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Personal flotation devices —

Part 6:
Special purpose lifejackets and additional test methods

Dispositifs flottants individuels —

Partie 6: Dispositifs flottants spéciaux — Exigences de sécurité et méthodes d'essai complémentaires

ICS 13.340.10

ISO/CEN PARALLEL ENQUIRY

This draft International Standard is a draft European Standard developed within the European Committee for Standardization (CEN) and processed under the CEN-lead mode of collaboration as defined in the Vienna Agreement. The document has been transmitted by CEN to ISO for circulation for ISO member body voting in parallel with CEN enquiry. Comments received from ISO member bodies, including those from non-CEN members, will be considered by the appropriate CEN technical body. **Accordingly, ISO member bodies who are not CEN members are requested to send *a copy* of their comments on this DIS directly to CEN/TC 162** (DIN, Burggrafenstraße, 6, D-10787 Berlin) **as well as returning their vote and comments in the normal way to the ISO Central Secretariat.** Should this DIS be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month FDIS vote in ISO and formal vote in CEN.

In accordance with the provisions of Council Resolution 15/1993 this document is circulated in the English language only.

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Persönliche Auftriebsmittel - Teil 6: Rettungswesten und Schwimmhilfen für besondere Einsatzzwecke - Sicherheitstechnische Anforderungen und zusätzliche Prüfverfahren (ISO/DIS 12402-6:2002)

This draft European Standard is submitted to CEN members for parallel enquiry. It has been drawn up by the Technical Committee CEN/TC 162.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: rue de Stassart, 36 B-1050 Brussels

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Foreword

This document (prEN ISO 12402-6:2002) 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, in collaboration with Technical Committee ISO/TC 188 "Small craft".

This document is currently submitted to the parallel Enquiry.

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

This Standard is the sixth part of a series covering personal flotation devices. The series consists of:

Part 1: Lifejackets for seagoing ships — Safety requirements

Part 2: Lifejackets for extreme offshore conditions (level 275) — Safety requirements

Part 3: Lifejackets for offshore conditions (level 150) — Safety requirements

Part 4: Lifejackets for inland/close to shore conditions (level 100) — Safety requirements

Part 5: Buoyancy aids (level 50) — Safety requirements

Part 6: Special purpose lifejackets and buoyancy aids — Safety requirements and additional test methods

Part 7: Materials and components — Safety requirements and test methods

Part 8: Accessories — Safety requirements and test methods

Part 9: Test methods

Part 10: Selection and application of personal flotation and other relevant devices

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).

Contents

Introduction

This series of prEN ISO 12402 has been prepared to give guidance on the design and application of personal flotation devices (hereafter referred to as PFDs) for persons engaged in activities, whether in relation to their work or their leisure, in or near water. PFDs manufactured, selected, and maintained to this standard should give a reasonable assurance of safety from drowning to a person who is immersed in water.

This series of standard allows for the buoyancy of a PFD to be provided by a wide variety of materials or designs, some of which may require preparation before entering the water (e.g. inflation of chambers by gas from a cylinder or blown in orally). However, PFDs can be divided into the following two main classes:

a) those which provide face up in-water support to the user regardless of physical conditions (lifejackets), and

b) those which require the user to be conscious to either orient the user with the face out of the water or to deploy the device to achieve face up flotation (buoyancy aids).

Within these main two classes there are a number of levels of support, types of buoyancy media, activation methods for inflatable types, and auxiliary items (such as location aids), all of which will affect the user‘s probability of survival. Within the types of buoyancy mediums allowed, inflatable PFDs either provide full buoyancy without any user intervention other than arming (i.e. PFDs inflated by a fully automatic method) or require the user to initiate the buoyancy provision. Hybrid PFDs always provide some buoyancy but rely on these same methods as inflatables to achieve full buoyancy. With inherently buoyant PFDs, the user only needs to put the PFD on to achieve the performance of its class.

PFDs that do not require intervention (self-acting PFDs) are suited to activities where persons are likely to enter the water unexpectedly; whereas PFDs requiring intervention (e.g., manually inflated PFDs) are only suitable for use if the user believes there will be sufficient time to produce full buoyancy, benign conditions, or help close at hand. In every circumstance, the user should ensure that the operation of the PFD is suited to the specific application. The conformity of a PFD to this standard does not imply that it is suitable for all circumstances. The relative amount of required inspection and maintenance is another factor of paramount importance in the choice and application of specific PFDs.

This series of standard is intended to serve as a guide to manufacturers, purchasers, and users of such safety equipment in ensuring that the equipment provides an effective standard of performance in use. Equally essential is the need for the designer to encourage the wearing of the equipment by making it comfortable and attractive for continuous wear on or near water, rather than for it to stowed in a locker for emergency use. Throwable devices and flotation cushions are not covered by this standard. The primary function of a PFD is to support the user in reasonable safety in the water. Within the two classes, alternative attributes make some PFDs better suited to some circumstances than others or make them easier to use and care for than others. Important alternatives allowed by the standards are:

a) to provide higher levels of support (levels 100, 150, or 275) that generally float the user with greater water clearance, enabling the user’s efforts to be expended in recovery rather than avoiding waves; or to provide lighter or less bulky PFDs (levels 50 to 100)

b) to provide the kinds of flotation media (inherently buoyant foam, hybrid, and inflatable) that will accommodate the sometimes conflicting needs of reliability and durability, in-water performance, and continuous wear;

c) to provide self-acting (inherently buoyant or automatically inflated) PFDs that float users without any intervention on their part, except in initially donning the PFD (and regular inspection and rearming of inflatable types), or to provide user control of the inflatable PFDs buoyancy by manual and oral operation;

d) to assist in detection (location aids) and recovery of the user.

PFDs provide various degrees of buoyancy in garments that are light in weight and only as bulky and restrictive as needed for their intended use. They will need to be secure when worn, providing positive support in the water, allowing the user to swim or actively assist herself/himself or others. The PFD selected shall ensure that the user is supported with the mouth and nose clear of the water under the expected conditions of use and the user’s ability to assist.

In certain circumstances of the environment (such as waves), the wearing of garments which provide (intentionally or otherwise) additional buoyancy, (such as immersion suits) or the use of equipment with additional weight, (such as tool belts) will likely alter the performance of the PFD. Users, owners and employers need to ensure that this is taken into account when selecting a PFD. Similarly, PFDs may not perform as well in extremes of temperature, although fully approved under this standard. PFDs may also be affected by other conditions of use, such as chemical exposure and welding, and may require additional protection to meet the specific requirements of use. If the user intends taking a PFD into such conditions, she/he has to be assumed that the PFD will not be adversely affected. The standard also allows a PFD to be an integral part of a safety harness designed to conform to ISO/DIS 12401, or an integral part of a garment with other uses, for example to provide thermal protection during immersion, in which case the complete assembly as used is required to conform to this standard.

In compiling the attributes required of a PFD, consideration has also been given to the potential length of service that the user might expect. Whilst a PFD which conforms to the specification needs to be of substantial construction and material, its potential length of service often depends on the conditions of use and storage which are the responsibility of the owner, user and/or employer. Furthermore, whilst the performance tests included are believed to assess relevant aspects of performance in real life use, they are not necessarily accurate simulations of it. For example, the fact that a device passes the self-righting tests described herein does not guarantee that it will self-right an unconscious user wearing waterproof clothing, neither can it be expected to completely protect the airway of an unconscious person in rough water.

It is essential that owners, users and employers choose those PFDs that meet the correct standards for the circumstances in which they will be used. Manufacturers and those selling PFDs have to make clear to prospective purchasers the product properties and alternative choices and the limitations to normal use, prior to the purchase.

Similarly, those framing legislation regarding the wearing of these garments should consider carefully which class and performance level is most appropriate for the foreseeable conditions of use, allowing for the more severe circumstances which often pertain in emergencies. More information for the selection and application is given in prEN ISO 12402-10.

1 Scope

This part of prEN ISO 12402 specifies the safety requirements and additional test methods for special purpose lifejackets and buoyancy aids (hereafter referred to as special purpose devices) in combination with the requirements specified in prEN ISO 12402-1 to –5.

2 Normative references

This European Standard incorporates by dated or undated references, provision from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

EN 532, *Protective clothing — Protection against heat and flame — Test method of test for limited flame spread.*

EN 533, *Protective clothing — Protection against heat and flame — Limited flame spread materials assemblies.*

EN 1621-1, *Motorcyclist' protective clothing against mechanical impact — Part 1: Requirements and test methods for impact protectors.*

prEN 1621-2, *Motorcyclists' protective clothing against mechanical impact — Part 2: Requirements and test methods for back protectors.*

prEN ISO 12402-1, *Personal flotation devices — Part 1: Lifejackets for seagoing ships — Safety requirements.*

prEN ISO 12402-2, *Personal flotation devices — Part 2: Lifejacket for extreme offshore conditions (level 275) — Safety requirements.*

prEN ISO 12402-3, *Personal flotation devices — Part 3: Lifejackets for offshore conditions (level 150) — Safety requirements.*

prEN ISO 12402-4, *Personal flotation devices — Part 4: Lifejackets for inland/close to shore conditions (level 100) — Safety requirements.*

prEN ISO 12402-5, *Personal flotation devices — Part 5: Buoyancy aids (level 50) — Safety requirements.*

prEN ISO 12402-7, *Personal flotation devices — Part 7: Materials and components — Safety requirements and test methods.*

prEN ISO 12402-8, *Personal flotation devices — Part 8: Accessories — Safety requirements and test methods.*

prEN ISO 12402-9, *Personal flotation devices — Part 9: Test methods.*

prEN ISO 12402-10, *Personal flotation devices, Part 10: Selection and application of personal flotation and other relevant devices.*

ISO/DIS 12401, *Small craft — Deck safety harness and safety line for use on recreational craft — Safety requirements and test methods.*

3 Terms and definitions

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

3.1
personal flotation device (PFD)
garment or device which, when correctly worn and used in water, will provide the user with a specific amount of buoyancy which will increase the likelihood of survival

3.2
inherently buoyant material
material which is permanently less dense than water

3.3
self-acting PFD
device in which, buoyancy is provided by permanent means (inherently buoyant material) or by suitable means (gas inflation) effected by a system which automatically activates upon immersion and which, except for the inspection and rearming of inflatable types, when correctly donned requires no further action by the user

3.4
automatically inflated PFD
device in which inflation is effected as a result of immersion without the user carrying out any action at the time of immersion

3.5
manually inflated PFD
device in which inflation is effected as a result of the user operating a mechanism

3.6
orally inflated PFD
device inflated by mouth to produce buoyancy

3.7
PFD with secondary donning
additional donning or adjustment that is needed to place the PFD in its functioning position from the position it is normally worn

NOTE Pouch-type devices are examples of the type of PFDs which usually require such additional positioning.

3.8
vest-type PFD
device covering the upper trunk of the user like a vest

3.9
yoke-type PFD
device worn around the neck secured by a waist strap

3.10
emergency light
device which emits light so as to increase the chances of a user being located

3.11
multi-chamber buoyancy system
system that divides the buoyancy provided by an inflatable lifejacket into two or more separate compartments, such that if mechanical damage occurs to one, others can still operate and provide buoyancy so as to aid the user when immersed

3.12
deck safety harness and safety line
device that allows a user to be securely attached to a strong point on a vessel or on shore, so as to prevent the user from falling into the water, or, if he does fall into the water, to prevent him from being separated from the vessel or shore

3.13
buddy line
length of cord which can be tied or otherwise fixed to another person or to that person's lifejacket or buoyancy aids, liferafts, or other objects, so as to keep a user in the vicinity of that person or object with a view to making location and thus rescue easier

3.14
lifting loop
device, which is suitable to facilitate manual recovery of a person from water

3.15
sprayhood
cover brought or placed in front of the airways of a user in order to reduce or eliminate the splashing of water from waves or the like onto the airways and thereby to promote the survival of the user in rough water conditions

3.16
protective cover
cover that is normally in place over the functional elements of a PFD in order to protect them from physical damage, or snagging on external objects. The protective cover may be designed to provide additional physical properties i.e. to make the PFDs suitable for use when the subject is exposed to additional hazards

NOTE 1 Such hazards may be significant abrasion, molten metal splash, flame and fire and other hazards.

NOTE 2 The inflatable chamber of an inflatable PFD is an example of a functional element.

3.17
overpressure relief valve
valve which may be used in an inflatable system, to avoid the likelihood of destruction caused by overpressure

3.18
whistle
device which, when blown by mouth, produce an audible sound which can aid in the location of the user

3.19
hybrid type PFD
a device of combined buoyancy types, i.e. inherent and inflatable

3.20
HELP position
body posture to reduce heatloss to a minimum, legs and arms as close to the body as possible

3.21
chin support
the device is in direct contact with the jaw while the subject is either in the vertical upright or relaxed face-up position, or the device prevents the subject from touching the chin to the chest when starting from the relaxed face-up position of static balance

3.22
decorative D ring
D shaped loop or other free-hanging tabor open loop that is a potential attachment point designed to pull free of the PFD at a force of ≥ 220 N

3.23
universal size
size range which includes 760 mm to 1 320 mm chest sizes

4 Classification

4.1 Classes

4.1.1 Lifejackets

These devices provide face-up flotation with levels of support sufficient for various open and rough water uses. Lifejackets have a buoyancy distribution sufficient to turn all users when tested according to this standard to a position where the mouth has a defined freeboard above the water's surface, even when unconscious.

4.1.2 Buoyancy aids

These devices provide lift without significant face-up turning ability, to float the conscious user with levels of support suitable for sheltered waters and should be comfortable for continuous wear.

4.1.3 Special purpose lifejackets and buoyancy aids

These devices perform in the above definitions with different levels of support, but have modifications related to special applications for use, which do not relate to essential requirements such as in water-performance, stability and safety in use, or may have use conditions stated on their label to maintain essential requirements.

4.2 Performance levels

4.2.1 Level 275

This level is intended primarily for offshore use and by people who are carrying significant weights and thus require additional buoyancy. It is also of value to those who are wearing clothing which traps air and which may adversely affect the self-righting capacity of the lifejacket. It is designed to ensure that the user is floating in the correct position with his mouth and nose clear of the surface.

See prEN ISO 12402-2.

4.2.2 Level 150

This level is intended for general offshore and rough weather use where a high standard of performance is required. It will turn an unconscious person into a safe position and requires no subsequent action by the user to maintain this position.

See prEN ISO 12402-3.

4.2.3 Level 100

This level is intended for those who may have to wait for rescue, but are likely to do so in sheltered water. The devices should not be used in rough conditions.

See prEN ISO 12402-4.

4.2.4 Level 50

This level is intended for use by those who are competent swimmers and who are near to bank or shore, or who have help and a means of rescue close at hand. These garments have minimal bulk, but they are of limited use in disturbed water, and cannot be expected to keep the user safe for a long period of time. They do not have sufficient buoyancy to protect people who are unable to help themselves. They require active participation by the user.

See prEN ISO 12402-5.

5 Requirements

5.1 General

5.1.1 Principles

There are special purpose devices which have additional features for specific needs going beyond the requirements for the average user and those that rely on the skill, knowledge, special training and participation of the user. This has to be spelled out clearly by the information supplied by the manufacturer.

The requirements specified in prEN ISO 12402-1 to -5 are also the basic requirements for special purpose devices. If any modification change such basic performance of the PFD, this will require a down grade of the product to the next suitable performance level of PFD.

A special purpose device shall be tested in accordance with prEN ISO 12402-9. The tests of prEN ISO 12402-9 have to be considered as test sequence, whereas temperature cycling and rotating shock bin test shall be considered as reliability against wear and tear.

A combination of a special purpose device and accessories shall not impair the performance of each of it. This shall be proved during the test required for the special purpose device as well as the additional item. If necessary the test sequence has to be arranged accordingly, i.e. a special purpose device is provided with a deck safety harness, the harness tests shall be performed first.

An inflatable special purpose device shall have auto or manual inflation that allows providing full compliance with all performance requirements of this standard and at least manual and oral inflation. It shall be tested against inadvertent inflation.

5.1.2 Accessories

5.1.2.1 General

Special purpose devices shall be equipped with accessories complying with prEN ISO 12402-8, as specified in Table 1.

Table 1 — PFD and accessories required

Accessories	PFDs according to				
	prEN ISO 12402-1	prEN ISO 12402-2	prEN ISO 12402-3	prEN ISO 12402-4	prEN ISO 12402-5
Emergency light	O[a]	O	O	O	O
Whistle	M	M	M	M	M
Lifting loop	O[b]	M	M	O	O
Buddy line	O	O	O	O	O
Retroreflective material	M	M	M	M	M
Deck safety harness	O	O	O	O	O
Overpressure relief valve	O	O	O	O	O
Multi-chamber system	M[c]	O	O	O	O
Protective covers	O	O	O	O	O
Sprayhood	O	O	O	O	O

O = optional

M = mandatory

[a] only mandatory for operator, emergency light according to SOLAS specification

[b] see MSC, but lifting loop recommended

[b] only for inflatables

5.1.2.2 Lifting loop

A special purpose device shall be provided with a lifting loop. Testing according to prEN ISO 12402-9.

The lifting loop shall be affixed to the special purpose device in front of the chest anterior to lines from each axial to midway between lower end of sternum and the umbilicus and within no more than 100 mm from the midline.

The minimum length of the loop shall be 150 mm, measured from attachment to end of the loop.

The lifting loop shall have a minimum width of 20 mm and shall have a colour to be distinctive from that of the special purpose device.

The lifting loop shall be conspicuous when the user is floating normally, but may be enclosed to the cover when the special purpose device is worn but not deployed to floatation.

5.1.2.3 Whistle

The lifejacket shall be provided with a whistle complying with 4.3 of prEN ISO 12402-8. The whistle shall be firmly secured to the device.

5.1.2.4 Sprayhood

If any form of hood or sprayhood is fitted to cover the face in whole or in part (e.g. to protect mouth and nose from water splash), the carbon dioxide level within the hood shall not exceed 5 % at any place at any time and does not average more than 2,5 % in any one minute, when tested in accordance with 4.6.2 of prEN ISO 12402-9.