SUKELDUMISÜLIKONNAD. OSA 2: KUIVÜLIKONNAD. NÕUDED JA KATSEMEETODID

Diving suits - Part 2: Dry suits - Requirements and test methods



### EESTI STANDARDI EESSÕNA

### NATIONAL FOREWORD

See Eesti standard EVS-EN 14225-2:2017 sisaldab Euroopa standardi EN 14225-2:2017 ingliskeelset teksti.

This Estonian standard EVS-EN 14225-2:2017 consists of the English text of the European standard EN 14225-2:2017.

Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas.

This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.

Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 06.12.2017.

Date of Availability of the European standard is 06.12.2017.

Standard on kättesaadav Eesti Standardimis- ja Akrediteerimiskeskusest.

The standard is available from the Estonian Centre for Standardisation and Accreditation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile <u>standardiosakond@evs.ee</u>.

#### ICS 97.220.40

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardimis- ja Akrediteerimiskeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardimis-ja Akrediteerimiskeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardimis-ja Akrediteerimiskeskusega: Koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation and Accreditation No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation and Accreditation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation and Accreditation:

Homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

### EUROPEAN STANDARD

### NORME EUROPÉENNE

### **EUROPÄISCHE NORM**

November 2017

EN 14225-2

ICS 97.220.40

Supersedes EN 14225-2:2005

### **English Version**

## Diving suits - Part 2: Dry suits - Requirements and test methods

Vêtements de plongée - Partie 2 : Combinaisons étanches - Exigences et méthodes d'essai

Tauchanzüge - Teil 2: Trockentauchanzüge - Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 7 June 2017.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

# Contents Page

Europ	pean foreword	4
Intro	ductionduction	
1	Scope	6
2	Normative references	6
3	Terms and definitions	7
4	Requirements	
4.1	General	
4.2	Mechanical performance	10
4.2.1	Resistance to cold and hot storage	10
4.2.2	Sea water resistance	11
4.2.3	Resistance to cleaning, disinfection and decontamination	11
4.3	Mechanical performance of the material, seams and attachments	
4.3.1	Resistance of material to puncture and dynamic tearing	
4.3.2	Strength of suit seams	
4.3.3	Strength of closures	
4.3.4	Joint strength of attachments	
4.3.5	Integrity of slide fasteners	
4.4	Construction	
4.4.1	Sizing	
4.4.2	Internal volume control system	
4.4.3	Connectors	
4.4.4	Penetrators	
4.4.5	Provision for urination	
4.4.6	Leakage resistance	
4.5	Practical performance requirements	
4.6	Optional features	
4.6.1	Hoods	
4.6.2	Special protection	
_	Test methods	
5		
5.1	General	
5.2	Test sequence	
5.3	Visual Inspection	18
5.4	Mechanical test methods	18
5.4.1	General	
5.4.2	Preliminary tests	
5.4.3	Mechanical tests	
5.5	Testing of suit components	
5.5.1	Internal volume control system	20
5.5.2	Leakages test	
5.5.3	Inflation connections	23
5.6	Practical performance test	24
5.6.1	General	24
5.6.2	Sampling	24
5.6.3	Test panel	24

5.6.4	Test divers	24
5.6.5	Test clothing	24
5.6.6	Diving equipment	
5.6.7	Test procedure	
5.6.8	Depth dive	
5.6.9	Pass / fail criteria	27
5.7	Testing optional features	
5.7.1	Thermal insulation	
5.7.2	Chemical resistance	_
5.7.3	Resistance against biological hazards	
5.7.4	Abrasion test	
5.7.5	Visibility	28
6	Marking	29
7	Information to be supplied by the manufacturer	
7.1	Information to be supplied with the suit	
7.2	Customer information to be supplied at the point of sale	
7.3	Instructions for use	30
Annex	A (normative) Ratings of practical performance, thermal comfort and perceived exertion	32
<b>A.1</b>	Practical Performance: Scale	32
<b>A.2</b>	Thermal Comfort: Scale and Questionnaire	32
<b>A.3</b>	Perceived Exertion: Scale and Questionnaire	33
Annex	B (normative) Abrasion — Requirements for glass paper and glass cloth	34
<b>B.1</b>	Quality of materials	
B.1.1	Abrasive	34
B.1.2	Backing	34
B.1.3	Adhesive	
<b>B.2</b>	Form and dimensions	
<b>B.3</b>	Abrasive grain	34
<b>B.4</b>	Breaking strength	34
Annex	c C (informative) Significant technical changes between this European Standard and EN 14225-2:2005	36
Annex	x ZA (informative) Relationship between this European Standard and the Essential requirements of Directive 89/686/EEC aimed to be covered	38
Annex	ZB (informative) Relationship between this European Standard and the Essential Requirements of Regulation (EU) 2016/425 aimed to be covered	40
D:LI:-		
DIMIIO	graphy	42

### **European foreword**

This document (EN 14225-2:2017) 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 2018, and conflicting national standards shall be withdrawn at the latest by June 2018.

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

This document supersedes EN 14225-2:2005.

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 Regulation (EU) 2016/425.

For relationship with Regulation (EU) 2016/425, see informative Annexes ZA and ZB, which are an integral part of this document.

Annex C provides details of significant technical changes between this European Standard and the previous edition.

EN 14225 consists of the following parts under the general title *Diving suits*:

- Part 1: Wet suits Requirements and test methods;
- Part 2: Dry suits Requirements and test methods;
- Part 3: Actively heated or cooled suit systems and components Requirements and test methods.

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, Iteland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

### Introduction

This document for dry diving suits has been prepared to meet the needs of persons engaged in underwater activities where the user is breathing underwater, and where thermal comfort and required thermal protection is higher than that provided by a wet suit. A dry suit is also designed to enable the wearers to adjust the gas volume in the suit according to their requirements.

A dry suit may be comprised of one or more pieces. Dry suits may be used in conjunction with a range of accessories including passive and active undergarments, gloves, a hood and other head protection equipment.

The conformity of a dry suit to this document does not imply that it is suitable for all circumstances, nor does the standard make detailed provisions for all the special uses for which dry suits may be utilized.

A dry suit manufactured for special purposes may also:

- a) provide or enable thermal insulation;
- b) provide special protection.

The level of protection and performance offered by a dry suit may be altered by a number of factors, including the water temperature, the depth of the dive, the diver's work rate and behaviour, and the manner in which the suit has been maintained. The adequacy of the protection provided by a dry suit also depends upon the individual diver's level of cold tolerance. The degree of thermal protection offered by a dry suit is especially problematic. Appropriate material and manikin tests are being developed and refined, but at best they will only be able to provide broad indications of the likely t viduan protection provided by a particular suit to an individual diver.

### 1 Scope

This European Standard specifies the construction and performance of dry suits for wear by divers for underwater activities where the user is breathing underwater. Marking, labelling, information meant to be provided at the point of sale and instructions for use are also specified.

Laboratory and practical performance tests are specified.

### 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 250, Respiratory equipment — Open-circuit self-contained compressed air diving apparatus — Requirements, testing and marking

EN 530:2010, Abrasion resistance of protective clothing material — Test methods

EN 1809:2014+A1:2016, Diving equipment — Buoyancy compensators — Functional and safety requirements, test methods

EN 14126:2003, Protective clothing — Performance requirements and tests methods for protective clothing against infective agents

EN 14225-1:2017, Diving suits — Part 1: Wet suits — Requirements and test methods

EN 16523-1, Determination of material resistance to permeation by chemicals — Part 1: Permeation by liquid chemical under conditions of continuous contact

EN 20811, Textiles — Determination of resistance to water penetration — Hydrostatic pressure test (ISO 811:1981)

EN ISO 3758, Textiles — Care labelling code using symbols (ISO 3758)

EN ISO 13935-2, Textiles — Seam tensile properties of fabrics and made-up textile articles — Part 2: Determination of maximum force to seam rupture using the grab method (ISO 13935-2)

EN ISO 13995, Protective clothing — Mechanical properties — Test method for the determination of the resistance to puncture and dynamic tearing of materials (ISO 13995)

EN ISO 15027-3:2012, *Immersion suits — Part 3: Test methods (ISO 15027-3:2012)* 

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

ISO 4046-3:2016, Paper, board, pulps and related terms — Vocabulary — Part 3: Paper-making terminology

SOLAS:1974, as amended, Chapter III as amended by IMO Resolution MSC 47(66) and LSA Code. Use and fitting of retro-reflective materials on life-saving appliances, adopted by Res. A.658(16), Annex 2, issued by the International Maritime Organisation (IMO)