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Varovalna obleka - Splošne zahteve

Protective clothing - General requirements

Schutzkleidung - Allgemeine Anforderungen

Vetements de protection - Exigences générales

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Protective clothing - General requirements

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Schutzkleidung - Allgemeine Anforderungen

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Foreword

This document (EN 340:2003) has been prepared by 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of an identical text or by endorsement, at the latest by June 2004, and conflicting national standards shall be withdrawn at the latest by June 2004.

This European Standard supersedes EN 340:1993.

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.

The CEN/TC 162 at its 19th meeting on 1998-09-24/25 in Haan, Germany, decided to revise the standard. The work was allocated to CEN/TC 162/WG 1.

The annexes A, B, C and D are informative, annex E is normative.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

This European Standard is a reference standard to be called up as appropriate by specific standards. This standard cannot be used alone but only in combination with another standard containing requirements for specific performance of a product in providing protection. If specific requirements are needed, they should be specified in the appropriate standard for those products.

The revision of the standard EN 340:1993 led to the following main changes in this new standard edition:

— Basic health and ergonomic requirements including test methods have been added (see clause 4). Most of the requirements will effect the suppliers of materials to garment manufacturers. Other requirements will be important for the garment manufacturers to comply with specific product standards.

— An industrial washing test procedure has been included in clause 5 because this kind of washing is frequently applied to many types of protective clothing.

— The size designation system in clause 6 has been improved to take account of the size requirements of EN 13402 series.

— A new annex C (informative) has been introduced as a guide to develop specifications for practical performance tests in product standards.

1 Scope

This European Standard specifies general performance requirements for ergonomics, innocuousness, size designation, ageing, compatibility and marking of protective clothing and the information to be supplied by the manufacturer with the protective clothing.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions 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 420, *General requirements for gloves*

EN 1413, *Textiles — Determination of pH of aqueous extract*

EN 1811, *Reference test method for release of nickel from products intended to come into direct and prolonged contact with the skin*

EN 13402-1, *Size designation of clothes — Part 1: Terms, definitions and body measurement procedure (ISO 3635:1981, modified)*

EN 13402-2, *Size designation of clothes - Part 2: Primary and secondary dimensions*

prEN 13402-3, *Size designation of clothes — Part 3: Measurements and intervals.*

prEN 14362-1, *Textiles — Methods for the detection and determination of certain aromatic amines derived from azo colorants — Part 1: Detection of the use of certain azo colorants accessible without extraction.*

EN 23758, *Textiles — Care labelling code using symbols (ISO 3758:1991)*

EN 25077, *Textiles; determination of dimensional change in washing and drying (ISO 5077:1984)*

EN ISO 3175-1, *Textiles - Dry-cleaning and finishing - Part 1: Method for assessing the cleanability of textiles and garments (ISO 3175-1:1998)*

EN ISO 3175-2, *Textiles — Dry-cleaning and finishing — Part 2: Procedures for tetrachloroethene (ISO 3175-2:1998)*

EN ISO 4045, *Leather - Determination of pH (ISO 4045:1977)*

EN ISO 6330, *Textiles — Domestic washing and drying procedures for textile testing (ISO 6330:2000)*

EN ISO 105, *Textiles — Test for colour fastness (all parts)*

ISO 7000, *Graphical symbols for use on equipment - Index and synopsis*

ISO 15797, *Textiles — Industrial washing and finishing procedures for testing of workwear*

3 Terms and definitions

For the purposes of this European Standard the following terms and definitions apply.

3.1
ageing
change of one or more initial properties of protective clothing materials during the passage of time

NOTE This statement only refers to laboratory values and does not give indications for the actual time of use.

3.2
hazard
situation which can be the cause of harm or damage to the health of the human body

NOTE There are different general types of hazards, e. g. mechanical hazards, chemical hazards, cold hazards, heat and/or fire hazards, biological agents hazards, radiation hazards.

Certain of these types of hazards can, according to circumstances, derive from more specific hazards. Thus, a heat hazard can derive from contact heat, radiant heat etc. for each of which there can be separate test methods.

Particular garments have been designed to give protection against the hazards encountered in specific types of work. Examples of such garments are aprons that provide protection against hand knives, trousers for use with chainsaws, clothing for protection against chemicals, high visibility clothing and motorcycle rider's protective clothing.

3.3
risk
combination of the frequency, or probability, of occurrence and the consequence of a specified hazardous event

NOTE The concept of risk always has two elements: the frequency or probability with which a hazardous event occurs and the consequences of the hazardous event [6].

3.4
performance level
number that designates a particular category or range of performance by which the results of testing can be graded

NOTE For further information see annex A.

3.5
protective clothing
clothing including protectors which cover or replace personal clothing, and which is designed to provide protection against one or more hazards

3.6
waist to waist over the shoulder length
maximum length measured from the plane of the waist over the shoulder to the plane of the waist

NOTE See also clause 6.

4 Basic health and ergonomic requirements

4.1 General

In the following paragraphs some basic health and ergonomic requirements are stated that are relevant for many types of protective clothing. For general ergonomic principles to be used in designing and specifying personal protective equipment see prEN 13921-1[2].

Protective clothing shall be designed and manufactured as follows.

4.2 Innocuousness

Protective clothing shall not adversely affect the health or hygiene of the user. Protective clothing shall be made of materials such as textiles, leather, rubbers, plastics that have been shown to be chemically suitable. The materials shall not in the foreseeable conditions of normal use release or degrade to release substances generally known to be toxic, carcinogenic, mutagenic, allergenic, toxic to reproduction or otherwise harmful. Information claiming that the product is innocuous shall be checked.

NOTE 1 - Information on the classification and identification of harmful substances can be found e.g. in [7, 8] of the Bibliography.

NOTE 2 - Guidance on how to consider acceptability of materials in protective clothing is given in informative annex B (flow chart).

NOTE 3 - Materials should be selected to minimise the environmental impact to the production and disposal of protective clothing.

NOTE 4 - The following list of documents is given for information and as examples of documents to be examined:

a) Information supplied by the manufacturer could include a declaration confirming that the product does not contain any substances at levels that are known or suspected to adversely effect user hygiene or health,

b) Materials specifications,

c) Safety data sheets relating to the materials,

d) Information relating to the suitability of the materials for use with food, in medical devices, or other relevant applications.

e) Information relating to toxicological, allergenic, carcinogenic, toxic to reproduction or mutagenic investigations on the materials,

f) Information relating to ecotoxicological and other environmental investigations on the materials,

The examination should determine whether the claim that the materials are suitable for use in the protective clothing or protective equipment is justified. Particular attention has to be paid to the presence of plasticisers, unreacted components, heavy metals, impurities and the chemical identity of pigments and dyes.

Materials of protective clothing shall comply with the following requirements:

a) The chromium VI content in leather clothing shall comply with the requirements of EN 420.

b) All metallic materials which could come into prolonged contact with the skin (e.g. studs, fittings) shall have an emission of nickel of less than 0,5 µg/cm² per week. The method of test shall be according to EN 1811.

c) The pH value for protective clothing material shall be greater than 3,5 and less than 9,5. The test method for leather shall be according to EN ISO 4045 and for other materials according to EN 1413.

d) The colour fastness to perspiration of protective clothing material to ensure user hygiene (e.g. no skin staining) shall be determined in accordance with EN ISO 105-A02 and shall be at least grade 4 of the Grey scale for the colour change of the specimen. The test shall be conducted in accordance with EN ISO 105-E04.

e) Azo colorants which release carcinogenic amines listed in prEN 14362-1 shall not be detectable by the method in that standard.

4.3 Design

4.3.1 The design of protective clothing should facilitate its correct positioning on the user and should ensure that it remains in place for the foreseeable period of use, taking into account ambient factors, together with the movements and postures that the wearer could adopt during the course of work or other activity. For this purpose, appropriate means, such as adequate adjustment systems or adequate size ranges should be provided so as to enable protective clothing to be adapted to the morphology of the user.

4.3.2 The design of protective clothing shall ensure that no parts of the body get uncovered by expected movements by the wearer (e.g. a jacket should not rise above the waist when the arms are raised) if this is defined in the specific standard. The specific standard for protective clothing shall contain test criteria (e.g. checking that the garment can be put on and taken off easily, that arm and knee and bending movements are possible, that unprotected body areas do not appear during movements, that there is an adequate overlap of jacket and trousers, and that the manufacturers information is adequate to explain the correct usage of the protective clothing (see annex C).

4.3.3 Where applicable, protective clothing design should take into account other items of protective clothing or equipment which must be worn to form an overall protective ensemble. The appropriate level of protection should be provided at interface areas between products of the same manufacturer such as in sleeve to glove, trouser to footwear, and hood and respirator combinations.

4.3.4 In each specific standard a minimum mechanical property to assess the strength of a garment shall be defined.

4.3.5 If required in the specific standard the mass shall be given for all sizes of the garment in the information supplied by the manufacturer or the marking. The mass shall be given for a garment at 20 °C, 65 % R.H. and in new condition; the mass tolerance or range shall be defined in the specific standard. The mass of one garment size shall be measured to check the mass indication in the information of the manufacturer or the marking.

NOTE 1 A lower mass will not always be beneficial.

NOTE 2 Protective clothing should be as light as possible taking into account comfort, water vapour resistance, design and protection level.

4.4 Comfort

4.4.1 Protective clothing should provide users with a level of comfort consistent with the level of protection against hazard which is provided, the ambient conditions, the level of the user's activity, and the anticipated duration of use of the protective clothing. Specific product standards shall contain requirements related to the comfort of particular types of protective clothing and methods for its assessment (e.g. assessment by manual inspection, visual inspection or wearer trial, see annex C). Protective clothing shall not

— have rough, sharp or hard surfaces that irritate or injure the user;

— be so tight that blood flow is restricted;

— be so loose and/or heavy so that it interferes with movements.

4.4.2 Where permissible, protective clothing shall be made of materials with low water vapour resistance and/or high air permeability and/or shall be sufficiently ventilated to minimise discomfort and thermal stress. In these cases test method(s) and requirement(s) for water vapour resistance of materials or clothing, air permeability of materials or ventilation of clothing shall be specified in the specific standard.

NOTE 1 An international test method is standardised in EN 31092 [1].

NOTE 2 For other purposes e.g. quality supervision a different reproducible method may be applied to test the water vapour permeability for use other than classification or testing to meet specified values as laid down in related standards.

NOTE 3 For further information see prEN 13921-4 [3].

4.4.3 Protective clothing that imposes significant ergonomic burdens such as heat stress, or is inherently uncomfortable because of the need to provide adequate protection, should be accompanied in the information supplied by the manufacturer by specific advice or warnings. Specific advice on the appropriate duration for continuous use of the clothing in the intended application(s) should be given.

5 Ageing

5.1 General

Ageing can be caused by a single factor or several factors (see 4.8 of prEN 13921-1:2003 [2]). This standard is only concerned with the detrimental effects of colour alteration, cleaning and dimensional change to the levels of performance and legibility of marking (see 5.2 to 5.4).

5.2 Colour fastness

If the specific standard contains requirements for colour fastness, protective clothing shall be tested in accordance with the relevant part of EN ISO 105 (for example EN ISO 105-B02, colour fastness to artificial light: Xenon arc fading lamp test).

5.3 Dimensional change due to cleaning

If the manufacturer's instructions indicate that garments can be washed or dry cleaned, the test procedure for dimensional change for washing of protective clothing material shall be carried out in accordance with EN 25077 and for dry cleaning in accordance with EN ISO 3175-1 .

Changes in dimension due to cleaning of material for protective clothing shall not exceed ± 3 % in either length or width, unless stated otherwise in a specific standard.

One sample shall be subjected to 5 washing cycles or dry cleaning cycles according to 5.4 if not otherwise specified. If both washing and dry cleaning are permitted, the sample shall only be washed. Each washing cycle consists of washing and drying.

5.4 Washing and dry cleaning methods

If the specific standard contains pre-treatment requirements for checking the detrimental effects of cleaning, the test procedure shall be as follows, unless stated otherwise in a specific standard.

If care labelling or manufacturer's information allows domestic washing or dry cleaning and/or finishing, then the protective clothing or material shall be washed in accordance with EN ISO 6330 or dry cleaned in accordance with EN ISO 3175 -2 and/or finally finished.

If industrial washing and/or finishing is allowed, then the protective clothing shall be washed in accordance with ISO 15797.

If washing is permitted as well as dry cleaning, then the sample shall only be washed.

If domestic and industrial washing is permitted, then industrial washing shall be carried out with the specified number of processes in accordance with ISO 15797.

6 Size designation

Protective clothing shall be marked with its size based on body dimensions measured in centimetres. Exceptions shall be specified in detail in the relevant product standards, e.g. Genital protectors for use in sports. Measurement procedures and the designation of dimensions shall correspond to EN 13402 (see also [4]) if not otherwise specified. The size designation of each garment shall comprise the control dimensions as given in Table 1.

Table 1 - Body dimensions for sizing protective clothing

No	Protective clothing	Control dimensions
1	jacket, coat, vest	chest or bust girth and height
2	trousers	waist girth and height
3	coverall	chest or bust girth and height
4	aprons	waist or chest or bust girth and height
5	protective equipment (e.g. knee pads, back protectors etc.)	chest or bust or waist girth or height or body weight or waist to waist over the shoulder length