



SLOVENSKI STANDARD
oSIST prEN 16448-1:2012

01-september-2012

Varovalna obleka - Neprebojno oblačilo - 1. del: Splošne zahteve

Protective Clothing - Body Armour - Part 1: General requirements

Schutzkleidung - Körperschutz - Teil 1: Allgemeine Anforderungen

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Ta slovenski standard je istoveten z: prEN 16448-1

[oSIST prEN 16448-1:2012](https://standards.iteh.ai/catalog/standards/sist/70621960-bcc3-4077-a065-054597964388/osist-pren-16448-1-2012)

<https://standards.iteh.ai/catalog/standards/sist/70621960-bcc3-4077-a065-054597964388/osist-pren-16448-1-2012>

ICS:

13.340.10 Varovalna obleka Protective clothing

oSIST prEN 16448-1:2012

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN 16448-1:2012](#)

<https://standards.iteh.ai/catalog/standards/sist/70621960-bcc3-4077-a065-054597964388/osist-pren-16448-1-2012>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 16448-1

June 2012

ICS 13.340.10

English Version

Protective Clothing - Body Armour - Part 1: General requirements

Schutzkleidung - Körperschutz - Teil 1: Allgemeine Anforderungen

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

If this draft becomes a European Standard, 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.

This draft European Standard was established by CEN 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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.

Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

Warning : This document is not a European Standard. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a European Standard.



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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

	Page
Foreword.....	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	6
3.1 General terms relating to body armour	6
3.2 Terms relating to specific injury and to associated protective mechanisms	7
3.3 Terms relating to constructions and components used in body armour	7
3.4 Terms relating to test specimens.....	8
4 Classification of body armour and performance levels.....	8
5 Requirements	9
5.1 General.....	9
5.2 Designation of body armour.....	9
5.2.1 Designation of style.....	9
5.2.2 Designation of the performance level	10
5.3 Minimum dimensions of zones of protection	10
5.4 Innocuousness.....	10
5.5 Size designation.....	10
5.6 Dimensional stability.....	10
5.7 Tear strength.....	10
5.8 Fitting.....	11
5.9 Ergonomic	11
5.9.1 Requirements	11
5.9.2 Principles.....	11
5.9.3 Evaluation of the ergonomic score.....	11
6 Test methods and procedures	11
6.1 Body armour for general examination and ergonomic testing.....	11
6.2 Pre-conditioning of body armour.....	11
6.3 Test team for ergonomic assessment and size verification	12
6.4 Preparations for ergonomic assessment and fitting verification	13
6.5 Procedure for fitting verification	13
6.6 Procedure for ergonomic evaluation.....	13
6.7 Examination of the construction and workmanship of body armour	14
6.8 Examination of labels and information supplied by the manufacturer.....	14
6.9 Test report	14
7 Marking	14
8 Information supplied by the manufacturer	15
9 Graphical symbols (pictograms).....	17
Annex A (normative) Ergonomic assessment by wearer trial.....	19
Annex B (informative) Example of scorecard for ergonomic assessment by wearer trail.....	24
Annex C (informative) Examples of product labels	28
Annex D (informative) Examination of the construction and workmanship of body armour.....	30
Annex ZA (informative) Relationship between this European Standard and the Essential Requirements of EU Directive 89/686/EEC.....	31
Bibliography	33

Figures

Figure 1 — Graphical symbols - ISO 7000.....	15
Figure 2 — Graphical symbols for sizing.....	17
Figure 3 — Graphical symbols showing protection classes.....	17
Figure C.1 — Example of Carrier Label Example of Carrier Label.....	28
Figure C.2 — Example of FRONT armour panel label.....	29

Tables

Table 1 — Class Definitions for Ballistic protection.....	8
Table 2 — Class Definitions for knife and spike protection.....	9
Table 3 — Variance of sizes within the test panel.....	13
Table B.1 — Guidance for picking scores.....	26
Table ZA — Correspondence between this European Standard and Directive (Add the reference and title of the Directive).....	31

(standards.iteh.ai)

<https://standards.iteh.ai/catalog/standards/sist/70621960-bcc3-4077-a065-054597964388/osist-pren-16448-1-2012>

Foreword

This document (prEN 16448-1:2012) has been prepared by Technical Committee CEN/TC TC “Protective clothing including hand and arm protection and lifejackets”, the secretariat of which is held by DIN.

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

This document is currently submitted to the CEN Enquiry.

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.

This European Standard consists of the following Parts:

- EN 16448-1 Protective clothing — Body armour — Part 1: General requirements
- EN 16448-2 Protective clothing — Body armour — Part 2: Bullet resistance — Requirements and test methods
- EN 16448-3 Protective clothing — Body armour — Part 3: Knife stab resistance — Requirements and test methods

iTeh STANDARD PREVIEW
(standards.iteh.ai)
[oSIST prEN 16448-1:2012](https://standards.iteh.ai/catalog/standards/sist/70621960-bcc3-4077-a065-054597964388/osist-pren-16448-1-2012)
<https://standards.iteh.ai/catalog/standards/sist/70621960-bcc3-4077-a065-054597964388/osist-pren-16448-1-2012>

Introduction

Body armour is worn by individuals and by groups of employees who are at risk of assault. Body armour is generally designed to prevent serious and fatal injuries to the torso from the anticipated threats. Body armour can be designed to provide bullet resistance or stab resistance, or a combination of both. The wide range of threats in different operational situations, the variable risk of assault, and the ergonomic requirements of wearers, influence the specifications of body armour. In recognition of these threats, this standard is divided into separate parts for Part 1: General requirements, Part 2: Bullet resistance and Part 3: Knife stab resistance.

It should be recognised that no body armour can provide complete protection from injury in all situations. However it has been found that the incidence and severity of injuries is reduced by appropriate body armour.

Personal protective equipment produced exclusively for use in National armed forces and in police forces engaged in the maintenance of law and order is excluded from the requirements of Directive 89/686, but may never-the-less, be assessed in part according to this European Standard, providing additional necessary requirements relating to specific operational needs are identified.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 16448-1:2012](https://standards.iteh.ai/catalog/standards/sist/70621960-bcc3-4077-a065-054597964388/osist-pren-16448-1-2012)

<https://standards.iteh.ai/catalog/standards/sist/70621960-bcc3-4077-a065-054597964388/osist-pren-16448-1-2012>

1 Scope

This European Standard specifies the minimum general requirements for body armour intended to provide basic torso protection and high protection to some vital organs against assaults by firearms and / or edged and pointed weapons including sizing, coverage, ergonomic and innocuousness requirements, and requirements for labelling and the provision of information.

The standard targets products aimed for the civilian market, for example for different types of guards.

Smaller components such as collars, shoulders & groin protectors (if included) fall outside the scope of this standard.

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 340:2003, *Protective clothing — General requirements*

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)*

prEN 16448-2, *Protective clothing — Body armour — Part 2: Bullet resistance — Requirements and test methods (ISO/FDIS 14876-2:2001)*

prEN ISO 16448-3, *Protective clothing — Body armour — Part 3: Knife and spike resistance — Requirements and test methods (ISO/FDIS 14876-3:2001)*

3 Terms and definitions

<https://standards.iteh.ai/catalog/standards/sist/70621960-bcc3-4077-a065-054597964388/osist-pr-en-16448-1-2012>

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

3.1 General terms relating to body armour

3.1.1

body armour

general name for a garment designed to provide protection against one or more threats by firearms and/or edged and pointed weapons over the whole or the part of the torso

Note 1 to entry: Normally a body armour consists of a carrier containing one or more armour panels that are designed to provide protection against one or more threats over the whole or the majority of the torso. The carrier may also contain modular inserts such as armour plates, and/or a trauma pack.

3.1.2

coverage

area of the body which is covered by the body armour

3.1.3

covert body armour

body armour designed to be worn close to the body under a shirt, blouse or jersey. It is intended to be inconspicuous

3.1.4

model name

model number

manufacturer's unique code or name that identifies a product having a particular construction common to all examples of the model, a specified performance level, a specified zone of protection. A model may be

available in a range of sizes and styles

3.1.5

overt body armour

body armour designed to be worn on top of other clothing and often to be the outer-most layer of clothing

3.1.6

performance class code

code which designates the category of the protection that it is intended the armour should provide. This code is used in designating the test severity to which the armour is to be subjected

3.1.7

style

manufacturer's designation that identifies a particular combination of features or versions of a model that define its appearance, but do not alter the model and thus its performance level

3.1.8

torso

upper part of body, both front and back, including abdomen and chest, but excluding arms, neck and head

3.2 Terms relating to specific injury and to associated protective mechanisms

3.2.1

bullet resistance

property of a material or combination of materials, reflecting their ability to defeat perforation by a bullet or similar projectile

3.2.2

knife stab resistance

property of a material or combination of materials reflecting their ability to defeat perforation by a knife or similar edged weapon

3.2.3

spike stab resistance

property of a material or combination of materials reflecting their ability to defeat perforation by a spike or similar pointed weapon

3.3 Terms relating to constructions and components used in body armour

3.3.1

armour panel

specific construction of layers of materials designed to provide protection against ballistic and / or knife / spike threats

3.3.2

carrier

enclosing fabric garment into which the armour panels are inserted to complete the assembly of a particular body armour. The carrier normally performs ergonomic, informative, hygienic and cosmetic functions

3.3.3

cover

enclosing fabric garment that seals and encloses **the armour panels**. The cover normally protects the armour panels from water or dirt

3.3.4

armour plate

additional item that can be added to a bullet, knife, or spike resistant body armour to enhance the level of protection or the number of threats against which it provides protection in specific areas

prEN 16448-1:2012 (E)

3.4 Terms relating to test specimens

3.4.1

body side

inner surface of a sample of body armour that is against the body, and the face of a test specimen placed against the supporting backing material

3.4.2

strike face

outer face of body armour and the face of a test specimen to be struck by a projectile, test blade or test spike

3.4.3

sample

complete item of body armour as it is supplied to be worn, or a number of units of the same model that together will provide sufficient test specimens for the testing to be done

3.4.4

test specimen

object that have been prepared and conditioned according to this standard for a specific test procedure. A single test specimen may be a whole sample, or a combination of more than one sample such as an armour plate and an appropriate ballistic vest, or part of a sample such as the complete front or back of an armour, a protective element manufactured to the correct size for ballistic test or an area of an armour cut away from the rest of the sample for a particular test

4 Classification of body armour and performance levels

The performance class code is a unique coding system that shall denote the performance level of the body armour determined by testing against the particular threats defined in Parts 2 and 3 of this Standard.

The performance class code corresponding to the protection class of the garment is stated together with the applicable pictogram, showing bullet, knife or spike protection. See examples in Annex C.

A Body Armour protecting against ballistics shall be placed by the manufacturer in one of the performance classes below.

Table 1 — Class Definitions for Ballistic protection

Class Code	Class Name	Class Description
G1	Gun protection class 1	Soft armour protecting against bullets in class G1 in Table 1 in part 2 of this standard.
G2	Gun protection class 2	Soft armour with rigid armour plates protecting against bullets in class G2 in Table 1 in part 2 of this standard.
G3	Gun protection class 3	Soft armour with rigid armour plates protection against bullets in class G3 in Table 1 in part 2 of this standard.

A Body Armour in performance class G2 and G3 shall be tested and approved also for classes with lower class number. This means that for example a Body Armour in class G3 shall be tested and approved also for class G1 and G2.

A Body Armour protecting against knives shall be placed by the manufacturer in one of the performance classes below.

Table 2 — Class Definitions for knife and spike protection

Class Code	Class Name	Class Description
K1	Knife protection class 1.n	Body armour protecting against knife stabs with stab force according to class K1 in Table 1 in part 3 of this standard.. General Duty soft armour for low risk situations. May be overt or covert;
K2	Knife protection class 2.n	Body armour protecting against knife stabs with stab force according to class K2 in Table 1 in part 3 of this standard. Soft armour for medium risk situations. May be overt or covert;
K1+S1	Knife protection class 1 and spike protection class 1	Body armour protecting against knife stabs with stab force according to class K1 in Table 1 in part 3 of this standard and spike stabs with stab force according to class S1 in Table 1 in part 3 of this standard. General Duty soft armour for low risk situations. May be overt or covert;
K2+S2	Knife protection class 2 and spike protection class 2.	Body armour protecting against knife stabs with stab force according to class K2 in Table 1 in part 3 of this standard and spike stabs with stab force according to class S2 in Table 1 in part 3 of this standard. Soft armour for medium risk situations. May be overt or covert;

A body armour can provide bullet protection, stab protection or both. In case the body armour is protecting solely against bullets it is only marked with a bullet protection class. In case the body armour is protecting solely against stabbing it is only marked with a stab protection class. In case it is providing both kinds of protections it is marked with both protection classes.

This standard does not allow for only spike stab protection without comparable knife stab protection.

5 Requirements

5.1 General

All body armour shall meet the requirements in clauses, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7 and 5.8 and shall in addition meet at least one minimum performance classes given in Table 1 or Table 2 when tested in accordance with parts 2 or 3 of this standard respectively.

All body armour shall be marked according to clause 7.

All body armour shall be delivered together with the information from the manufacturer according to clause 8.

5.2 Designation of body armour

5.2.1 Designation of style

In the Information supplied by the Manufacturer, the intended use and the specific features of the body armour shall be mentioned, e.g. overt or covert body armour, zones of protection in relation to the performance level, etc. as stated in section 8.

prEN 16448-1:2012 (E)**5.2.2 Designation of the performance level**

Body armour shall be designated as providing a particular level of protection. The test conditions corresponding to the levels are given in parts 2 and 3 of this standard. The performance class coding system to be used is given in 4.

Body armour shall be marked with its performance class code. (See also clauses 7 and 8.)

5.3 Minimum dimensions of zones of protection

Depending on the balance between risk and ergonomics, the zone of protection might vary.

The zone of protection shall be stated by the manufacturer in the information from the manufacturer, as required in section 8.

The zone of protection shall not be smaller than stated in the information from the manufacturer.

5.4 Innocuousness

Construction materials and incorporated substances, shall meet the innocuousness requirements in EN 340:2003.

5.5 Size designation

Body armour sizes shall be designated according to EN 340. Body armour dimensions and sizes shall be based on at least three control body dimensions for male users and four control dimensions for female users. These dimensions shall be:

- (standards.iteh.ai)
- oSIST prEN 16448-1:2012
<https://standards.iteh.ai/catalog/standards/sist/70621960-bcc3-4077-a065-054597964388/osist-pren-16448-1-2012>
- a) Chest girth (male);
 - b) or Bust girth (female);
 - c) Under-bust girth (female);
 - d) Waist girth;
 - e) Waist to waist over the shoulder length.

Products to fit males should be specified on at least **a**, **d** and **e**, and for females on at least **b**, **c**, **d** and **e**. The dimensions used shall be shown in a sizing pictogram, (Figure 2) on a label or in the Information Supplied by the Manufacturer. (See also Clauses 7 and 8).

Sizing shall be verified according to 6.1 and 6.5 and Annex A.

5.6 Dimensional stability

Changes in dimension of the body armour carrier due to cleaning shall not exceed 3 % in either length or width for woven material and not exceed 5 % in either length or width or knitted materials.

Before the inspection for dimensional changes, the carrier shall be pre-conditioned according to 6.2.

5.7 Tear strength

The cover shall have a minimum tear strength of 15 N.

The tear strength of the cover shall be determined in accordance with EN ISO 13937-2:2000 in both the machine and cross directions.