SLOVENSKI STANDARD
SIST EN 14404:2005

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Osebna varovalna oprema – Ščitniki za kolena za delo v klečečem položaju

Personal protective equipment - Knee protectors for work in the kneeling position

Persönliche Schutzausrüstung - Knieschutz für Arbeiten in kniender Haltung

Equipements de protection individuelle - Protection des genoux pour le travail a genoux

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13.340.50 Varovanje nog in stopal Leg and foot protection

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Personal protective equipment - Knee protectors for work in the kneeling position

Equipements de protection individuelle - Protection des genoux pour le travail à genoux

Persönliche Schutzausrüstung - Knieschutz für Arbeiten in kniender Haltung

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Foreword

This document (EN 14404:2004) 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of an identical text or by endorsement, at the latest by May 2005, and conflicting national standards shall be withdrawn at the latest by May 2005.

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.

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Introduction

Kneeling is an unnatural working position. Without knee protectors, workers may suffer discomfort and 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, but knee protectors should slow the process.

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 does footwear.

Knee protectors incorporated into trousers or attached to trousers or worn over trousers or on the bare knees should remain in place while kneeling down, and while shuffling (walking) on the knees. Their size should ensure that they protect the knees during movement.

Knee protectors may have other functions not covered by this standard such as providing a good grip while working on sloping roofs or pushing carpet towards its fixings during carpet laying.

1 Scope

This document specifies the requirements for knee protectors for use in a kneeling position. Requirements for the marking of knee protectors and the information to be supplied by the manufacturer are given. Test methods are described and performance levels are defined. Where protection against additional hazards is claimed, performance requirements from other applicable standards may also be applied.

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

2 Normative references

The following referenced documents are indispensable for the application 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 340, *Protective clothing — General requirements.*

EN 863:1995, *Protective clothing — Mechanical properties — Test method: Puncture resistance.*

3 Terms and definitions

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

3.1
knee protectors
devices used by people kneeling down to protect their knees

3.2
Type 1 knee protectors
knee protectors that are independent of other clothing and fasten around the leg

3.3
Type 2 knee protectors
foam plastic or other padding material in pockets on trouser legs, or permanently attached to trousers

NOTE The position of Type 2 knee protectors on trousers may be fixed or adjustable.

3.4
Type 3 knee protectors
devices not attached to the body, but put into place as the user moves around. These may be for each knee or both knees together

3.5
Type 4 knee protectors
knee protectors for one or both knees, which are parts of devices with additional functions such as a frame to aid standing up, or a kneeling seat. The knee protectors may be worn on the body or be independent

3.6
fastening
part of a knee protector, which keeps it in the right position

3.7
zone of protection
area of protective equipment that is intended to provide protection, and is subject to specific testing

3.8
centre of the back of the knee
junction of the skin of the thigh and the shin when the knee is flexed to an angle of 90º at the centre of the popliteal fossa

4 Performance levels

Two performance levels are defined by performance requirements in laboratory tests given in Clauses 5 and 6.

NOTE Performance levels are defined by the severity of the test conditions.

— **level 1** knee protectors are expected to be suitable for use on flat floor surfaces where objects more than 1 cm high are not a common hazard

— **level 2** knee protectors are expected to be suitable for use in severe conditions such as when kneeling on broken rocks in mining and quarry work

5 Requirements

5.1 General requirements

Knee protectors shall meet a general requirement that they are safe to use and fit for their purpose. They shall be designed and manufactured to provide protection when used according to the manufacturer's instructions, without endangering the user. Knee protectors shall meet the innocuousness requirements of EN 340. There shall not be hard or sharp edges, seams, buckles or other items on the inner surfaces of the products that could harm the user during normal use. Examination shall be made according to 6.4.

Construction materials and incorporated substances shall not harm those coming into contact with them. The manufacturer shall list in the information supplied with the product, the substances used in the main components of the product, and shall label any product containing substances or preparations generally known to be hazardous, as defined in EN 340.

5.2 Requirements for knee protectors

5.2.1 Summary of specific requirements

Table 1 summarizes the specific requirements for the different Types of knee protectors.

Table 1 — Summary of specific requirements for Types of knee protector and the tests applicable

Requirement		Type of protector to which the requirement applies	Clauses describing the tests applicable
Clause number	Subject		
5.1	Innocuousness	All Types	EN 340 and 6.3.1 + 6.4
5.2.2	Type 4 protectors to meet requirements for Type 1 or Type 3 protectors as applicable	Type 4	-
5.2.3	Size designation and marking	All Types	6.3.1 + 6.4
5.2.4	Dimensions	All Types	6.3.1 + 6.4
5.2.5	Penetration resistance (Performance levels 1 and 2)	All Types	6.3.1 + 6.5 (EN 863:1995)
5.2.6	Force distribution (Performance levels 1 and 2)	All Types	6.3.2 + 6.3.1 + 6.6
5.2.7	Peak transmitted force in impact (Performance levels 1 and 2)	All Types	6.3.2 + 6.3.1 + 6.7
5.2.8.1	General requirements for restraint	Type 1, Type 2 and Type 4 [a]	6.4 + 8
5.2.8.2	Restraint by straps or equivalent system	Type 1. Type 4 [a]	6.3.1 + 6.8.1
5.2.8.3	Restraint in pockets or by attachment to trousers	Type 2	6.3.1 + 6.8.2

Table 1 (*concluded*)

Requirement		Type of protector to which the requirement applies	Clauses describing the tests applicable
Clause number	Subject		
5.3	Optional requirement for water resistance	Any type for which the claim is made. (Type 2 water resistance will depend on the properties of the trousers)	6.3.1 + 6.9 Type 1, 6.9.1 Type 3, 6.9.2 Type 4, 6.9.3
5.4 5.4.1	Ergonomics Restraint and comfort during use	All Types All types	6.3.1 + Type 1, 6.10.1 Type 2, 6.10.2 Type 3, 6.10.3 Type 4, 6.10.4
5.4.2	Compliance of straps	Type 1 and Type 4 [a]	6.3.1 + 6.10.5
7	Marking	All Types	Comparison with 7
8	Information for users	All Types	Comparison with 8

[a] Applicable if the Type 4 protector is of similar design to the Type of protector to which this clause applies directly.

5.2.2 Type 4 – Knee protectors

Type 4 knee protectors shall meet the requirements for Type 1 or Type 3 knee protectors depending on whether they are worn on the body or are independent, as applicable.

5.2.3 Size

All knee protectors shall be marked with their size based on the waist girth of the users they are intended to fit. The sizing shall be explained in the information supplied by the manufacturers.

5.2.4 Dimensions

The zones of protection shall have dimensions as specified in Table 2. The values of the dimensions shall be calculated from the waist girth of largest size of the user the protector is designed to fit, or in the case of “one size fits all” products a waist girth of 120 cm. The shapes of the zones of protection are shown in Figure 1.

When measured according to 6.4 on the inside of the knee protector the material providing protection shall be larger than the minimum zone of protection calculated from Table 2.

Table 2 — Dimensions of the zones of protection of knee protectors

Knee protector type	Minimum values for height and width of zones of protection of knee protectors expressed as a percentage of the waist girth of the largest intended user		Maximum values for the radius of curvature of corners of zones of protection, in mm	
	Height l_1	Width l_2	Proximal r_1	Distal r_2
Type 1	18	12	70	25
Type 2 - not adjustable, or loose in a pocket	24	12	25	25
Type 2 - adjustable in a vertical direction by at least 4% of the waist girth of the largest intended user and capable of being fixed in position	20	12		
Type 3	24	40	100	25