to maintain the manikin’s airways above the water applies to the whole device in the event of the failure of any component or chamber within it.

Devices shall be tested in accordance with B.1.3.

5.6.2 Fit and positioning

When tested in accordance with B.1, inspection by the assessment panel, there shall be clear evidence that the swim seat provides support to hold the child's body in a reasonable upright position without fixing it

or being too loose. The child's body shall be represented by the appropriate manikin I to III in accordance with the relevant swim seat category as specified in Table 2 (see also 5.3 and Annex J).

5.6.3 In-water behaviour, static stability

5.6.3.1 Inflatable swim seats

With the appropriate manikin in position as specified in Annex B, the swim seat shall not capsize when submitted to the test in calm water (see B.1.2.1). The airways - marked by shaded head area - shall always remain above water level.

5.6.3.2 Swim seats made from inherent buoyant material, e.g. foam

With the loads applied on the load application points as specified in Annex B, the swim seat shall not capsize when submitted to the test in calm water (see B.1.2.2).

5.6.4 In-water behaviour, static stability, capsizing under extreme condition (option 1 to 3)

When deliberately tipped to an angle as specified in Table 3 the swim seat shall meet one of the three options / performance levels as specified in Table 3. Testing shall be done in accordance with B.2.

Table 3 — Floating stability and escape performance levels

Requirement	Option 1 Performance Level 1	Option 2 Performance Level 2	Option 3 Performance Level 3
floating stability, self-righting and hold of manikin Tilting to all four sides or tilting to the side most likely to cause failure	self-righting after being tipped to an angle ≤ 120° for the manikin or 85° for the device test manikin not lost, shaded head area above water level after self-righting	Self-righting after being tipped to an angle ≤ 100° for the manikin or 80° for the device test manikin not lost, shaded head area above water level after self-righting	Self-righting after being tipped to an angle ≤ 120° for the manikin or 85° for the device test manikin not lost, shaded head area above water level after self-righting
Escape (complete capsizing)	Complete escape when tested in accordance with 5.6.5	Complete escape when tested in accordance with 5.6.5	no escape, manikin retained within device at any tipping angle when tested in accordance with 5.6.5
New safe floating position after escape outside or inside the swim seat	No new safe floating position	New safe floating position outside swim seat with shaded head area above water level	New safe floating position inside swim seat with shaded head area above water level

5.6.5 Escape from the swim seat (body entrapment, leg / foot entanglement)

When tested in accordance with B.2.2 the swim seat shall meet one of the 3 options/performance levels as specified in Table 3. There shall be no entrapment or entanglement of legs or feet or any other part of manikin's body. Arm stumps shall be removed as required.

5.6.6 In-water behaviour, static stability retention of function

Swim seats (class A devices) shall retain their intended function and safety if a buoyancy chamber most likely to cause failure has failed (see 5.6.1). Devices shall be tested in accordance with B.1.3.

5.6.7 Swim seats with special seat designs

NOTE The vast majority of swim seats is based on seat pants as an appropriate body holding system. Test manikins as specified in A.1 are designed to test these common types of swim seats. Due to their upright standing posture they cannot be used for some very rare designs with fixed and hard shell plastic seats positioning the user in a posture with angled legs. The posture causes problems with regard all stability tests and the escape test.

Swim seats which - due to their seat designs - cannot be tested for requirements according to 5.6 with the upright standing manikin as specified in A.1 shall be tested by applying the sitting manikin as specified in A.4.4.

The escape test according to 5.6.5 shall be tested on the basis of this standard considering all foreseeable circumstances.

6 Test methods

6.1 Enhanced conditioning

It is important that the test procedures are in normal climate condition. If not otherwise stated test shall be carried out on the entire assembly and in the sequence in which they appear below. Unless otherwise stated always the same product shall be used in order to achieve an accumulation of stresses.

Prior to any kind of testing, the products or material samples shall be kept for a period of 24 h at (−10 ± 1) °C for another 24 h at (60 ± 2) °C and for further 24 h at (20 ± 2) °C (room temperature).

The products or material samples shall then be submerged individually in agitated chlorinated salt water for 12 h, in darkness and at room temperature (20 ± 2) °C. Inflatable devices shall be in a deflated condition. It is important to ensure that the test samples are thoroughly wetted. After removal from chlorinated salt water the samples shall be rinsed in distilled water and dried by hanging in air at room temperature.

The chlorinated salt water is prepared by dissolving 30 g of sodium chloride (NaCl) in one litre of an aqueous solution of sodium hypochlorite (NaOCl) containing 50 mg of active chlorine at pH (7,5 ± 0,05). The sodium hypochlorite solution is prepared in accordance with the description in EN ISO 105-E03:2010, 4.4. The solution shall always be prepared immediately prior to use, using grade 3 water as defined in EN ISO 3696:1995, Clause 3.

A suitable apparatus for the conditioning procedure should consist of a glass or stainless steel container that is big enough to hold the necessary volume of chlorinated salt water for a liquor ratio of 100 : 1 and a motor driven stirrer rotating at a frequency of 40 min^{-1}. In order to maintain the whole arrangement at room temperature, the procedure should be undertaken in a climate controlled room.

6.2 Test apparatus and procedure

The test apparatus shall be designed and manufactured and the tests shall be carried out in accordance with Annexes A to I.

7 Warnings and markings

7.1 General

The markings shall be printed or debossed on the product and shall be clearly visible when preparing for use and then donning the product. The words "WARNING", "DO NOT USE" and "RISK OF CAPSIZING" shall be in bold upper case, letter size not less than 5 mm in height. Other text may be in lower or upper case and shall be not less than 3 mm in height. Colour may vary but shall always be in contrast or relief to the background and be legible. Verification by measurement and inspection by the assessment panel.

All warnings and markings (see 7.2) and information supplied by the manufacturer (see 7.3 and 7.4) shall be given in the language of the country of sale on the device, on the packaging and in the information supplied by the manufacturer.

7.2 Warnings and markings on the product

The following minimum information shall be given: **WARNING – RISK OF CAPSIZING**

After or below the words "WARNING – RISK OF CAPSIZING" the following text shall be printed or debossed in any order:

a) Will not protect against drowning

b) Always fully inflate all air chambers (if applicable to the product)

c) Use only under constant supervision in direct reach of the swim seat

d) Do not omit any component (if applicable to the product)

Figure 2 — Additional symbol advising not to omit any component

In addition, the words **"DO NOT USE: …"** and the words

— by user beyond or below designated weight range/age;

— within child's standing depth;

— in breaking waves;

— in bath tubs;

shall be printed or debossed below or next to the warnings.

The words DO NOT USE shall be printed or debossed in bold and upper case letters of 5 mm in height.

Relevant graphical symbols and their correct application in accordance with EN 15649-2:2009+A2:2013 may be used to replace warning information above in plain text.

Class A products shall be additionally marked as follows:

— the type designation of the product: commercial name or model or code;

— the words: "Not an aquatic toy.";

— always supervise in direct reach of the child

— capability to sit upright as starting point to use swim seats

— Mass: … to … kg, (for orientation only: this mass corresponds to an age group of … to … years);

— Number of this European Standard, i. e. EN 13138-3;

— Name or trademark of the manufacturer, importer or supplier.

7.3 Information supplied by the manufacturer

The following minimum information, where applicable, shall be given at least on an accompanying leaflet:

— details of how to inflate, deflate and the means of securing the stopper on inflatable swimming aids, if applicable;

— details of how to use swim seats in sufficiently deep water with reference to any specific features appropriate to it;

— details of how to ensure the correct fit for the swim seats; e.g. the water level is at or about the level of the nipples of how to fit and remove the swimming aid with reference to any specific features appropriate to it;

— details of storage and maintenance procedures;

— information on determining the suitability of the device for the intended user;

— the use of diapers or any other apparel or device shall not lead to an entrapment of the child inside the seat;

— instructions advising that these products should not be bitten or chewed by the user as pieces that may be bitten off/torn from/come away from the material may cause a choking hazard;

— The full postal address of the manufacturer shall be provided.

7.4 Consumer information at the point of sale

The specified product information label (see Figure 3) shall be uniformly applied as shown.

The application of graphical symbols shall be in accordance with EN 15649-2:2009+A2:2013.

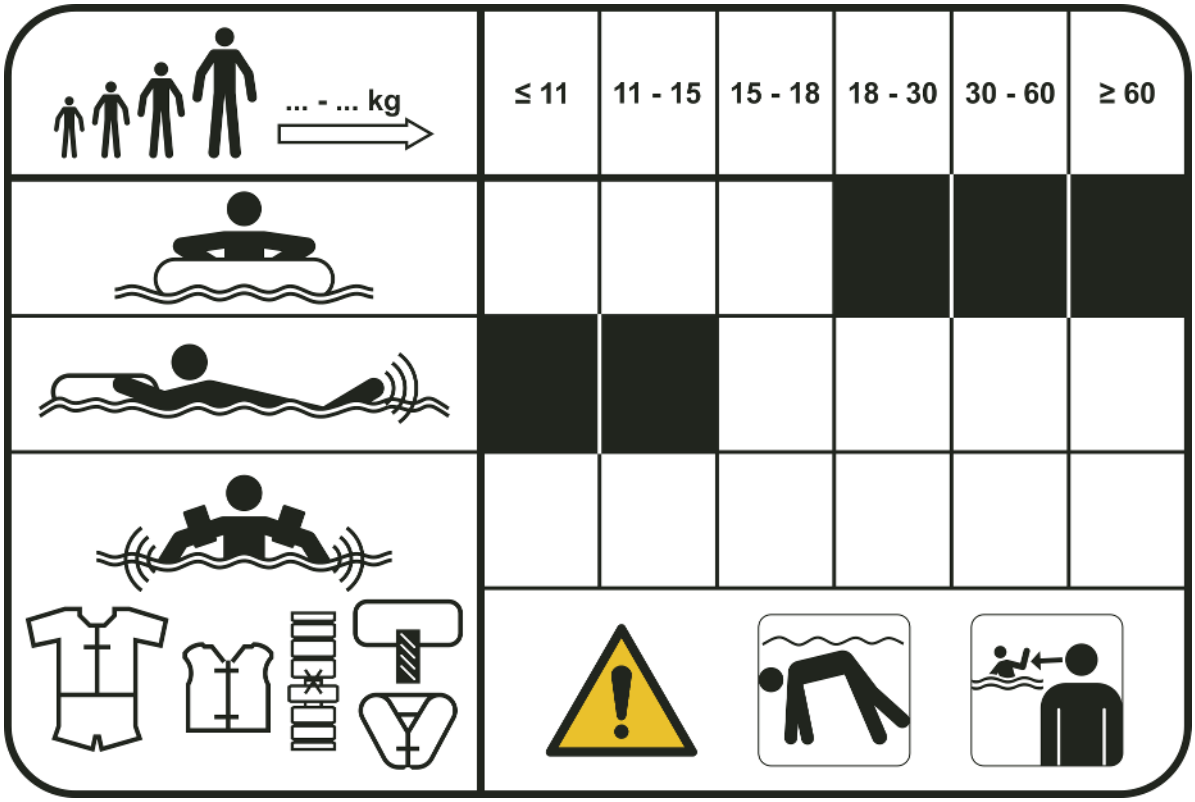


Figure 3 — Recommended layout of the product information label

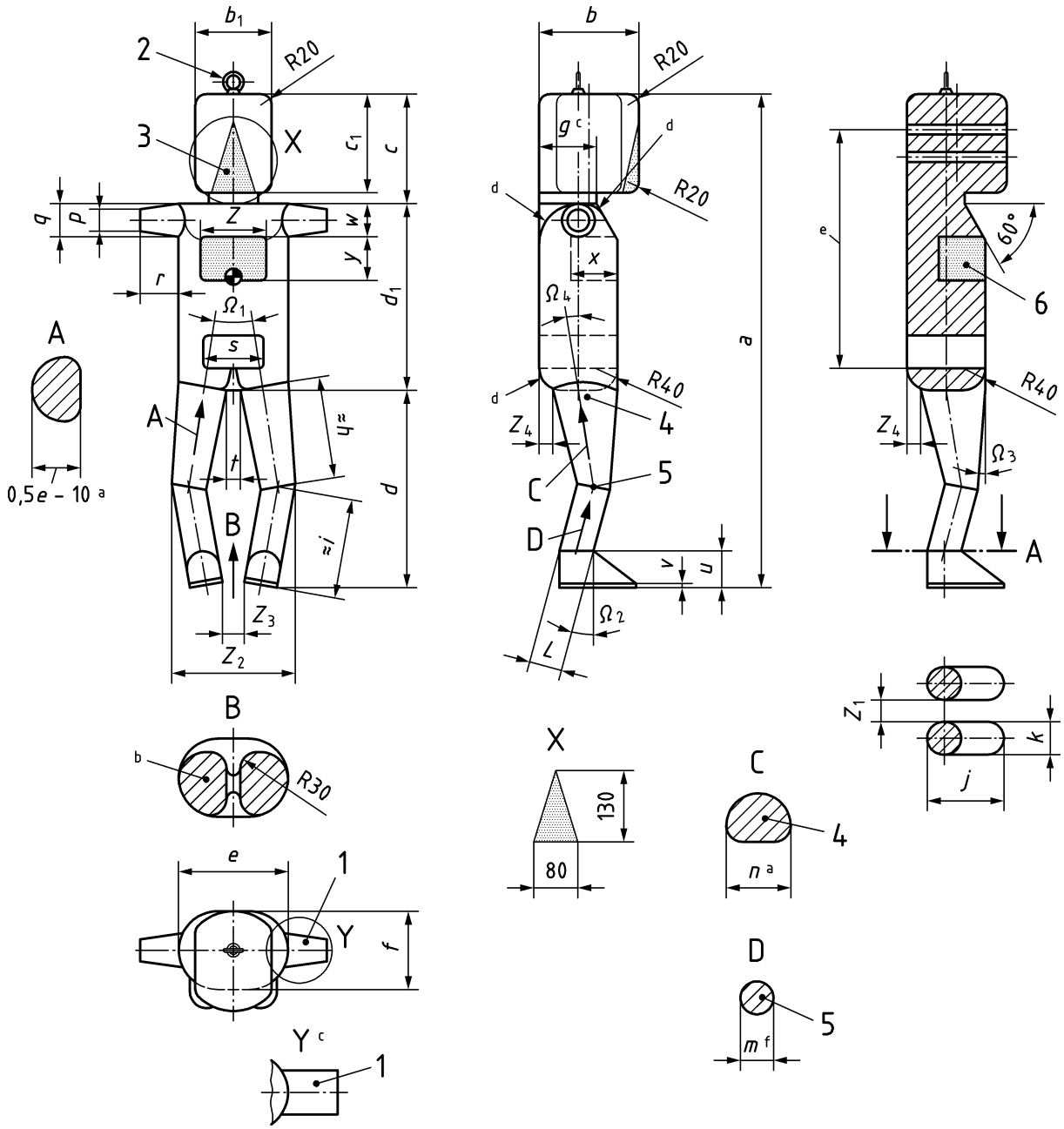
The example shows a class A device suitable for body mass (size) from 11 kg to 15 kg corresponding roughly to an group of 1 year to 2 years.

Guidance – approximate body weight – age group:	
– 11 kg	≈ 12 month;
– 11 kg to 15 kg	≈ 12 month to 24 month;
– 15 kg to 18 kg	≈ 24 month to 36 month;
– 18 kg to 30 kg	≈ 3 years to 6 years;
– 30 kg to 60 kg	≈ 6 years to 12 years;
– 60 ... kg	≈ 12 ... years

Annex A
(normative)

Test manikins I to III

A.1 Dimensions



Key

1 conical arm stumps for testing swim seats. Detachable (for exchange of arm stumps see prEN 13138–4).

2 ring nut, ring screw

3 shaded area (indicating mouth and nose area: width / height 80 × 130mm)

4 upper thigh, diameter n[a]

5 lower thigh, diameter m[f]

6 closed cell soft foam pad 6 / 8 / 12 N buoyancy for functional residual lung volume. Foam density ($35^{0/-3,5}$) g/dm^3

a fit to torso

b leg / body cross section

c oval

d rounded to near anatomical shape

e calibrations holes / openings . Amount, diameter, positions according to the needs ballast holes (ballast symmetric distributed, no air caverns, no undue torque in relation to centre line (in particular to be considered when adding ballast to the head)

f cylindrical, flattened circle or oval, dimension to be measured as width of the part

Figure A.1 — Dimensions

Table A.1 — Dimensions of manikins I to III

Manikin	a	b	b_1	c	c_1	d_1	d	e	f	$g^{\pm 10}_{oval}$	~h[a]	~i[a]	j	k	L	m	n	o	p	q
I	800	174	134	190	172	300	310	180	133	100x85	141	175	117	55	$60^{\pm 5}$		80	210	40	60
II	900	182	139	200	180	340	360	200	143	105x90	175	194	140	65	$65^{\pm 5}$		90	257	50	80/70
III	1100	184	141	230	190	420	450	205	155	110x95	200	250	160	70	$70^{\pm 5}$		100	288	60	90

Manikin	$r^{conical}$	s	t	u	v	w	x	y	Z	Z_1	Z_2	Z_3	Z_4	$\sim\Omega_1$	$\sim\Omega_2$	Ω_3	$\sim\Omega_4$
I	60		20	60	6	60	66	80	120	38	200	38	15	20	15	5	12
II	80		25	67	8	60	85	80	120	40	225	40	25	20	15	5	9
III	100		25	72	10	60	90	100	140	44	205	-	-	0	0	13	0

NOTE 1 Dimensions in millimetres

NOTE 2 Grey area shows non-anthropometric dimensions.

[a] to be measured along centre line of component

Table A.2 — Functional residual lung volume (FRV), manikins I … XIV1) in dm^3

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV
0,6	0,8	1,2	1,3	1,6	1,7	2,0	2,2	2,4	2,5	2,7	2,8	3,1	3,3

NOTE *Manikins IV to XIV see* prEN 13138–4.

A.2 Specifications

a) total mass:

— manikin I: 11 kg

— manikin II: 15 kg

— manikin III: 18 kg

b) Material: It is recommended to manufacture the manikin from a material less dense than the specified average density in order to avoid mass/volume/dimension conflicts. Weight and density of body sections/components shall be adapted by lead filling at appropriate place and amount. Water absorption during testing must not affect the manikins weight beyond the tolerance specified in A.2 f).

c) Density: average density of the manikin: 1,05 kg/dm^3

head density: 1,10 kg/dm^3

d) Mass distribution: equal distribution of masses in relation to centre lines of the various body components

e) Balance load: 2 to 4 kg of lead shot

f) Tolerances dimensions: ± 3 % **if not otherwise stated**

weight: + 5 %

shape: the shape of the manikins may deviate from the depicted shape if these deviations do not influence the test results

exchange: the exchange of arm stumps from conical to cylindrical shape shall not conflict with the mass distribution and the displacement of these components in the water

A.3 Density of components

Head	1,10 kg/dm^3
Torso	1,01 kg/dm^3
Arms	1,05 kg/dm^3
Legs	1,07 kg/dm^3
Average	1,05 kg/dm^3

NOTE For orientation only.

A.4 Centre of gravity

A.4.1 Location

When measured from the floor the centre of gravity shall be on the middle axes of the manikin at a height of:

a) manikin I: 0,63 × body height a;

b) manikin II: 0,63 × body height a;

c) manikin III: 0,60 × body height a.

A.4.2 Calibration on land (dry)

Position the manikin as shown in Figure A.2 with the suspension strap attached to a ring screw on the back of the manikin in line with the axes of the centre of gravity according to formula.

Add lead shot at appropriate places in order to balance the manikin without creating undue a-symmetrical mass distribution in relation to the vertical centre axes of the manikin. Each sub-component (leg, torso, head) shall show an approximate symmetrical mass contribution around their geometric centre of gravity before final calibration of complete manikin.

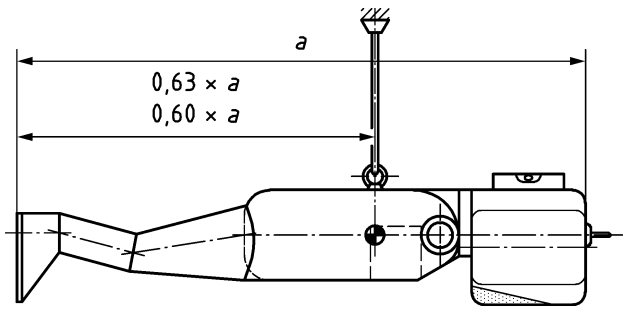
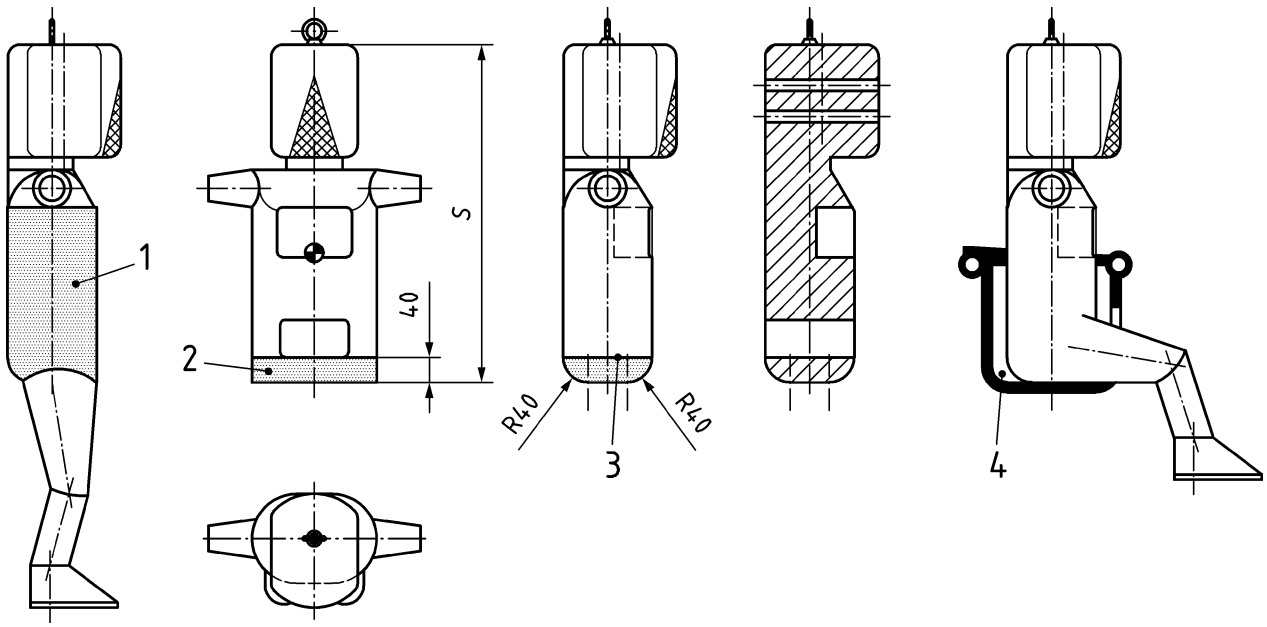


Figure A.2 — calibration of centre of gravity

A.4.3 Calibration in water (wet)

When put into the water without any swimming aid the test manikin shall sink head forward. The final position after sinking shall be flat on the ground.

A.4.4 Test manikins I ... III, variant: upright sitting manikin



Key

1 seat

2 buttock segment

3 interface

4 moulded hard plastic seat

Figure A.3 — Sitting postures and Dimensions of manikins I, II, III in upright sitting posture

NOTE The test manikins representing an upright sitting child are derived from the test manikin according to A.1. Given dimensions there apply. The variation relates only to the buttocks segments. This segment replaces the legs with regard to their weight and provides by its shape the buttocks of the child. The total weight of the manikins results as specified in Table A.2 for the reason that the in water weight of the legs is less its portion to the total weight of the dummy on land.

Table A.3 — Dimensions / weights of manikins I to III in upright sitting posture

Manikin	Sitting height S in mm	Weight of buttocks segment in kg	Total weight in kg
I	510	The buttocks segment shall replace the weight of the hip segment and the weight of the legs but consider the in-water buoyancy of the leg volumes with regard to the three sizes of manikins.	11 - leg buoyancy
II	550		15 - leg buoyancy
III	620		18 - leg buoyancy

The centre of gravity moves slightly upwards which is in line with the anthropometric circumstances. The displacement in water (buoyancy) of the buttocks segment will be less than the original legs but this loss of buoyancy due the concentration of the hip and the leg mass in the buttocks segment is negligible.

Annex B
(normative)

Test procedures for swim seats

B.1 Fit and positioning

B.1.1 General

a) Fully inflate the swim seat and place it on the water.

b) Position manikin according to manufacturer's instruction.

c) Verification by assessment panel:

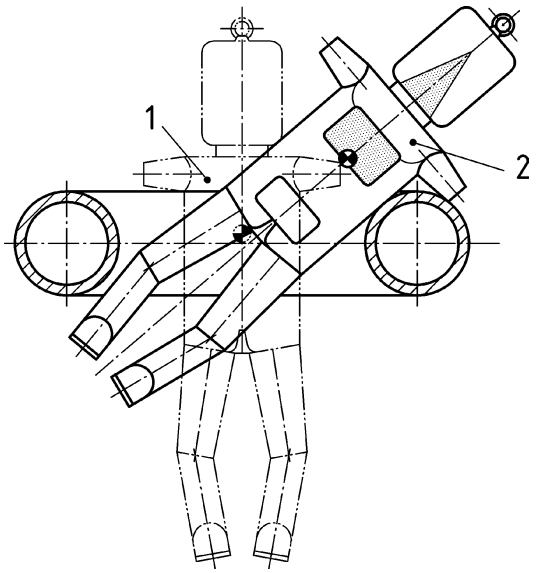
1) Check whether the manikin can be positioned and is supported in a reasonable upright posture.

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

B.1.2 In-water behaviour, static stability in calm water

B.1.2.1 Static stability of inflatable swim seats

Place the manikin inside the seat in the position 2 as shown in Figure B.1. The arm of the manikin shall just touch the outer surface of the buoyancy chamber. Check whether the seat does not capsize and shaded head area remains above water level.



Key

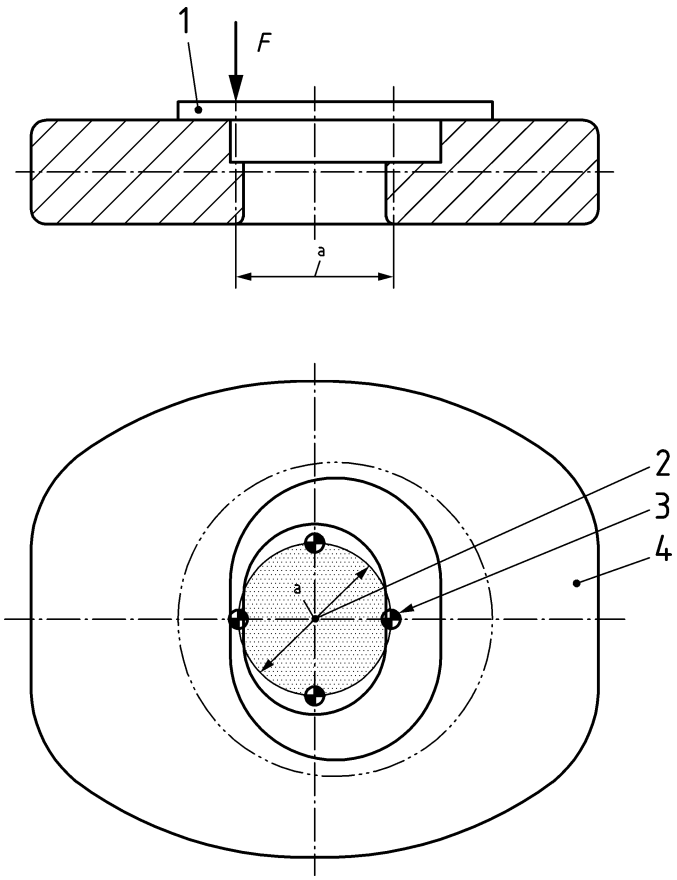
1 intended position

2 position inside swim seat but most likely to cause failure

Figure B.1 — Positioning of manikin when testing static stability

B.1.2.2 Static stability of swim seats made from inherent buoyant material, e.g. foam

Apply load F which is equal to 50 % of body weight of the relevant test manikin (I: 5,5 kg; II: 7,5 kg; III: 9kg) successively at each specified loading point. The diameter of the loading circle determining the four loading points varies with the size: I: 160 mm; II: 180 mm; III: 200 mm. Centre of the loading circles is the centre of the body opening. Check whether the swim seat does not capsize.



Key

1	loading pad if required
2	centre of body opening and centre of loading point circle
3	load application points
4	device to be tested (example only)
a; b; c	circle of loading points

Figure B.2 — Application of load F and loading points

B.1.3 Efficiency of residual buoyancy and retention of function

Deflate completely the air chamber most likely to cause failure. Put the manikin into the swim seat system in a way that it is initially positioned vertically and centrally into the intended position inside the body holding system.

Release the manikin.

Check whether the remaining buoyant structure keeps the manikin's airways (shaded head area) above water level.

NOTE With regard to known swim seat systems due to its mass distribution, the manikin will tip forward as soon as it is released from the initial vertical position. It is not intended to force the manikin intentionally into any other position [eg rearwards or sideways].

B.2 Self-righting test, options 1 to 3

B.2.1 General

a) Position swim seat in test pool with a min. depth of water of 1,5 m.

b) Position appropriate manikin I to III in intended position into swim seat.

c) Tip swim seat deliberately by exerting a torque via force *Fc* until centre line of manikin has reached an angle as specified in Table 3. *Fc* shall be applied at the ball knob on manikin's head by using one hand only in order to allow free movement of manikin's body.

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

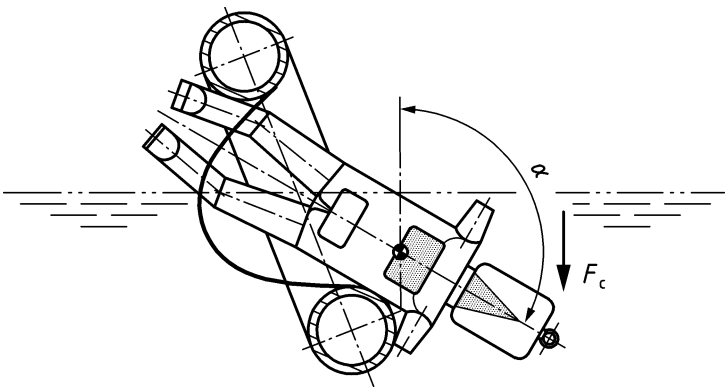


Figure B.3 — Force application and tipping angle at self-righting test

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

B.2.2 Escape test

Position test board as shown in Figure B.3 with its upper surface at approximately 2 cm below water level inside an appropriate test pool as shown in Figure B.4. Allow the swim seat just to float above the floor when loaded.

a) position inflated swim seat with manikin inside on the test board;

b) ensure that centre of manikin is in line with centre point X of test board;

c) adjust side walls so that they just touch the inflated hull without creating any hindrance to movement;

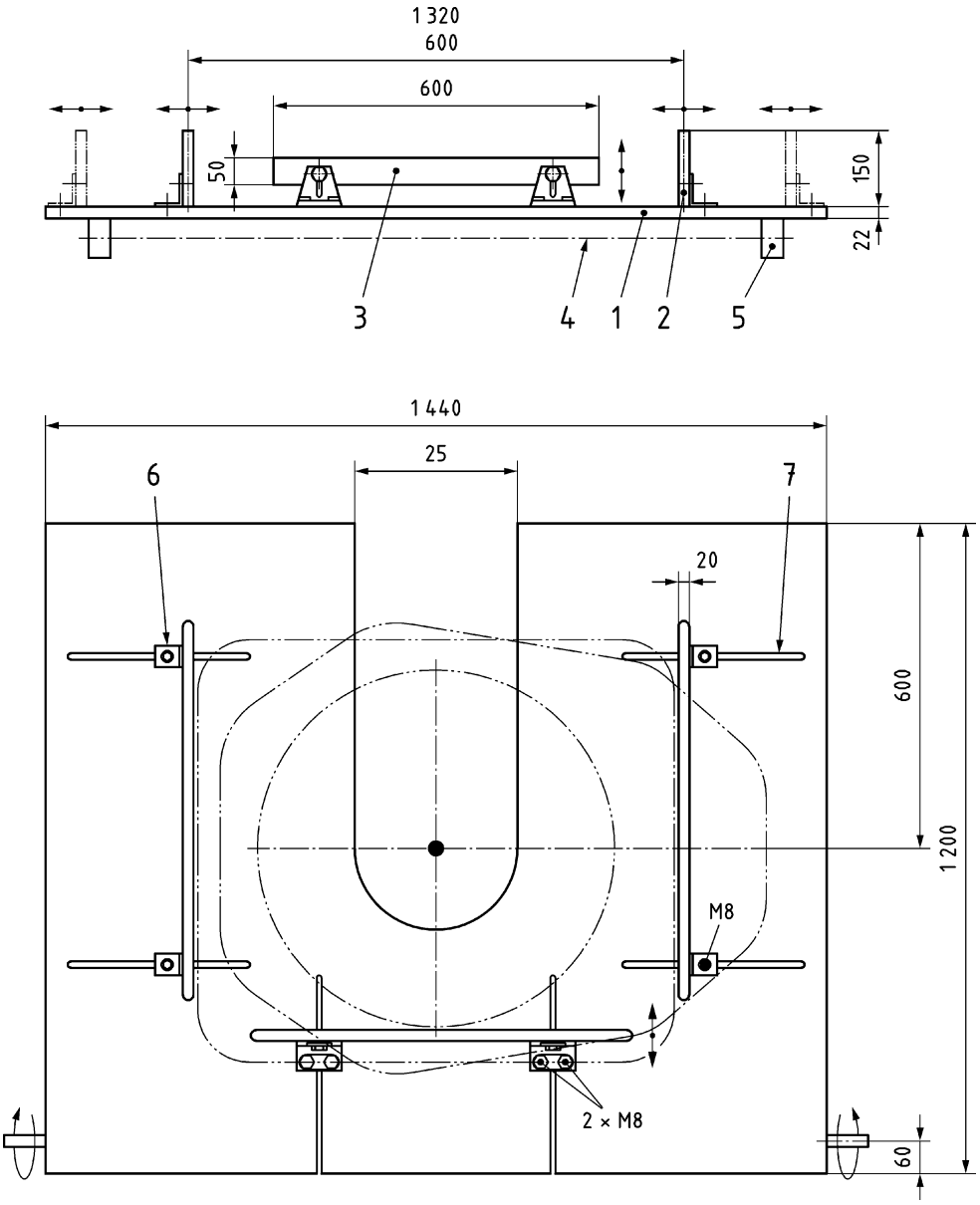
d) adjust front barrier so that the upper edge of it is in line with the mid height of the inflated chamber adjacent to the barrier;

e) release drop weight;

f) check whether requirements set out in Table 3 options 1 to 3 and 5.6.5 are met;

Testing shall include one test in forward direction, one test in backward direction and one sideways test.

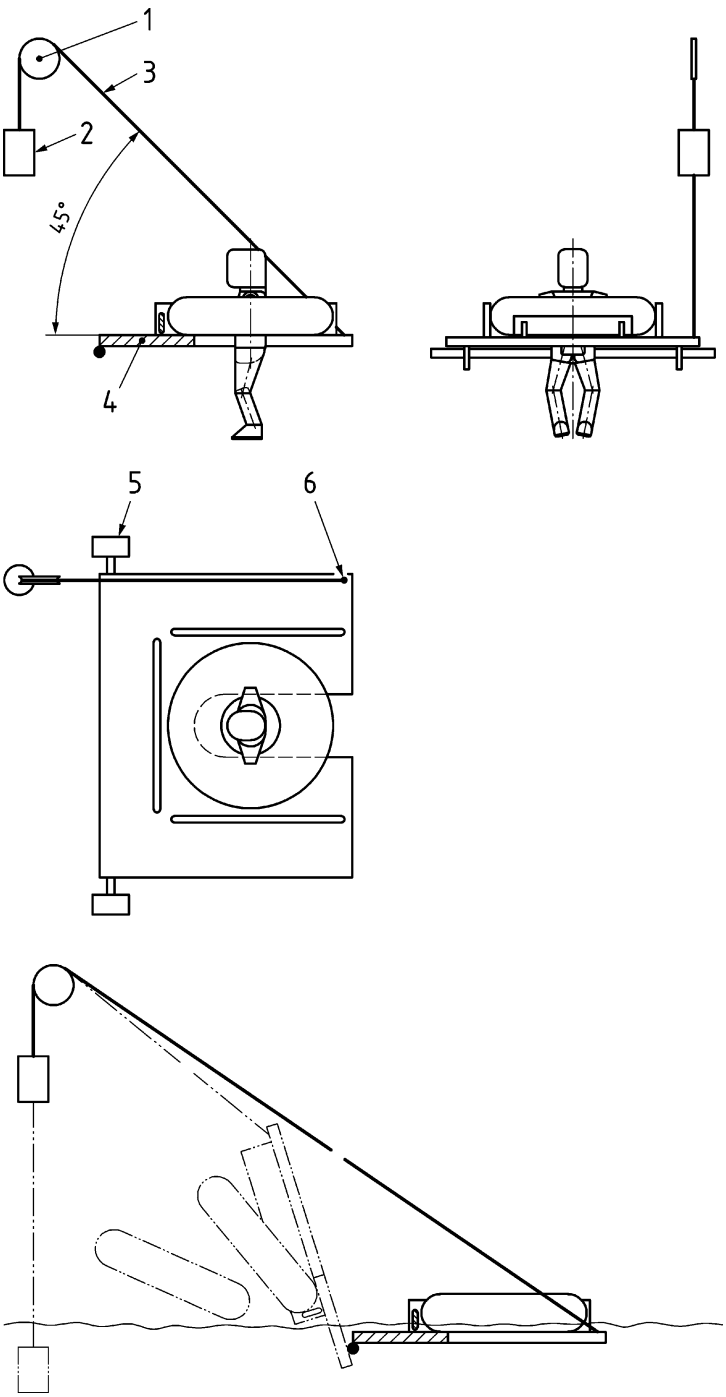
Dimensions in millimetres



Key

1 test board
2 side barriers (adjustable)
3 front barrier (adjustable)
4 turning axis
5 bearings
6 adjustment fittings
7 adjustment long holes

Figure B.4 — Test board for escape test



Key

1 pulley
2 drop weight (Manikin I / II / III = 15 / 20 / 25 kg)
3 rope
4 test board according to Figure B.3
5 bearings
6 rope attachment

Figure B.5 — Test board installation inside pool

The drop weight should not hit the water surface before the turning process of the test board has been completed. Test should be carried out once forward, once rearward and once sideward.

B.3 Strength of entire seat (weldings, sewings, straps etc.)

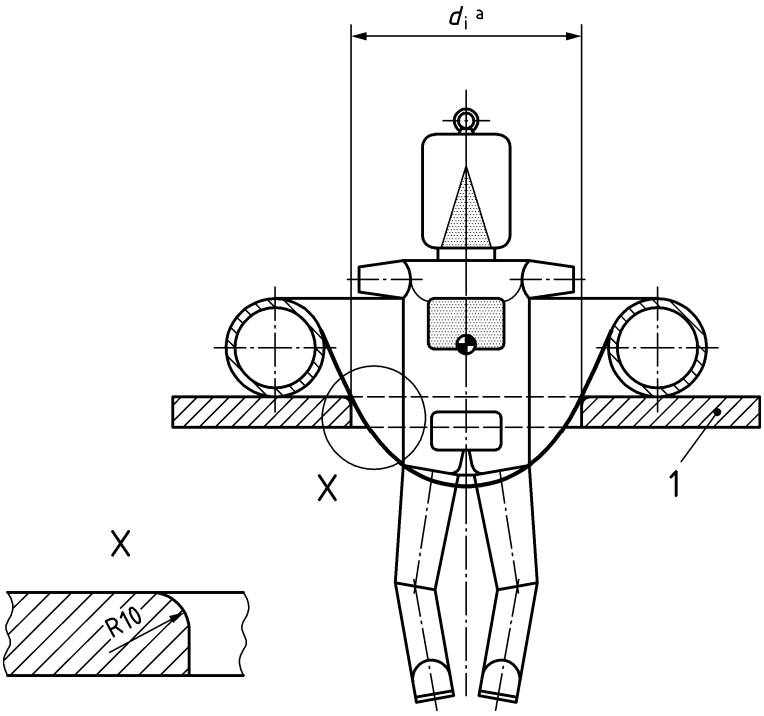
Test procedure:

a) Put swim seat on a flat and rigid board as shown in Figure B.5;

b) Put manikin of appropriate size into swim seat to be tested, lean manikin backwards to provided backrest from inner ring (if appropriate) or inside wall of swim seat;

c) Allow the device to hang freely;

d) Check whether there is any sign of failure compromising safety. Loading time: 1 h



Key

1 test board

a d_i, is the opening in compliance with the contour of swim seat interior

Figure B.6 — Strength of entire seat assembly

Annex C
(normative)

Procedures for testing resistance of markings to saliva

The procedure and assessment shall be carried out in accordance with that prescribed in EN ISO 105-E04 for fastness to perspiration but using a test solution comprising the following constituents:

Sodium bicarbonate, $NaHC0_3$, for analysis	4,2 g
Sodium chloride, NaCI, for analysis	0,5 g
Potassium carbonate, K_2C0_3, for analysis	0,2 g
Distilled water or water of equivalent purity	1 000 cm^3

Annex D
(normative)

Procedures for testing efficiency of valves of inflatable devices

The test procedure shall be carried out in accordance with EN ISO 12402-9:2006, 5.5.9, with the exception that inflation of inflatable devices shall be done orally to achieve the maximum volume. A device, with the opened stopper un-inserted if inflatable, is submerged in the test apparatus in a water-bath for a period of two min. Its buoyancy retention is measured by noting the change in the apparent mass of the test apparatus with and without the inflated device over the period of the test.

The buoyancy of the device at the beginning and the end of the test can then be calculated in Newton.

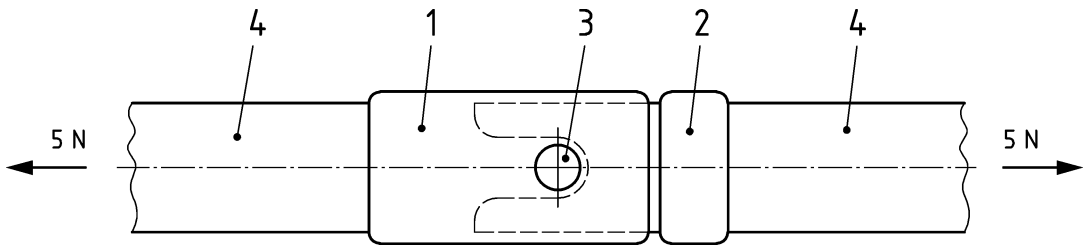
Buoyancy at beginning of test	B1
Buoyancy at conclusion of test	B2
Loss of buoyancy	B1 - B2 = B3
Percentage loss of buoyancy	(B3/B1) × 100

Annex E
(normative)

Security of the pressure release of buckles

The buckle used for securing a buoyant swimming device to the user, with the webbing attached to it, shall be positioned on a plain and rigid surface in such a way that at one end of the webbing a force of 5 N can be applied. A force of 50 N shall be applied at right angles to the release mechanisms of the buckle. This applies for all types of release mechanisms as well for simultaneous as for subsequent action type.

This test is not applicable when the buckle system is not accessible to the user or another person while the device is in the water.



Key

1 buckle

2 counter buckle

3 locking device

4 webbing

Figure E.1 — Example of test method for buckles security

For other designs of buckle appropriate means of securing the buckle and strap under tension and applying a force of 50 N to the buckle release mechanism should be developed.

Annex F
(normative)

Procedures for testing non-objectively measurable features like donning, adjustability, retention of function, edges, corners and points by panel assessment

F.1 General

The overall properties of buoyant devices for swimming instruction include a number of properties and performance characteristics that cannot be assessed by measurement or other objective means. In addition, it is not ethical to use children for testing the performance of these devices when they are used in the water.

To overcome these problems and to minimize the cost of testing but to be able to judge the effectiveness of certain aspects of the devices, an assessment panel is used, the composition of which is defined in 3.16. In particular, the fit and positioning of the device as described in 5.6.2 includes features that shall be assessed by the panel.

F.2 Assessment of risks

The assessment panel shall consider the following in order to determine the extent to which the device represents a risk to the user:

a) Clarity of instructions,

b) Unintended incorrect donning of the device or part of the device,

c) Correct fit of the device,

d) Injury or discomfort caused to the user,

e) Unintentional displacement of the device when in use in the water,

f) Safe performance in the water after the failure of one main air chamber.

The list of risks in Table F.1 is not exhaustive and obvious risks should not be ignored. Reference should be made to the guidance in Table F1.

F.3 Guidance to panel assessment of complete device

Table F.1 — Assessment panel guidance on safety criteria

Item/Property/Risk	Criteria for assessment	Assessment requirements	Remarks
Risk of unintended incorrect donning of the device. Right/left side confusion. Inside/outside confusion.	Top/bottom confusion Front/back confusion	It should not be possible to incorrectly don a buoyant device after following the instructions. No fault: device OK Fault: device fails test	Incorrect means that there is a loss of performance. If there is a likelihood of confusion with the instructions and/or product markings, the device fails the test.
Risk of unintended opening of buckles/closures. Risk of unintended release from the user.	Is there a simultaneous or sequential action for release or opening?	Visual and experimental inspection. No fault: device OK Fault: device fails test	The buckle shall require at least two simultaneous or sequential actions to prevent unintended opening.
Risk of incorrect fit and/or position of any part of the device when in use or ready for use in the water	Does the device adjust for all sizes within the user category? Is it possible to position and fix the device in the intended position for the user'? Assessment of whether the device, when in use, will support the user appropriately.	No fault: device OK Fault: device fails test	Correct fit and positioning of the body in the device is of paramount importance when assessing safety of the device in use.
Risks of injury and/or discomfort to the user or a third party.	Are there any parts of the device that could cause harm or discomfort when the user is moving on land or is in the water. Examples include sharp edges and/or points, a hindrance to normal breathing or vision.	No fault: device OK Fault: device fails test	Amongst others, 5.2.2 refers.

Risk of unintended displacement when in use	Is there a likelihood that the device may become displaced due to the user's actions or movement in the water? Is the amount of displacement relevant to the safe performance of the device?	If the device is likely to become displaced, there shall be no effect on its safety or performance. No fault: device OK Fault: device fails test	In particular, displacement of buoyancy below the user's centre of gravity is dangerous.

Where doubt arises or in cases of ambiguity, the assessment panel shall discuss the problem and decide by a simple majority.

F.4Re-assessment of instructions supplied with the device

Following completion of the assessment of the device, the instructions supplied with the device shall be re-evaluated to determine their effectiveness.

Annex G
(normative)

Test procedures for seam strength and durability of inflatable devices

Two adjoining air chambers of the device shall in alternating order with the adjoining chamber be evacuated.

a) First cycle:

   1) Inflate chamber A up to a test pressure of 0,05 bar.

   2) Maintain the test pressure for 30 s.

   3) Deflate chamber A completely.

   4) Inflate adjoining chamber B to test pressure of 0,05 bar.

   5) Maintain the test pressure for 30 s.

   6) Deflate chamber B.

b) Second cycle:

   Repeat the first cycle starting with chamber A.

c) n-cycle:

   Apply a total of 500 cycles.

Annex H
(normative)

Test procedures for determining the puncture resistance of inflatable devices

Apply a force of 5 N to any part of the external surface of the inflated device through a steel needle tip with a hemispheric radius of 0,5 mm and a needle diameter of (1,0 ± 0,05) mm. Apply the force gradually over a period of 5 s. Maintain the force for a further 5 s. Upon completion of the procedure, submerge the device in a bath of cold water and examine for leakage of air.

Annex I
(normative)

Test procedure for size of leg holes

Place the swim seat on the test board as specified in Figure B.5.

Check to confirm that the appropriate torso probe as shown in Figure I.1 does not pass through the individual leg holes.

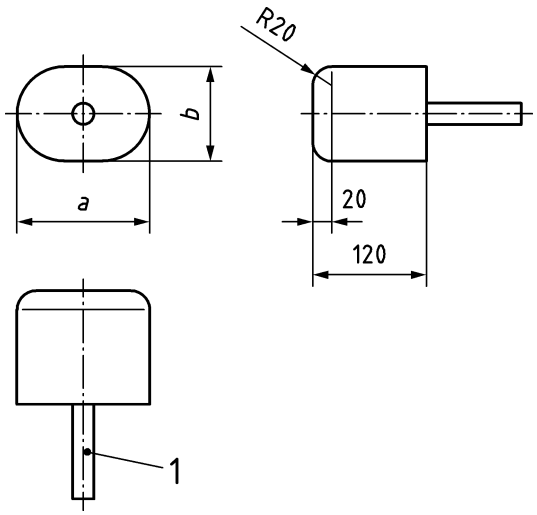
Torso probe dimensions shall be as given in Table I.1.

3-dimensional probe see Figure I.1.

Table I.1 — Torso probe dimensions

Dimension	Age		
	≤ 12 months	**> 12 months to 24 months**	**> 24 months to 36 months**
a	140 mm	150 mm	165 mm
b	100 mm	115 mm	135 mm

Dimension in millimetres



Key

1 handle

a, *b* see Table I.1

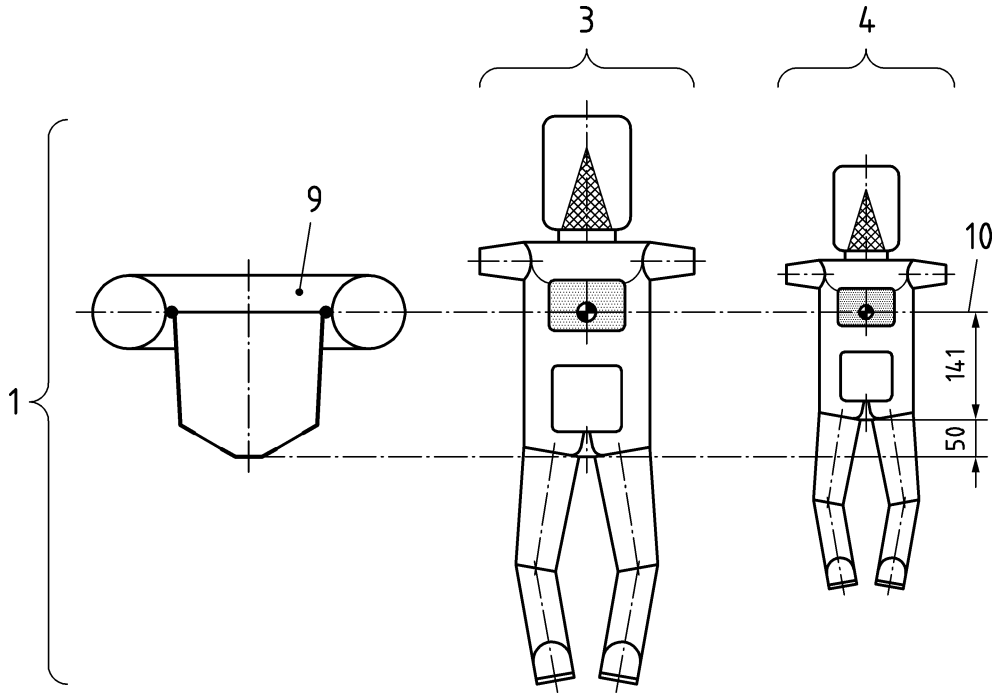
Figure I.1 — Torso probe

Annex J
(normative)

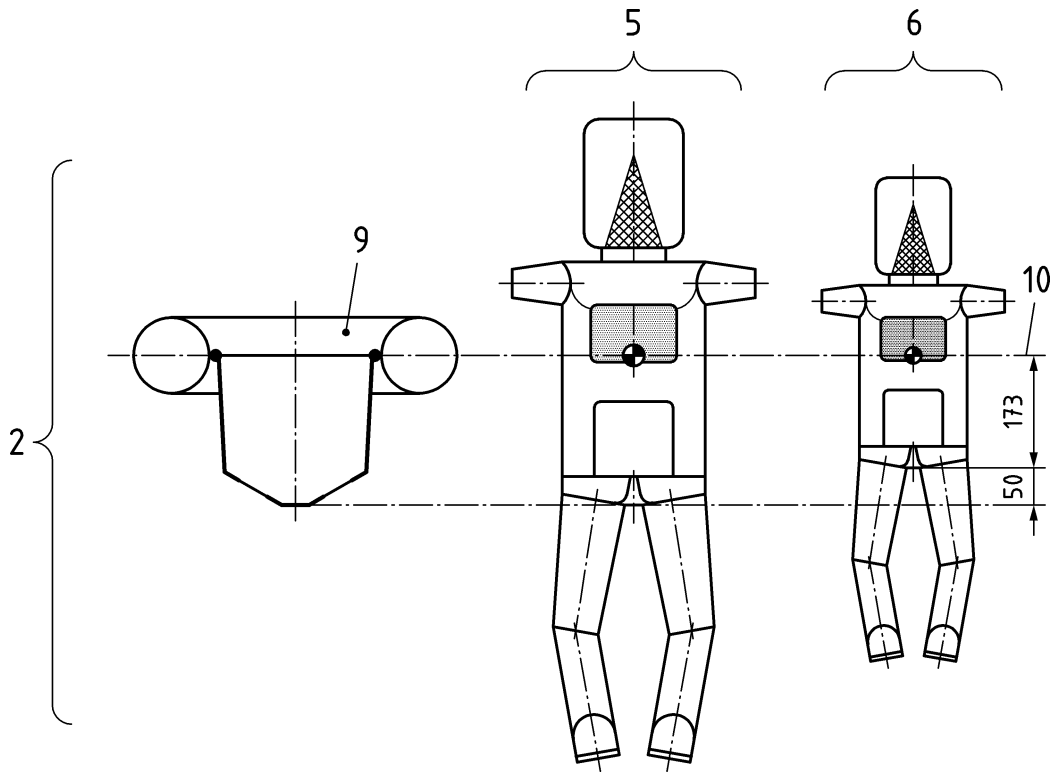
Test procedure for seat depth adjustment of swim seats of sizes I; II; III related to equal height of centre of gravity

J.1 Dimensions

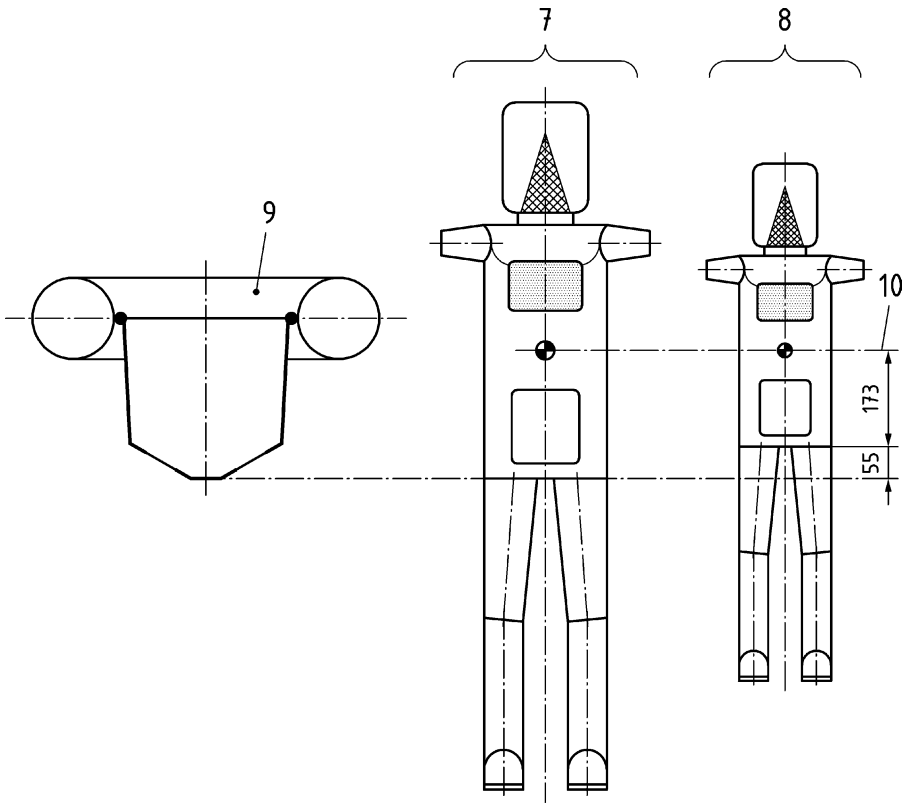
Dimensions in mm,
Dimensional tolerances: +0 / −5 mm



Size I



Size II



Size III

Figure J.1 – Relevant body dimensions related to seat depth adjustment, size I, II, III

J.2 Testing

J.2.1 Marking a reference point

Testing shall be done by marking the height level where the centre of gravity of the relevant test manikin is positioned on the surrounding structure.

J.2.2 Measurement

Measure with an appropriate templates whether the adjustment device is capable to lift the 50. and the 5. percentile user's centre of gravity to the marked reference point. The shape of the templates shall represent the lower torso profile of the medium and small sized user (see anthropometric data).

Check whether the adjustment device does not allow higher sitting positions than specified in Figure J.1 size I, II, III which is 50 mm; 50 mm; 55 mm.

Annex K
(informative)

Significant technical changes between this document and the previous edition EN 13138-3:2007

Paragraph	Changes
Contents	- Updated and expanded to provide more detail - Add Annex K, this document
Foreword	Editorial changes
1 Introduction	- Harmonization across all three parts of EN 13138 - Minor editorial amendments to achieve this
2 Normative references	- Remove EN ISO 12402-7 - Add EN 15649–1:2009+A2:2013 and EN 15649–2:2009+A2:2013
3 Terms and definitions	- Amendments to definitions to ensure harmonization across the three parts of the standard; - Add new 3.4 ‘Minimum buoyancy’; - Remove 3.17 ‘Pull buoy’ as no longer incorporated into standard
4 Classification	- Harmonization across all three parts of the standard; - Editorial amendments to Class A and Class C definition; - Editorial amendment to 4.2, Table 2
5 Safety requirements	- Editorial amendments; - 5.1 Addition of reference to Class A or Class B or Class C for harmonization across standard; - 5.2 Relaxation and clarification of colour requirements; - 5.2.5 Harmonization of safety requirement across standard and with reference to EN 15649–1:2009+A2:2013; - 5.5.1 Editorial amendment to test reference; - 5.6.1 Removal of paragraph as unnecessary in the standard Re-number remaining paragraphs; - Amendment to ‘Residual Buoyancy’ requirement; - 5.6.3 Editorial correction to test reference; - 5.6.4 Amendment to safety requirements for in-water behaviour; - 5.6.7 Added

Paragraph	Changes
6 Test methods	6.1 Clarification of conditioning process
7 Warnings and markings	Inclusion of the word 'debossed' for markings that are impressed into foam materials: - 7.2 Remove symbols for information to Annex J Updated label design to remove the need for text
8 Information supplied	Editorial amendment to incorporate into Section 7 to harmonize with other parts of the standard
Annex A	Editorial amendment to diagrams
Annex B	Editorial amendments to paragraph numbers
Annex J	New Annex from Para 7.2

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