BS EN 13138-1:2014

BSI Standards Publication

Buoyant aids for swimming instruction

Part 1: Safety requirements and test methods for buoyant aids to be worn

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National foreword

This British Standard is the UK implementation of EN 13138-1:2014. It supersedes BS EN 13138-1:2008 which is withdrawn.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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Compliance with a British Standard cannot confer immunity from legal obligations.

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Buoyant aids for swimming instruction - Part 1: Safety requirements and test methods for buoyant aids to be worn

Aides à la flottabilité pour l'apprentissage de la natation - Partie 1: Exigences de sécurité et méthodes d'essai pour les aides à la flottabilité portées au corps

Auftriebshilfen für das Schwimmenlernen - Teil 1: Sicherheitstechnische Anforderungen und Prüfverfahren für am Körper getragene Auftriebshilfen

This European Standard was approved by CEN on 16 August 2014.

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Foreword

This document (EN 13138-1:2014) 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of an identical text or by endorsement, at the latest by April 2015 and conflicting national standards shall be withdrawn at the latest by April 2015.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 13138-1:2008.

This document has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s).

For relationship with EU Directive(s), see informative Annex ZA which is an integral part of this document.

Annex H provides details of significant technical changes between this European Standard and the previous edition EN 13138-1:2008.

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

- EN 13138-1, *Buoyant aids for swimming instruction — Part 1: Safety requirements and test methods for buoyant aids to be worn*
- EN 13138-2, *Buoyant aids for swimming instruction — Part 2: Safety requirements and test methods for buoyant aids to be held*
- EN 13138-3, *Buoyant aids for swimming instruction — 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 instruction (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.

1 Scope

This European Standard specifies safety requirements for construction, performance, sizing, marking and information supplied by the manufacturer for swimming aids intended to assist beginners with movement through the water while learning to swim or while learning part of a swimming stroke. It also gives methods of test for verification of these requirements.

This part 1 of EN 13138 applies only to devices that are designed to be worn, to be securely attached to the body and which have either inherent buoyancy or can be inflated. It only applies to Class B devices intended to introduce the user to the range of swimming strokes. It does not apply to Class A 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 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

Buoyant swimming devices shall be classified according to Table 1.

Table 1 — Classification of buoyant devices

Class	Definition
A	Buoyant device in which the child is in contact with the water positioned inside the buoyant structure. This device is intended to allow the user to become familiar with the water environment. 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 active user to the range of swimming strokes.
C	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

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 garments, these colour requirements apply only to the neck, shoulder and upper chest area.

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 Buoyancy

5.2.1 Buoyancy characteristics of the complete device

When tested in accordance with the procedures in EN ISO 12402-9, the device shall, with all of its buoyant components, have minimum buoyancy in accordance with Table 2. Where the Table shows a "dash" (-), this is intended to indicate that the device is not appropriate for the type of user.

Table 2 — Buoyancy characteristics including illustration of class of device

		Class of buoyant aid for swimming instruction				
Mass range kg	**Age**[a] years	**Minimum buoyancy** N				
		Garment	Collar	Arm bands per pair	Chest belt	Backpack
≤ 11	≤ 1	20	20	20	-	-
> 11 to 15	> 1 to 2	20	20	20	-	-
> 15 to 18	> 2 to 3	20	25	25	15	20
> 18 to 30	> 3 to 6	20	25	25	15	20
> 30 to 60	> 6 to 12	25	30	30	20	25
> 60	> 12	30	40	40	25	30
[a] Age groups are for orientation only. The correlation between the age and the body mass can vary considerably.						

5.2.2 Residual buoyancy

Any inflatable device for swimming instruction when tested in accordance with EN ISO 12402-9:2006, 5.5.9, shall, after complete deflation of one chamber, provide no less than 50 % of the minimum buoyancy according to Table 2.

Where buoyancy is not provided by inherently buoyant material the device shall have at least two independent air chambers. Where an inflatable device or component consists of two or more components, after deflating

the one chamber most likely to fail in the component, this component shall provide at least 25 % of the total minimum buoyancy for the device set out in Table 2.

NOTE Devices that have buoyancy provided by inherently buoyant material are not considered likely to fail in normal use.

5.3 Design, fit and positioning

5.3.1 Adjustability - Class B devices

Each device shall be designed in such a way as to ensure that:

— it can be securely fitted to the appropriate size of user;

— its position on the body shall not, when correctly fitted, allow it to be able to be accidentally displaced when in normal use;

— its position on the body permits the wearer to adopt the correct position for the stroke being learned.

The position of the device when worn is shown in Figure 1.

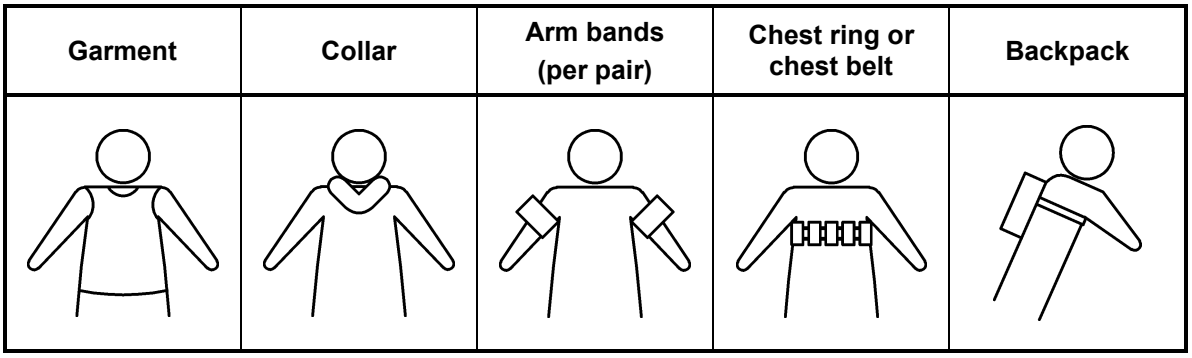


Figure 1 — Position of the device on the body

The testing procedures for this device shall be in accordance with Annex D.

Sizing of class B devices shall be in accordance with the range of body weights as specified in Figure 5. The suitability of the device for a wearer shall be indicated on the product (see Figure 5) and by marking the relevant box(es) according to Figure 5, by ticking "✓" in the appropriate box.

5.3.2 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 C.

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

5.3.3 Retention of function

Class B devices shall retain their intended function in accordance with the manufacturer's instructions even if there is a failure of a component or part of the device.

Devices will be tested through inspection by members of an assessment panel in accordance with Annex D.

5.3.4 Innocuousness

5.3.4.1 General

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

5.3.4.2 Edges, corners and points

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 Table D.1.

5.3.4.3 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 which can become detached shall not fit wholly into the small parts cylinder, testing of which shall be in accordance with EN 71-1.

5.4 Entire assembly and components

5.4.1 Integrity of the entire assembly of worn devices

When tested in accordance with Annex G, the entire assembly shall have an overall strength in accordance with Table 3.

The entire assembly may consist of a number of components. Where armbands or similar products are tested, each component shall meet the test requirements.

Table 3 — Breaking strength of swimming aids

Category of user		
Age[a] years	**Mass** kg	**Load *F* in Annex G, Figure G.1** N
≤ 1	≤ to 11	50
> 1 to 2	> 11 to 15	70
> 2 to 3	> 15 to 18	100
> 3 to 6	> 18 to 30	120
> 6 to 12	> 30 to 60	250
> 12	> 60	500
[a] Age groups for orientation only. The correlation between the age and the body mass can vary considerably.		

Buckles or other fastenings shall not, when loaded, slip more than 25 mm in the direction of the applied load. Where webbing, tapes and straps are intended to be worn next to the body, they shall be not less than 20 mm in width and shall resist roping or rolling. Toggle ends on drawstrings for adjustment of the device are not permitted.

5.4.2 Thread

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

Thread shall be tested using a simple burn test. Fibres shall not leave an ash when burned but should melt or burn to leave a black pellet like residue.

5.4.3 Valves, stoppers and other protruding parts

Inflatable class B devices shall be fitted with non-return valves on every inflatable chamber. Stoppers shall be connected to the body of the valve. The protrusion of the valve/stopper or of any other protruding part shall not catch a test rope when tested in accordance with EN 15649-1:2009+A2:2013, 5.5.

All non-return valves shall ensure that, with any opened stopper, inflatable devices when tested in accordance with Annex B 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.

5.5 Materials - mechanical properties

5.5.1 Seam strength and durability of inflatable devices

The device shall remain airtight after being submitted to a cyclic pressure test when tested in accordance with the procedures in Annex F.

5.5.2 Resistance to puncturing

Where swimming aids have air filled buoyancy chambers, the chambers shall remain airtight when tested in accordance with the procedures in Annex F.

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 3 new, pre-conditioned samples of the inherent buoyant material, conditioned in accordance with the requirements in Clause 6.

5.5.3 Resistance of foam and other inherent buoyant materials to compression

Class B 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 Clause 6, 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.

5.6 Materials and markings

5.6.1 General

These tests, 5.6.3 to 5.6.5, shall not apply where the markings are debossed into or embossed below the surrounding surface of the material. Guidance on marking methods is illustrated in Figure 2.

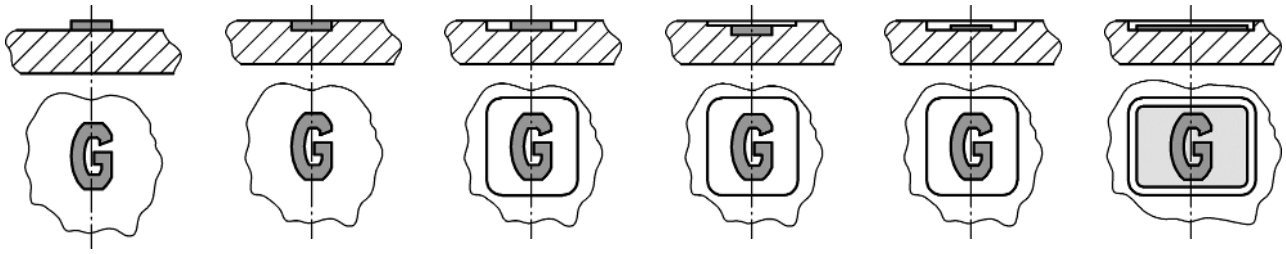


Figure 2 — Illustration of embossed and debossed markings

5.6.2 Resistance to chlorinated salt water

After conditioning according to the procedures in Clause 6, 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.

5.6.3 Resistance of the markings to saliva

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

5.6.4 Resistance of the markings to perspiration

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

5.6.5 Adhesion of markings

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

6 Test methods

It is important that the test procedures are carried out in normal climate conditions. If not otherwise stated tests shall be carried out on the entire assembly. 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.

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.

Devices that have warnings and marking embossed above the mean surface of the device are not permitted.

The word WARNING 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 shall be by measurement and inspection by the assessment panel.

It is recommended that other text is in lower case letters; however, upper case letters may be used.

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

Next to or immediately below the word “WARNING” the following text shall be given:

— Will not protect against drowning

— Always fully inflate all air chambers if applicable to the product

— Use only under constant supervision

— To be worn on the upper arm only (for arm bands only)

— All components shall be worn (if applicable to the product)

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

The additional safety information symbol in Figure 3 may also be used for armbands requiring that they be worn on the upper arm. Graphical symbols shall also be printed or debossed.

Figure 3 — Additional safety information symbol for armbands

The additional safety information symbol in Figure 4 may also be used for devices comprising more than one component requiring that a component not be omitted.

Figure 4 — Additional graphical information symbol for devices comprising more than one component

The following is also required:

— mass equivalent, size range; age range if appropriate;

— the number of this European Standard EN 13138-1:2014;

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

— 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;

— details of how to fit and remove the swimming aid with reference to any specific features appropriate to it;

— details of how to ensure the correct fit for the swimming aid;

— details of storage and maintenance procedures;

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

— 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 5) shall be uniformly applied as shown.

Graphical symbols shall be in accordance with EN 15649-2:2009+A2:2013.

If this information label is used on the packaging, the size and class of the device shall be indicated by ticking "✓" in the relevant box(es) of the label.

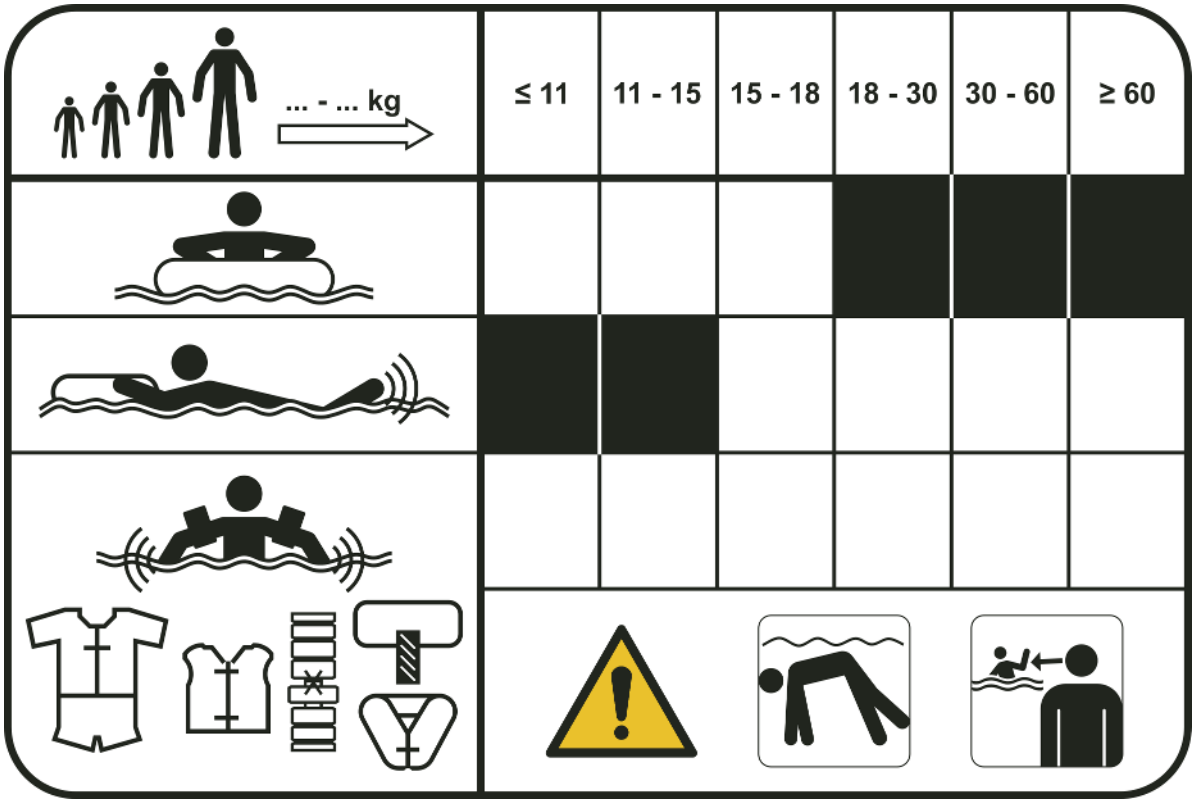


Figure 5 — Recommended layout of product information label

Guidance – Approximate body weight: age group			
11 kg	~ 12 months	11 kg – 15 kg	~ 12 months to 24 months
15 kg – 18 kg	~ 24 months to 36 months	18 kg – 30 kg	~ 3 years to 6 years
30 kg – 60 kg	~ 6 years to 12 years	> 60 kg	~ over 12 years

The example shows a Class B device suitable for a body mass [size] from 15 – 18 Kg corresponding to a user aged between 1 and 2 years.

For swim suit type garments, information of garment size shall be provided to ensure the correct fit of the garment and to indicate its intended use.

Annex A
(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 hydrogen carbonate, $NaHC0_3$, for analysis 4,2 g;

— Sodium chloride, NaCl, 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 B
(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 minutes. 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.

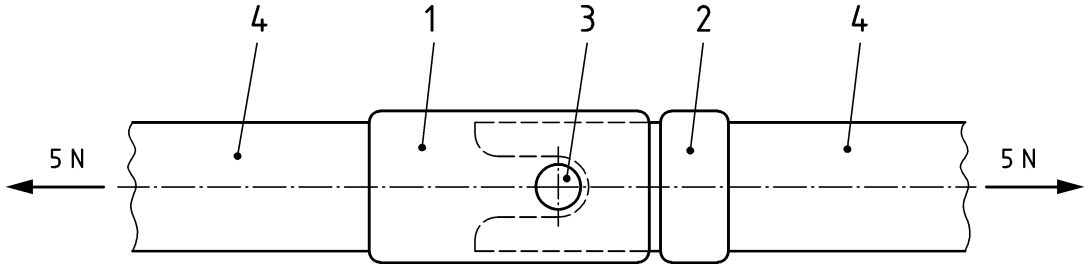
The buoyancy of the device at the beginning and the end of the test can then be calculated in Newtons.

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 C
(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 single release mechanisms.



Key

1 buckle

2 counter buckle

3 locking device

4 webbing

Figure C.1 — Example of test method for buckle security

For other designs of buckle, test houses should develop an appropriate means of securing the buckle and strap under tension and applying a force of 50 N to the buckle where a single action pressure is required for release.

Annex D
(normative)

Procedures for testing adjustability, retention of function, edges, corners and points by assessment panel

D.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 5.3 includes features that shall be assessed by the panel.

Some in-water performance tests may be undertaken using a specified manikin if available.

D.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;

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 D.1 is not exhaustive and obvious risks shall not be ignored. Reference should be made to the guidance in Table D.1.

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

D.3 Re-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.

Table D.1 — Instructions to assessment panel — Assessment of complete device where applicable

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 on the body 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 on the user's body? Assessment of whether the device, when in use, will support the user appropriately.	No fault: device OK Fault: device fails test	Amongst others, 5.3.1 refers. Correct fit and positioning on the body 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, 5.4.1 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.

Item/Property/Risk	Criteria for assessment	Assessment requirements	Remarks
Safe performance of the device in the water after the failure of one main air chamber or filled chamber when in use or when about to be used.	Will the failure of one main air chamber or one filled air chamber lead to a significant reduction in the safety of the device?	No fault: device OK Fault: device fails test	Failure means a loss of buoyancy by deflation or by loss of filling material. In particular, 5.3.3 refers.

Annex E
(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 deflated.

a) First cycle

   Inflate chamber A up to a test pressure of 0,05 bar; Maintain the test pressure for 30 s; Deflate chamber A completely; Inflate adjoining chamber B to test pressure of 0,05 bar; Maintain the test pressure for 30 s; Deflate chamber B .

b) Second cycle

   Repeat the first cycle starting with chamber A.

c) n cycle

   Apply a total of 500 cycles.

Annex F
(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 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 water at ambient temperature and examine for leakage of air.

Annex G
(normative)

Test procedures for integrity of the entire assembly

G.1 Test description

Suspend the device as shown in Figure G.1 and load the device to be tested using a test strap with a load (F) in accordance with Table 3. Buckles and other closures shall be fastened and put in a position sufficiently distant from the lower loading point so as to avoid bending or folding of the closure. Inflatable devices shall be orally inflated to normal operating pressures.

The upper point of the load application for vest style buoyant aids shall always be the shoulder section of the device.

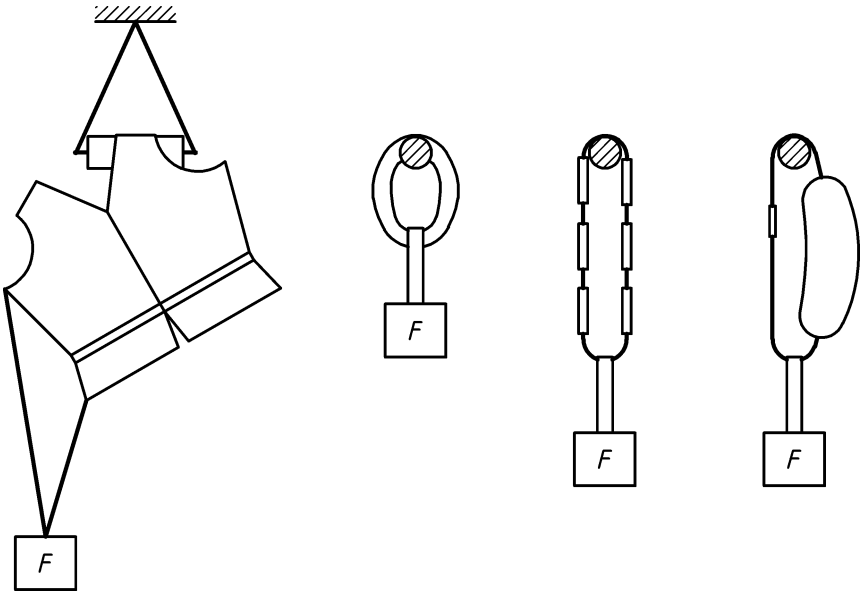


Figure G.1 — Test procedures for assembly integrity

G.2 Test parameters

Duration of load application 5 min; Width of test strap 45 mm to 50 mm; Length of test strap as appropriate to the device on test; Diameter of upper suspending tube 45 mm to 50 mm

Annex H
(informative)

Significant changes between this document and the previous edition of EN 13138-1:2008

Paragraph	Changes
Foreword	− Editorial changes
1 Introduction	− Harmonization across all three parts of EN 13138 − Introduction of term 'buoyant device' as a shortened form of the description of these devices − Minor editorial amendments to achieve this
2 Normative references	Add: EN 15649–1:2009+A2:2013 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' − Removal of 3.17 'Pull buoy' as no longer incorporated into standard. Listed as an exclusion in the Scope.
4 Classification	− Harmonization across all three parts of the standard. − Amendments to Class A and Class C definition
5 Safety requirements	5.1 Clarification of classification – Class A or Class B or Class C, a device cannot be in more than one class; 5.2.2 Simplification of calculation for residual buoyancy; 5.3 New section heading to include design; 5.3.1 Change title to Innocuousness. Editorial amendments to merge 5.3 and 5.4 Removal of 5.5.3 and 5.5.4 5.6 Editorial amendments 5.6.1 Inclusion of the word 'debossed' for markings that are impressed into foam materials; Addition of guidance on design features of embossed and debossed markings
6 Test methods	6 Clarification of conditioning process

Paragraph	Changes
7 Warnings and markings	7.2 Editorial amendments for clarity of English words 7.3 Inclusion of information on very small risk of choking if foams are bitten; 7.4 Simplification of the product information label
Annex D	Editorial amendments for clarity of English words
Annex ZA	Updated

Annex ZA
(informative)

Relationship between this European Standard and the Essential Requirements of EU Directive 89/686/EEC

This European Standard has been prepared under a mandate given to CEN CENELEC by the European Commission and the European Free Trade Association to provide a means of conforming to Essential Requirements of the New Approach Directive 89/686/EEC for Personal Protective Equipment

Once this standard is cited in the Official Journal of the European Union under that Directive and has been implemented as a national standard in at least one Member State, compliance with the clauses of this standard given in Table ZA.1 confers, within the limits of the scope of this standard, a presumption of conformity with the corresponding Essential Requirements of that Directive and associated EFTA regulations.

Table ZA.1 — Correspondence between this European Standard and Directive 89/686/EEC

Clause(s)/sub-clause(s) of this EN	Essential Requirements (ERs) of Directive 89/686/EEC, Annex II		Qualifying remarks/Notes
4	1.1.2	Levels and classes of protection	
5.3	1.1	Design principles	
5.3	1.1.1	Ergonomics	
5.3.4	1.2	Innocuousness of PPE	
5.3	1.3	Comfort and efficiency	
5	3.4	Buoyancy aids	
5.3	1.3.1	Adaption of PPE to user morphology	
5.3	2.1	PPE incorporating adjustment systems	
5.3	2.9	PPE incorporating components which can be adjusted or removed by the user	
5.4	1.2.1	Absence of risks and other ‘inherent’ nuisance factors	
5.6	1.2.1.1	Suitable constituent materials	
7.2 and 7.3	1.4	Information supplied by the manufacturer	

WARNING — Other requirements and other EU Directives may be applicable to the product(s) falling within the scope of this standard.

Bibliography

EN ISO 12402-7:2006, *Personal flotation devices — Part 7: Materials and components — Safety requirements and test methods (ISO 12402-7:2006)*

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