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Protective clothing — Body armour —

Part 1: General requirements

Vêtements de protection — Protection corporelle —

Partie 1: Exigences générales

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ISO/FDIS 14876-1

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Please see the administrative notes on page iii

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This final draft International Standard is a draft European Standard developed within the European Committee for Standardization (CEN) in accordance with subclause 5.2 of the Vienna Agreement. Following parallel ISO member body voting and CEN enquiry on the DIS, this final draft, established on the basis of comments received, has been transmitted by CEN to ISO for circulation for a parallel two-month FDIS vote in ISO and formal vote in CEN.

Positive votes shall not be accompanied by comments.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this part of ISO 14876 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 14876-1 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 94, *Personal safety — Protective clothing and equipment*, Subcommittee SC 13, *Protective clothing*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

Throughout the text of this document, read "...this European Standard..." to mean "...this International Standard...".

ISO 14876 consists of the following parts, under the general title *Protective clothing — Body armour*:

- *Part 1: General requirements* [ISO/FDIS 14876-1](https://standards.iteh.ai/catalog/standards/sist/303765be-2d68-4d36-a1bf-0a5249f8ffab/iso-14876-1)
- *Part 2: Bullet resistance — Requirements and test methods* <https://standards.iteh.ai/catalog/standards/sist/303765be-2d68-4d36-a1bf-0a5249f8ffab/iso-14876-2>
- *Part 3: Knife stab resistance — Requirements and test methods*
- *Part 4: Needle and spike stab resistance — Requirements and test methods*

Annex ZZ forms a normative part of this part of ISO 14876. Annex ZA is for information only.

Annex ZZ provides a list of corresponding International and European Standards for which equivalents are not given in the text.

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Foreword

This document (prEN ISO 14876-1:2002) 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, in collaboration with Technical Committee ISO/TC 94 "Personal safety - Protective clothing and equipment".

This document is currently submitted to the parallel Formal Vote.

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 standard consists of the following parts:

- | | |
|------------------|--|
| prEN ISO 14876-1 | <i>Protective clothing — Body armour — Part 1: General requirements (ISO/FDIS 14876-1:2001).</i> |
| prEN ISO 14876-2 | <i>Protective clothing — Body armour — Part 2: Bullet resistance — Requirements and test methods (ISO/FDIS 14876-2:2001).</i> |
| prEN ISO 14876-3 | <i>Protective clothing — Body armour — Part 3: Knife stab resistance — Requirements and test methods (ISO/FDIS 14876-3:2001).</i> |
| prEN ISO 14876-4 | <i>Protective clothing — Body armour — Part 4: Needle and spike stab resistance — Requirements and test methods (ISO/DIS 14876-4:2001)</i> |

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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. This series of European Standards recognises the potentially rapidly changing needs of users and manufacturers, by being divided into separate parts for Part 1: General requirements, Part 2: Bullet resistance, Part 3: Knife stab resistance and Part 4: Needle and spike stab resistance. The specific ballistic threat-related test parameters are placed in a normative annex to Part 2 to facilitate the making of rapid amendments when for example new threats arise, or specified test cartridges become unavailable.

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.

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1 Scope

This European Standard specifies the general requirements for body armour including the designations of types of body armour, the sizing, coverage, ergonomic and innocuousness requirements, and requirements for labelling and the provision of information. Test methods are included where appropriate. The body armour covered by this Standard is intended to provide torso protection to users exposed to assaults by firearms and/or edged or pointed weapons.

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 340, *Protective clothing — General requirements*.

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

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

prEN ISO 14876-4, *Protective clothing — Body armour — Part 4: Needle and spike stab resistance — Requirements and test methods (ISO/DIS 14876-4:2001)*.

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

ISO/IEC Guide 37, *Instructions for use of products of consumer interest*.

3 Terms and definitions

For the purposes of this European Standard, the following definitions apply.

3.1

general terms relating to body armour

3.1.1

bullet (or knife or spike) resistant vest

general name for a sleeveless garment covering part or all of the torso and part of the abdomen. Normally a vest consists of a cover or carrier containing one or more packs that are designed to provide protection against one or more threats over the whole or the majority of the torso. The cover may also contain modular inserts such as armour plates, and/or a trauma pack. See also 3.1.12

3.1.2

coverage

area of the body which is covered by the zone of protection of the protective equipment

3.1.3

covert body armour

body armour designed to be worn close to the body under a shirt, blouse or jersey. It is normally intended that it should be inconspicuous and close fitting

3.1.4

model name or 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 minimum zone of protection and thus an anticipated body coverage, and is of a particular type. 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

NOTE The dimensions of overt body armour to fit an individual are greater than those of covert body armour, but the size designation is the same for the same size of user.

3.1.6

performance level

number which designates the category of the protection that it is intended the product should provide. This number is used in designating the test severity to which the product is to be subjected. See clause 4

3.1.7

performance level code

coding system that denotes the performance level of the body armour determined by testing against the particular threats defined in Parts 2, 3 and 4 of this standard, and is used in labelling. See clauses 4, 7 and 9

3.1.8

protective equipment - body armour

clothing and specific devices that are worn on the body or are carried, that are intended to reduce the severity of injuries from assaults or accidental impacts by projectiles, knives, needles or spikes

3.1.9

size of a model

manufacturer's designation of the product indicating the dimensions and gender of the users the item should fit, see 3.6, 5.4 and 5.5

3.1.10

style of a model

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

3.1.11

type of body armour

designation of a body armour having a particular size and location of its zone(s) of protection. The types include both complete body armours and additional components which are only used in conjunction with complete body armour. Additional components include armour plates which raise the performance level within particular areas in the zone of protection of the whole body armour, or pelvic protectors which increase the overall area of the zone of protection. See the classification of types in clause 4

3.1.12

vest

sleeveless garment worn on the torso

NOTE This term is loosely used to refer to body armour worn on the torso with additional descriptors; for example "Bullet proof vest", "Ballistic vest", or "Stab vest". These combinations may be ambiguous or not strictly true, and the forms in 3.1.1 should be used.

3.1.13

zone of protection

area of protective equipment that is intended to provide protection, and is subject to specific testing

NOTE The dimensions of the zones of protection are scaled in proportion to the sizes of the intended users. The minimum dimensions of the zones of protection will normally be marked on test specimens in the test procedures.

3.2 terms relating to specific injury and to associated protective mechanisms

NOTE The following definitions are used in this Standard, and it is recommended that the words are used in the same sense in Information Supplied by the Manufacturer and in advertising.

3.2.1 blunt trauma

injuries resulting from energy transfer in impacts to the body that do not cause breakage of the skin

NOTE The injury may be caused by a direct blow with a bar or baseball bat, or it is claimed by transferred energy from body armour that has defeated perforation by a bullet or a knife. The injuries constituting blunt trauma vary from slight bruising through temporary incapacity to major internal organ damage and death. The term "behind body armour ballistic trauma" is sometimes used. It is not accepted by all forensic experts that significant blunt trauma injuries occur in ballistic impacts at level 3 and below. No correlation is accepted between Plastilina deformation in ballistic or stab testing and blunt trauma.

3.2.2 bullet resistance

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

3.2.3 bullet resistant

description of a material or product showing bullet resistance

3.2.4 knife stab resistance

property of a material or combination of materials reflecting their ability to defeat perforation by a knife or similar weapon with at least one sharpened edge

3.2.5 knife stab resistant

description of a material or product showing knife stab resistance

3.2.6 <https://standards.iteh.ai/catalog/standards/sist/303765be-2d68-4d36-a1bf-0a5249f8ffab/iso-fdis-14876-1> penetrating ballistic trauma

injuries resulting from the passage of a bullet or similar projectile through the skin. The injuries vary from slight to massive and fatal

3.2.7 penetrating stab trauma

injuries resulting from the perforation of the skin by a knife, a spike or a similar weapon. The injuries vary from slight to massive and fatal

3.2.8 spike or needle stab resistance

property of a material or combination of materials reflecting their ability to defeat perforation by a sharp spike, narrow chisel, or a needle

3.2.9 spike or needle stab resistant

description of a material or product showing spike or needle stab resistance

3.3 terms relating to constructions and components used in body armour

NOTE The following definitions are used in this standard, and it is recommended that the words are used in the same sense in Information Supplied by the Manufacturer and in advertising.

3.3.1 bullet, knife, or needle and spike, resistant pack

specific construction of layers of materials designed to be worn in a specific cover and to provide a specified protection against one or more threats

3.3.2

cover or carrier

enclosing fabric garment into which the specific protective packs are inserted to complete the assembly of a particular specified resistant vest. The cover normally performs ergonomic, informative, hygienic and cosmetic functions

3.3.3

hard unit

any rigid or semi-rigid component such as a metal or ceramic plate, tile, ring, disc, or wire that is intended to resist ballistic and/or stabbing threats by virtue of its hardness and other physical characteristics

3.3.4

interstice

space or opening between two or more elements of a structure. In knife and spike resistant materials the spaces may be between hard units or through holes in hard units

3.3.5

modular insert

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

3.3.5.1

armour plate

material or combination of materials in a rigid structure intended to defeat particularly high energy, high velocity or armour piercing bullets and projectiles

NOTE The materials are often formed into regular shaped plates that can be placed in pockets of the cover of a bullet resistant vest which contains a bullet resistant pack.

3.3.5.2

trauma pack

specific construction of materials designed to be worn as part of a system with other components such as a cover and a bullet resistant pack

NOTE Trauma packs are intended to reduce blunt trauma as indicated by a reduction in the indentation depth in ballistic testing. However it is not proven that they are effective (see 3.2.1 Blunt Trauma).

3.4

terms relating to test specimens

following terms are used in this standard and are recommended for use in communications, between manufacturers, test houses and others

3.4.1

back face

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

development test pack (Also may be known as shoot packs and stab packs)

specially constructed panel of material replicating that in specific body armour used solely in quality assurance and developmental work

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

NOTE Modular inserts (3.3.5) on their own may constitute a sample but they cannot constitute a test specimen for performance testing.

3.4.4 strike face

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

3.4.5 test specimen

materials that have been prepared and conditioned according to this standard for a specific test procedure. A single specimen can 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, or an area of an armour cut away from the rest of the sample for a particular test.

3.5 terms relating to test procedures

following terms are used in this standard and are recommended for use in communications, between manufacturers, test houses and others

3.5.1 angle of impact

angle between the line of flight of the bullet, knife or spike and a line normal (perpendicular) to the plane tangential to the strike face of the test specimen at the point of impact

3.5.2 backing material

defined material that is placed behind a test specimen during projectile, test blade, needle and test spike impact testing

3.5.3 blade or spike velocity

velocity of the tip of the blade or spike measured at the specified distance above the strike face of the test specimen

3.5.4 bullet velocity

velocity of the bullet measured at the specified distance from the strike face of the test specimen

3.5.5 edge separation distance

distance between a point of impact (3.5.10.5) and the nearest line marking the edge of the zone of protection

3.5.6 hit separation distance

distance between the points of impacts (3.5.10.5) on the same test specimen

3.5.7 indentation depth

maximum depth of the indentation made in the backing material in an impact test. The depth is measured relative to the original front surface of the backing material as indicated by the level of surrounding undisturbed material

3.5.8 penetration

passage of an object into or through a layer or material

NOTE This is deemed to have occurred during performance testing if any of the following events have occurred at the back face of a test specimen:

- Either a) a bullet or any fragment of it has passed completely through the back face;
- Or b) any rigid part of the test specimen whether a whole hard unit or part of one, made of metal, ceramic, composite or other material has passed completely through the back face;
- Or c) more than 1 mm of a test blade, needle or spike tip has projected through the back face. Either maintained protrusion of the tip, or a 1 mm signature in the backing material indicate this did occur.