

SLOVENSKI STANDARD
oSIST prEN 14404-4:2019
01-maj-2019

**Osebna varovalna oprema - Ščitniki za kolena za delo v klečečem položaju - 4. del:
Zahteve za kombinacijo interoperabilnih kolenskih podlog in oblačil (tip 2)**

Personal protective equipment - Knee protectors for work in the kneeling position – Part
4: Requirements for the combination of interoperable knee pads and garments (type 2)

Persönliche Schutzausrüstung - Knieschutz für Arbeiten in kniender Haltung - Teil 4:
Anforderungen für die Kombination von interoperablen Kniepolstern und Bekleidung (Typ
2)

Équipements de protection individuelle - Protection des genoux pour le travail à genoux -
Partie 4 : Exigences relatives à la combinaison de genouillères interoperables et de
vêtements (type 2)

Ta slovenski standard je istoveten z: prEN 14404-4

ICS:

13.340.50 Varovanje nog in stopal Leg and foot protection

oSIST prEN 14404-4:2019

en,fr,de

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN 14404-4:2019](https://standards.iteh.ai/catalog/standards/sist/fae4bad6-0331-4002-adff-8c0303668fb4/osist-pren-14404-4-2019)

<https://standards.iteh.ai/catalog/standards/sist/fae4bad6-0331-4002-adff-8c0303668fb4/osist-pren-14404-4-2019>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 14404-4

March 2019

ICS 13.340.50

Will supersede EN 14404:2004+A1:2010

English Version

**Personal protective equipment - Knee protectors for work
in the kneeling position - Part 4: Requirements for the
combination of interoperable knee pads and garments
(type 2)**

Persönliche Schutzausrüstung - Knieschutz für
Arbeiten in kniender Haltung - Teil 4: Anforderungen
für die Kombination von interoperablen Kniepolstern
und Bekleidung (Typ 2)

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

iTeh STANDARD PREVIEW

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, 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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword.....	3
Introduction	4
1 Scope	5
2 Normative references	5
3 Terms and definitions	5
4 Performance levels.....	6
5 Requirements	6
5.1 Interoperable padding	6
5.2 General	6
5.2.1 Summary	6
5.2.2 General requirements for knee protectors	7
5.2.3 Products for testing	7
5.2.4 Orientation of the interoperable padding.....	8
5.2.5 Specific requirements for the interoperable padding.....	8
5.2.6 Ergonomic requirements	10
5.3 Garments.....	10
5.3.1 General.....	10
5.3.2 General requirements for garment to use with interoperable knee pads	11
5.3.3 Products for testing.....	11
5.3.4 Specific requirements for the garments to use with interoperable knee pads	11
5.3.5 Ergonomic requirements	12
6 Marking.....	12
6.1 General.....	12
6.2 Specific	12
6.2.1 Interoperable knee pad	12
6.2.2 Garment.....	13
7 Information to be supplied by the manufacturer.....	14
7.1 Interoperable knee pad	14
7.2 Garment.....	15
Annex A (informative) Information on the problems of using knee protectors for work in the kneeling position	17
Annex B (informative) Information for Type 2 knee protector for arrangement of the knee protection pocket.....	18
Annex C (informative) Assessment of the combination of interoperable protectors and garment with interoperable pockets	19
Annex ZA (informative) Relationship between this European Standard and the essential requirements of Regulation (EU) 2016/425 of the European Parliament and of the Council of 9 March 2016 on personal protective equipment aimed to be covered.....	21
Bibliography.....	22

European foreword

This document (prEN 14404-4:2019) has been prepared by Technical Committee CEN/TC 162 “Protective clothing including hand and arm protection and life jackets”, the secretariat of which is held by DIN.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 14404:2004+A1:2010.

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 “Personal protective equipment - Knee protectors for work in the kneeling position” is split into 6 parts:

- Part 1: Test methods
- Part 2: Requirements for wearable knee protectors (type 1)
- Part 3: Requirements for the combination of knee pads and garments (type 2)
- Part 4: Requirements for the combination of interoperable knee pads and garments (type 2)
- Part 5: Requirements for knee mats (type 3)
- Part 6: Requirements for kneeling systems (type 4)

Introduction

Kneeling is a frequently occurring working position, but one which is problematic from an occupational health viewpoint. Without knee protectors, workers may suffer immediate injuries from hard surfaces and small stones and similar objects lying on the surfaces. However, no knee protector can ensure that workers will not suffer medical complications if they are required to kneel for long periods.

It is important that knee protectors do not compromise venous drainage in the leg while kneeling or standing up. Therefore, it is important that it is easy for workers to change position and to stand up to re-establish a normal blood circulation at frequent intervals while wearing knee protectors.

Work in a kneeling position involves the risk of chronic diseases such as prepatellar bursitis and cartilage injuries caused by continuous pressure on the knees. Knee protection is therefore recommended for all work in the kneeling position. The protection should distribute forces evenly and prevent small hard objects on the ground causing injuries. Many workers have pre-existing damage to their knees, particularly to their cartilages from sports injuries and from previous work. These injuries will be made worse by further kneeling. Wearing knee protectors cannot correct existing damage, but should slow down further damaging effects.

Work in a kneeling position may expose the skin of the shins, knees and thighs to toxic and corrosive materials normally kept off the body while walking and standing by waterproof or water-resistant footwear. Knee protectors and trousers for use with such wet materials and particularly wet cement, should take this into account and provide adequate protection, as should footwear.

For working in kneeling position exist 4 types of knee protectors:

- wearable knee protectors (type 1),
- knee pads in combination with garments (type 2),
- knee mats (type 3) and
- kneeling systems (type 4)

This document describes test methods, specifies requirements for knee protectors and defines performance levels. Requirements for the marking of knee protectors and the information to be supplied by the manufacturer are given. Where protection against additional hazards is claimed, performance requirements from other applicable standards may also be applied.

This document does not apply to knee protectors that are medical devices or are intended for sports and motorcycles.

1 Scope

This document specifies the requirements for interoperable knee pads to use in garments (type 2) and for garments to use with interoperable knee pads for use by work in kneeling position.

In addition to the combination test according to part 3 of this series, for which the garments and the associated padding are to be provided for testing, it is generally possible to combine padding standardized in its size with garments made to this size.

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.

prEN 14404-1:2019, *Knee protectors for work in the kneeling position – Test methods*

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

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

3 Terms and definitions

For the purpose 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 <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

knee protector, interoperable padding to use in garments (type 2)

combination of garments and padding forming the knee protection

Note 1 to entry: The pads consist of foam plastic or other materials that are positioned in knee pockets of the garments or permanently fastened in or on the garments

3.2

interoperable padding

piece of foam plastic or other materials able to be exchanged with another piece of the same dimensions when positioned in the same interoperable (knee) pocket

3.3

restraint, interoperable-padding

part of the knee protector that fixes it in the position required for protecting the knee. The pads are positioned in the knee pockets of the garments according to part 4b of this standard

3.4

zone of protection

surface of the knee protector that is intended to provide the user with protection of patellar and infrapatellar areas

3.5

interoperable pocket

pocket of specified dimensions in which can be inserted interoperable padding

prEN 14404-4:2019 (E)

3.6

garment with interoperable pockets

garment with pockets intended for placement of interoperable knee pads

Note 1 to entry: According to EN ISO 13688, this refers to protective clothing where garments, including body protectors, includes or replaces personal garments and is intended as protection against one or more hazards. Trousers with knee pockets (here for interoperable padding) are thus regarded as PPE.

3.7

restraint, interoperable padding

interoperable padding inserted into a knee pocket, which shall be designed depending on the size of the interoperable padding

4 Performance levels

The performance level is only given by the interoperable padding, as described in 5.4.2 of prEN 14404-4:2019.

4 performance levels are defined. The tests for the performance levels are described in 4 of prEN 14404-1:2019:

- **level 0:** knee protectors suitable for use on flat floor surfaces and providing no protection against penetration.
- **level 1:** knee protectors suitable for use on flat floor surfaces and providing protection against penetration at a force of at least 100 N
- **level 1U:** knee protectors suitable for use on even or uneven surfaces providing protection against penetration at a force of at least 100 N.
- **level 2:** knee protectors suitable for use on flat or non-flat floor surfaces in severe conditions and providing protection against penetration at a force of at least 250 N.

5 Requirements

5.1 Interoperable padding

5.2 General

5.2.1 Summary

Summary of the requirements given in Clause 5.2 – 7 for the interoperable knee pads and the tests applicable

Table 1 — Summary of requirements for the interoperable knee pads and the tests applicable

Clause number	Subject	Level				Clauses describing the tests applicable
		0	1	1U	2	
5.2.1	General requirements	X	X	X	X	Part 1: 5.4.1
5.2.1	Innocuousness	X	X	X	X	Part 1: 5.4.2 EN ISO 13688
5.2.2	Products for testing	X	X	X	X	Comparison with Clause 5, 5.3

Clause number	Subject	Level				Clauses describing the tests applicable
		0	1	1U	2	
5.2.3.1	Orientation of the knee protector Vertical alignment	X	X	X	X	Comparison with Clause 5, 5.4.1
5.2.3.2	Orientation of the knee protector Knee, right/left	X	X	X	X	Comparison with Clause 5, 5.4.2
5.2.4.1.1	Size designation	X	X	X	X	Part 1: 5.4.3
5.2.4.1.2	Dimensions	X	X	X	X	Part 1: 5.4.3
5.2.4.2	Penetration resistance (Performance levels 1, 1U and 2)	n.a. a	X	X	X	Part 1: 5.5
5.2.4.3.1	Force distribution on an even surface	X	X	n.a.	n.a.	Part 1: 5.6.2.1
5.2.4.3.2	Force distribution on an uneven surface	n.a.	n.a.	X	X	Part 1: 5.6.2.2
5.2.4.4	Peak transmitted force	X	X	X	X	Part 1: 5.7
5.2.4.5	Bend test	X	X	X	X	Part 1: 5.8.1
5.2.5.1	Comfort during use on an even surface	X	X	X	X	Part 1: 5.8.1
5.2.5.2	Comfort during use on an uneven surface	X	X	X	X	Part 1: 5.9.1
6.1	General Marking	X	X	X	X	Comparison with Clause 6.1
6.2.1	Specific Marking	X	X	X	X	Comparison with Clause 6.2.1
7.1	Manufacturer information	X	X	X	X	Comparison with Clause 7.1
a n.a.: non-applicable						

5.2.2 General requirements for knee protectors

Interoperable pads shall meet the general requirements.

Interoperable pads shall be safe to use and fit for their intended application defined by the manufacturer.

They shall be designed and manufactured to provide protection when used according to the information supplied by the manufacturer, without endangering the user.

There shall not be hard or sharp edges, seams, buckles or other items on the inner surfaces (especially within the zone of protection) of the products that could harm the user during normal use.

Interoperable pads shall meet the innocuousness requirements of EN ISO 13688. Construction materials and incorporated substances shall not harm those being in or coming into contact with them.

5.2.3 Products for testing

The manufacturer shall submit complete and ready-to-use 8 pairs of interoperable padding for testing. The manufacturer shall provide the documents and data required for the testing.

5.2.4 Orientation of the interoperable padding

5.2.4.1 Vertical alignment

The marking below (Figure 1) shall be used on the side facing the knee and pointing upwards.



Figure 1 — Pictogram ISO 7000 – 1861 Indication for vertical alignment

5.2.4.2 Knee right, left

When a differentiation is necessary to indicate the side of the body (left/ right) the additional marking (Figure 2 and Figure 3) shall be used respectively for the left knee and for the right knee.



Figure 2 — Pictogram ISO 7000 – 1861 + 1140 + 0251 Marking of left knee side at which the knee protector is to be worn

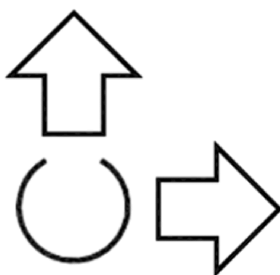


Figure 3 — Pictogram ISO 7000 – 1861 + 1140 + 0251 Marking of right knee side at which the knee protector is to be worn

5.2.5 Specific requirements for the interoperable padding

5.2.5.1 Dimensions of the interoperable padding

Dimensions of the interoperable padding coincide with the dimension of the zone of protection.

The dimension of the zone of protection of the interoperable padding shall be as follows:

L1 - Length: 240 mm ± 10 mm

L2 - Width: 145 mm ± 5 mm

Thickness: 20 mm ± 4 mm

If the pad is shaped, the dimension test shall be done with the test pocket (part 1, clause x,y,z) and has to fit into the test pocket.

Furthermore, the requirements in accordance with Table 2 apply.

NOTE: When a padding is interoperable, this attribute is expressed when referring to EN 14404-4

Table 2 — Dimensions of the radii of curvature

Interoperable padding	Maximum values for the radius of curvature of corners of zones of protection [mm]	
	Proximal, r_1	Distal, r_2
— not adjustable or loose in a pocket	25	25

iTeh STANDARD PREVIEW
(standards.iteh.ai)

oSIST prEN 14404-4:2019

<https://standards.iteh.ai/catalog/standards/sist/fae4bad6-0331-4002-adff-8c0303668fb4/osist-pren-14404-4-2019>

b)

Key

- l_1 Length of the zone of protection
- l_2 Width of the zone of protection
- r_1 Radius of curvature of a proximal (upper) corner of a knee protector
- r_2 Radius of curvature of a distal (lower) corner of a knee protector
- b) Type 2 knee protector

Figure 4 — Shapes of the zones of protection of knee protectors