BS EN 17487:2024

BSI Standards Publication

Protective clothing — Garments with permethrin as-treated articles supporting the protection against tick bites

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The UK participation in its preparation was entrusted to Technical Committee PH/3/13.

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Published by BSI Standards Limited 2024

ISBN 978 0 539 02125 7

ICS 13.340.10; 61.020

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 December 2024.

Amendments/corrigenda issued since publication

Date	Text affected

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EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 17487

December 2024

ICS 13.340.10; 61.020

English Version

Protective clothing - Garments with permethrin as-treated articles supporting the protection against tick bites

Habillement de protection - Vêtements de protection traités à la perméthrine favorisant la protection contre les piqûres de tiques

Schutzkleidung - Mit Permethrin behandelte Schutzkleidungsstücke zum Schutz gegen Zeckenbisse

This European Standard was approved by CEN on 4 November 2024.

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Ref. No. EN 17487:2024 E

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Full document details: BS EN 17487:2024

Contents

Page

European foreword 5
Introduction 6
1 Scope 8
2 Normative references 8
3 Terms and definitions 9
4 Performance requirements 11
4.1 General 11
4.1.1 Introduction 11
4.1.2 Size designation and fit 11
4.2 Innocuousness 11
4.3 Design 11
4.3.1 General 11
4.3.2 Pockets and flap closures 12
4.3.3 Closures and seams 12
4.4 Requirements related to permethrin 12
4.4.1 Consideration on permethrin transition 12
4.4.2 General 13
4.4.3 Requirements on permethrin concentration 13
4.4.4 Requirements for biological activity (bio-activity) against ticks 13
4.5 Mechanical properties 14
5 Sampling and pre-treatment 14
5.1 General 14
5.2 Sampling for selecting a fabric specific method for determining permethrin concentration 14
5.3 Sampling for determining the specific mass of the fabric 14
5.4 Sampling for determining the homogeneity, the average and maximum permethrin concentration 14
5.5 Pre-treatment 14
5.5.1 General 14
5.5.2 Pre-treatment with one cleaning cycle 15
5.5.3 Ageing 15
6 Marking in garments 15
7 Information supplied by the manufacturer 16
Annex A (normative) Measuring permethrin concentration in fabric 18
A.1 General 18
A.2 Selecting a fabric specific method for determining permethrin concentration 18
A.2.1 Principle of test 18
A.2.2 Reagents 18
A.2.3 Required equipment 18

Documents
Document Sharing Hub
Full document details: BS EN 17487:2024

A.2.4 Sample preparation ... 18
A.2.5 Testing procedure ... 18
A.2.6 Calculation and expression of results ... 19
A.2.7 Reported values ... 19
A.3 Determining the specific mass ... 19
A.4 Determining the homogeneity, the average, and the maximum permethrin concentration ... 19
A.4.1 Principle of test ... 19
A.4.2 Reagents ... 19
A.4.3 Required equipment ... 19
A.4.4 Test specimen preparation ... 19
A.4.5 Testing procedure ... 19
A.4.6 Calculation and expression of results ... 19
A.4.7 Reported values ... 20
A.5 Test report ... 20
Annex B (normative) Bio-activity testing, activity of the permethrin in the fabric against ticks ... 21
Annex C (informative) Rationale ... 22
C.1 Why permethrin? ... 22
C.2 Why use body covering garments that are industrially treated with permethrin? ... 22
C.3 Why is standardization needed for body covering garments with permethrin? ... 23
C.4 What is known about the uptake of permethrin in the body and the effects of permethrin on human health? ... 23
C.4.1 General ... 23
C.4.2 How does the body absorb permethrin? ... 23
C.4.3 Is permethrin a CMR (carcinogenic, mutagenic or reprotoxic) substance? Is it, for example, carcinogenic? ... 24
C.4.4 Can allergic reactions occur? Are any allergic reactions known? ... 24
C.4.5 Can chemicals in the textile be hazardous to health? ... 24
C.4.6 Have the health of wearers of the garment and the possible long-term effects on their health been studied? ... 25
C.4.7 Are there any high-risk groups for permethrin? ... 25
C.5 Risks other than permethrin ... 26
C.6 How to achieve optimal protection? ... 26
C.7 Washing and drying conditions for users of the garments ... 26
C.8 Additional remarks on labelling ... 26
C.9 Justification of test choices ... 27
C.9.1 General ... 27

Documents
Document Sharing Hub

Full document details: BS EN 17487:2024

C.9.2 Tests on permethrin concentration ... 27
C.9.3 Tests on bio-activity against ticks ... 27
C.9.4 User safety ... 27
Annex D (informative) Evaluation of the transition of permethrin using a method based on friction on the fabric surface ... 28
D.1 General ... 28
D.2 Principle of test ... 28
D.3 Apparatus and materials ... 28
D.4 Auxiliary materials ... 28
D.5 Reagents ... 29
D.6 Sampling and preparation of test specimens ... 29
D.6.1 General ... 29
D.6.2 Dimensions of specimens and auxiliary materials ... 29
D.7 Preparation of the sweat solution ... 29
D.8 Impregnation of the abradant with sweat solution ... 30
D.9 Preparation of the abrasion machine ... 30
D.10 Sample preparation and analysis ... 30
D.10.1 Extraction of abradant ... 30
D.10.2 GC-MS Determination ... 30
D.11 Test report ... 32
Annex ZA (informative) Relationship between this European Standard and the essential requirements of Regulation (EU) 2016/425 aimed to be covered ... 33
Bibliography ... 35

Documents
Document Sharing Hub
Full document details: BS EN 17487:2024

European foreword

This document (EN 17487:2024) 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 2025, and conflicting national standards shall be withdrawn at the latest by June 2025.

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 addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

For the relationship with EU Legislation, see informative Annex ZA, which is an integral part of this document.

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.

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Full document details: BS EN 17487:2024

Introduction

By preventing tick bites, a range of tick-borne infectious diseases can be prevented. This document refers to protection against all biting stages of the tick *Ixodes ricinus*, hereafter named wood tick, the tick species with the largest occupational and public health relevance in Europe.

The most prevalent disease transmitted by the wood tick is Lyme borreliosis, but (until now incidentally) also other diseases like tick-borne encephalitis. Lyme borreliosis can affect the skin, nervous system, joints and heart. In some EU countries, Lyme borreliosis is regarded as an occupational disease. Employers are then obliged to make the best possible effort to prevent occupational diseases among employees. Employees are also obliged to reasonably abide by the measures offered.

The garments help protect people who can come into contact with ticks during their work. Wood ticks lay in ambush in the lower vegetation and cling on to passers-by with whom they come in to contact. They then crawl over skin or garment to find a site where they can consume a blood meal. The protective effect of the garment against tick bites is primarily determined by the extent to which the garment covers the skin, and this effect will increase as a larger part of the body is covered. It is important here that those body parts (legs, waist, torso and arms) are covered that have contact with vegetation in which ticks can be present (up to a height of 1,5 m). When wearing covering garments without permethrin, ticks are able to crawl over the fabric for minutes up to several hours and reach bare skin to bite. In addition to the protective effect of covering the body, the permethrin on or in the fabric offers extra protection. Ticks that come in contact with permethrin are immobilized, and as a result they are no longer able to reach bare skin and transfer pathogens through a bite. Protection against tick bites can be one of the functions of a garment. Examples of other functions can be maintaining body heat, preventing exposure to UV light, camouflage, preventing skin irritation or injury by plants or working conditions, or representation and recognizability.

The body covering garments can also help other target groups such as volunteers and recreationists (such as hunters) to offer protection against tick bites. However, the choice of using the garments is ideally based on a professional risk assessment which includes exposure to ticks, and factors such as age and pregnancy. Instructions for use and warnings for tick bite risks also apply to these users and it is important that these are provided to these groups by the manufacturers of these garments.

The body covering garment industrially treated with permethrin or made with fabrics based on yarn containing permethrin yarns, or other treated fabrics, can also help to protect against other arthropods that can transmit diseases, such as different tick and mosquito species [6]. However, this document only applies to the protection against bites by the wood tick, and specifically the most relevant developmental stage (nymphs). A detailed description of the requirements is given in Clause 4 of this document.

Garments can be treated with permethrin to prevent tick bites. In accordance with the Biocidal Products Regulation (EU) 528/2012, such garments can be regarded either as 'treated articles' (if protection against ticks is part of a set of functionalities such as protection against weather conditions, camouflage, company representation, protection against stinging plants, etc.) or as 'biocides' (if the primary function of the garment is protection against tick bites). This document is only focusing on garments to be considered as treated articles [3].

The release rate of permethrin from the garment should be as minimal as possible in order protect the environment and the human health, and is for example dependent on the way the permethrin has been fixated on- or inside the fabric. The World Health Organization (WHO) states limits to the daily uptake of permethrin by the human body. This document states requirements to ensure that these limits will not be exceeded by wearing the protective garments and to safeguard that the additional protective effect of the permethrin is maintained throughout the lifetime of the garment. Additional general information can be found in Annex C. The importance of the manufacturers cleaning instructions to prevent early deterioration of the effect of permethrin treatment is stressed throughout the document.

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National requirements can be in place in different countries for the maximum permethrin concentration in consumer products. Collection of relevant data can be helpful for a further assessment for conformity of garments based on this document to those national requirements.

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1 Scope

This document specifies requirements for garments that support the protection against tick bites. The document applies to body covering garments (at least covering the torso, arms and legs) where protection against tick bites, which is provided by garments as physical barriers, is reinforced by industrial treatment with the biocide permethrin of the fabrics, fibres or yarns prior to confection. The specified requirements focus on prevention of bites by the nymph stage of the tick *Ixodes ricinus*, which is the most relevant stage and species for public and occupational health in Europe.

This document specifies requirements and the tests for garments containing permethrin to provide sufficient assistance in protection against tick bites, and to be durable and safe for the user.

This document does not apply to garments which are re-treated with permethrin or other substances after they are put on the market.

NOTE Non-permethrin containing garments covering the torso, arms and legs and feet offer some protection against tick bites, but are insufficient under high exposure to ticks, which can crawl over the fabric to reach bare skin and bite. Garments that comply with this document and cover at least torso, arms and legs to counter ticks from crawling over the fabric to reach bare skin and bite thereby provide substantial protection.

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 ISO 139:2005,[1] *Textiles - Standard atmospheres for conditioning and testing*

EN ISO 13688:2013,[2] *Protective clothing — General requirements (ISO 13688:2013)*

EN ISO 13934-1:2013, *Textiles - Tensile properties of fabrics - Part 1: Determination of maximum force and elongation at maximum force using the strip method (ISO 13934-1:2013)*

EN ISO 13935-2:2014, *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 13935-2:2014)*

EN ISO 13937-2:2000, *Textiles - Tear properties of fabrics - Part 2: Determination of tear force of trouser-shaped test specimens (Single tear method) (ISO 13937-2:2000)*

EN ISO 13938-1:2019, *Textiles - Bursting properties of fabrics - Part 1: Hydraulic method for determination of bursting strength and bursting distension (ISO 13938-1:2019)*

EN ISO 13938-2:2019, *Textiles - Bursting properties of fabrics - Part 2: Pneumatic method for determination of bursting strength and bursting distension (ISO 13938-2:2019)*

ISO 3801:1977, *Textiles — Woven fabrics — Determination of mass per unit length and mass per unit area*

[1] Document impacted by A1:2011.

[2] Document impacted by A1:2021.

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Full document details: BS EN 17487:2024

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at https://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
accepted daily intake
ADI
maximal allowed daily body intake of a substance (100 %) before adverse health effects can be expected

Note 1 to entry: In this document, the substance is permethrin.

Note 2 to entry: Based on the definition of the World Health Organization (WHO).

3.2
permethrin bio-activity
degree to which permethrin in the test fabric affects the test animals that came into contact with the fabric in the test assay

Note 1 to entry: This value is determined by the degree to which the animal comes into contact with permethrin.

Note 2 to entry: Bio-activity is not by definition determined by the permethrin concentration in a fabric. It is determined by the availability of permethrin present at contact surfaces of the fabric.

3.3
biocidal product
— any substance or mixture which, in the form in which it is supplied to the user, consists of, contains or generates one or more active substances, with the purpose of destroying, deterring, rendering harmless, preventing the action of, or otherwise exerting a controlling effect on a harmful organism by any means other than mere physical or mechanical action

— any substance or mixture, generated from substances or mixtures which do not themselves fall under the first indent, to be used with the intention of destroying, deterring, rendering harmless, preventing the action of, or otherwise exerting a controlling effect on, any harmful organism by any means other than mere physical or mechanical action

Note 1 to entry: The garments considered in this document are treated articles. A treated article that has a primary biocidal function shall be considered a biocidal product. According to the definitions set by the EU, products treated with permethrin can be considered as biocidal products or treated articles. This consideration could differ per product and depends on the primary function of the product. If the product is primarily intended to control harmful organisms or to prevent harmful effects, then the product is considered a biocide. If the biocidal effect through treatment with permethrin is only an additional property to the basic function(s) of the product, such product / object can be regarded as treated article [2].

[SOURCE: 528/2012 EU regarding biocidal products regulation, 2018-06-15]

3.4
cytotoxicity
effect of one or more components in a substance on growth of living cells in a cell culture

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