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Protective clothing - Protection against heat and flame - Requirements and test methods for garments with integrated smart textiles and non textile elements

Táto norma obsahuje anglickú verziu európskej normy.
This standard includes the English version of the European Standard.

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English Version

Protective clothing - Protection against heat and flame - Requirements and test methods for garments with integrated smart textiles and non textile elements

Vêtements de protection - Protection contre la chaleur et les flammes - Exigences et méthodes d'essai pour les vêtements dotés d'éléments intelligents textiles et non textiles intégrés

Schutzkleidung - Kleidung zum Schutz gegen Hitze und Flammen - Anforderungen und Prüfverfahren für Kleidungsstücke mit integrierten smarten Textilien und nicht-textilen Elementen

This European Standard was approved by CEN on 13 June 2022.

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.

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

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European foreword

This document (EN 17673:2022) 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of an identical text or by endorsement, at the latest by February 2023, and conflicting national standards shall be withdrawn at the latest by February 2023.

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 has been prepared under a Standardization Request given to CEN by the European Commission and the European Free Trade Association.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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

Introduction

This document concerns garments or assembly of garments providing protection against heat and flame, with integrated smart textiles and non-textile elements for enhanced health, safety and survival capabilities.

This document does not concern validating claims that the integrated smart textiles and non-textile elements substitute directly any protection provided by the garment from a heat and flame perspective.

The integrated smart textiles and non-textile elements may include not only the parts integrated into the protective garment but also connections to external devices and the data generated and exchanged. It is not within the scope of this document to evaluate data storage or transmission as well as the connectivity to the external devices other than the hardware integrated into the garment.

The garments or assembly of garments as a whole will need to fulfil the heat and flame requirements of EN ISO 11612 and the general clothing requirements EN ISO 13688. The smart elements shall be treated similarly to hardware when testing according to these two standards.

The purpose of this document is to provide the additional requirements on identifying the need for additional testing of the smart textiles or non-textile elements and how they should be tested from a heat and flame perspective. Additional requirements, if applicable, from an electrical/electronic safety perspective also are addressed. The applicability of the additional requirements will need to be evaluated depending on the functionality of the smart textiles or non-textile element and its needed efficacy in a heat and flame risks. At a minimum the smart textiles or non-textile elements should not negatively impact the protection that the garment intends to fulfil.

This document is complementary to and does not intend to repeat the requirements of EN ISO 11612 and/or EN ISO 13688; to assist the reader it summarises the requirements of EN ISO 11612.

It is essential that the industrial workers using heat and flame personal protective equipment (PPE) and fire (and rescue) services, or their employers, carry out a risk assessment as well as a compatibility and ergonomics check of all parts of the PPE (e.g. SCBA, gloves, boots, etc.) to meet the requirements of the Directive (EC) 89/656 on the minimum health and safety requirements for the use by workers of personal protective equipment at the workplace. It is essential that workers and maintenance personnel are trained in the selection, use, care and maintenance of all personal protective equipment including the smart elements. Guidelines for selection, use, care and maintenance of garments or assembly of garments with integrated smart textiles and non-textile elements for enhanced health, safety and survival capabilities (smart garments) protecting against heat and flame are given in CEN/TR 17620.

This document was prepared under the standardization request M/553 as regards advanced garments and ensembles of garments that provide protection against heat and flame, with integrated smart textiles and non-textile elements for enhanced health, safety and survival capabilities, in support of Regulations (EU) No 1007/2011 and (EU) 2016/425 of the European Parliament and of the Council. This document fulfils the request for (a) European standard(s) in the field of declaration and measurement of properties and overall performance of advanced garments and ensembles of garments that provide protection against heat and flame, with integrated smart textiles and non-textile elements for enhanced health, safety and survival capabilities as stated in Annex II of the standardization request. As this request left it open to choose how to approach the reply the committee decided to focus (i) on EN ISO 13688 as this document is an integral part of all PPE product standards for heat and flame protection and (ii) to not limit the application to only one or two categories of PPE (thus to include CAT III), which is why EN ISO 11612 rather than ISO 14116 was chosen.

1 Scope

This document applies to garments and assembly of garments providing protection against heat and flame, with integrated smart textiles and non-textile elements for enhanced health, safety and survival capabilities.

This document does not concern validating claims that the integrated smart textiles and non-textile elements substitute directly any protection provided by the garment from a heat and flame perspective.

The integrated smart textiles and non-textile elements could include not only the parts integrated into the protective garment but also connections to transmit the data generated or exchange data with external devices. It is not within the scope of this document to evaluate either the data storage or transmission (including connectivity) to the external devices, nor the external devices. This document evaluates only the smart textiles and non-textile elements integrated into the garment.

This document supplements the requirements of EN ISO 11612 and EN ISO 13688 and does not replace any of the requirements cited in those documents.

This document sets additional testing and performance requirements linked specifically to the garments and assembly of garments providing protection against heat and flame, with integrated smart textiles and non-textile elements for enhanced health, safety and survival capabilities. These additional requirements will depend on the functionality of the smart textiles or non-textile element and its needed efficacy during heat and flame hazards and risks from an electrical/electronic safety perspective in these situations.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 1149-5, *Protective clothing - Electrostatic properties - Part 5: Material performance and design requirements*

EN 55015, *Limits and methods of measurement of radio disturbance characteristics of electrical lighting and similar equipment*

EN 60068-2-6, *Environmental testing - Part 2-6: Tests - Test Fc: Vibration (sinusoidal)*

EN 60068-2-14, *Environmental testing - Part 2-14: Tests - Test N: Change of temperature*

EN 60529, *Degrees of protection provided by enclosures (IP code)*

EN 60598-2-4:2018, *Luminaires - Part 2-4: Particular requirements - Portable general purpose luminaires*

EN 61547, *Equipment for general lighting purposes - EMC immunity requirements*

EN 62133-2, *Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for portable sealed secondary cells, and for batteries made from them, for use in portable applications - Part 2: Lithium systems*

EN 62493, *Assessment of lighting equipment related to human exposure to electromagnetic fields*

EN 14360, *Protective clothing against rain - Test method for ready made garments - Impact from above with high energy droplets*

EN 50527-2-1:2016, *Procedure for the assessment of the exposure to electromagnetic fields of workers bearing active implantable medical devices - Part 2-1: Specific assessment for workers with cardiac pacemakers*

EN ISO 3376, *Leather - Physical and mechanical tests - Determination of tensile strength and percentage elongation (ISO 3376)*

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

EN ISO 4048, *Leather - Chemical tests - Determination of substances soluble in dichloromethane and content of free fatty acids (ISO 4048)*

EN ISO 5077, *Textiles - Determination of dimensional change in washing and drying (ISO 5077)*

EN ISO 11612:2015, *Protective clothing - Clothing to protect against heat and flame - Minimum performance requirements (ISO 11612:2015)*

EN ISO 13506-1, *Protective clothing against heat and flame - Part 1: Test method for complete garments - Measurement of transferred energy using an instrumented manikin (ISO 13506-1)*

EN ISO 13688:2013, *Protective clothing - General requirements (ISO 13688:2013)*

EN ISO 13934-1, *Textiles - Tensile properties of fabrics - Part 1: Determination of maximum force and elongation at maximum force using the strip method (ISO 13934-1)*

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 13937-2, *Textiles - Tear properties of fabrics - Part 2: Determination of tear force of trouser-shaped test specimens (Single tear method) (ISO 13937-2)*

EN ISO 13938-1, *Textiles - Bursting properties of fabrics - Part 1: Hydraulic method for determination of bursting strength and bursting distension (ISO 13938-1)*

EN ISO 13938-2, *Textiles - Bursting properties of fabrics - Part 2: Pneumatic method for determination of bursting strength and bursting distension (ISO 13938-2)*

EN ISO 15025:2016, *Protective clothing - Protection against heat and flame - Method of test for limited flame spread (ISO 15025:2016)*

EN ISO 30023, *Textiles - Qualification symbols for labelling workwear to be industrially laundered (ISO 30023)*

EN ISO/IEC 80079-34, *Explosive atmospheres - Part 34: Application of quality management systems for Ex Product manufacture (ISO/IEC 80079-34)*

CEN/TR 17512:2020, *Personal protective equipment - Smart garments - Terms and definitions*

CEN ISO/TR 11610, *Protective clothing - Vocabulary (ISO/TR 11610)*

CEN/CLC/TR 16832, *Selection, use, care and maintenance of personal protective equipment for preventing electrostatic risks in hazardous areas (explosion risks)*

EN IEC 60079 (all parts), *Explosive atmospheres*

ISO 7000, *Graphical symbols for use on equipment — Registered symbols*

ISO 13506-2, *Protective clothing against heat and flame — Part 2: Skin burn injury prediction — Calculation requirements and test cases*

ISO 17493, *Clothing and equipment for protection against heat — Test method for convective heat resistance using a hot air circulating oven*

IEC TR 62778, *Application of IEC 62471 for the assessment of blue light hazard to light sources and luminaires*