SLOVENSKI STANDARD
SIST EN 14021:2004

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Obojestranski ščitnik trupa motociklistov pred kamnito podlago in drobci, primeren za vožnjo po brezpotju – Zahteve in preskusne metode

Stone shields for off-road motorcycling suited to protect riders against stones and debris - Requirements and test methods

Protektoren gegen Aufprall von Steinen und Gesteinstrümmern für den Schutz von Gelände-Motorradfahrern - Anforderungen und Prüfverfahren

Pare-pierres pour le motocyclisme tout-terrain destinés a protéger les motocyclistes contre les pierres et autres menus projectiles - Exigences et méthodes d'essai

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13.340.10	Varovalna obleka	Protective clothing
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This European Standard was approved by CEN on 7 November 2003.

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This European Standard exists 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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Slovakia, Spain, Sweden, Switzerland and United Kingdom.

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Foreword

This document (EN 14021:2003) 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of an identical text or by endorsement, at the latest by June 2004, and conflicting national standards shall be withdrawn at the latest by June 2004.

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 document includes a bibliography.

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

Stone Shields conforming to this European Standard are articulate garments intended for the protection of chest, optionally of shoulders, back and biceps specifically against lofted stones and debris such as those riders often encounter in off-road motorcycling and in allied sports activities where these hazards may exist.

A complete stone shield provides protection to the whole of the torso.

The essential part of a stone shield is the breast guard, which may be associated with the shoulder guards, the back guard and the biceps guards.

When the stone shields are in the form of articulate assemblies the parts can be held together by diversified joining devices and can be made out of mixed soft/hard or hard materials (shells). In the latter case they are fitted with suitable padding on the inner surface, and their edges are rounded to avoid bruising of the skin.

1 Scope

This European Standard specifies requirements and test methods for the stone shields to be worn by youths and adults of either sex to provide limited protection against lofted stones and debris while riding motorcycles in motocross and other off-road activities on dirt roads.

Hence this European Standard contains general and performance requirements for the materials utilised and requirements for sizes, shapes, marking and assembly methodology.

This European Standard is not applicable to stone shield for children and for people with chest girth below 75 cm.

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 below. In the case of dated references, subsequent amendments to, or revisions of, any of these publications apply to this European Standard only when incorporated into it by amendment or revision. In the case of undated references the latest edition of the publications referred to apply (including amendments).

EN 340, *Protective clothing — General requirements.*

ISO 6487, *Road vehicles - Measurement techniques in impact tests - Instrumentation*

3 Definition

3.1
stone shield
product designed to be worn under or over outer clothing (but not without underclothing and not directly on the skin) and to provide protection from lofted stones and debris.

The product consists mainly of a breast guard, which may be associated with or include shoulder guards and other guards such as biceps guards and a back guard (see Figure 1).

4 Requirements

4.1 Construction

The stone shield shall be fitted with tightening or restraining devices or closures to allow them to be donned tight to the body assuring freedom of movements. Check according to 6.5.

4.2 Minimum protected areas

4.2.1 General

The minimum protected areas of the breast guard is specified in Table 1 and in 4.2.2.

4.2.3 to 4.2.5 are applicable when other parts are present.

4.2.2 Breast guard

The breast guard shall cover the anterior portion of the rib cage including the sternum.

4.2.3 Shoulder guards

The shoulder guards shall cover the top portion of the shoulders.

4.2.4 Biceps guards

Biceps guards shall cover the outer portion of the upper arms.

4.2.5 Back Guard

The back guard shall covers the scapulae and a portion of the spine with a length corresponding of at least C of Figure 2.

4.3 Sizing

Stone shields shall be marked on the breast guard with their size according to EN 340 except that the reference dimension is only the chest girth measured on a person in the upright position and breathing normally with the tape-measure passed over the scapulae under the armpits and across the chest and back.

Table 1 gives the minimum dimensions of a breast guard suited for a person with a chest girth of 105 cm.

Other sizes will be scaled to the same proportions.

Table 1 — Dimensions

Dimensions	*A*	*B*	*C*
Chest girth (%)	33	19	22
Example of chest girth of 105 cm	35 cm	22 cm	23 cm
The dimensions *A*, *B* and *C* are defined below by reference to Figure 2 and do not include the padding. *A* -- the minimum distance between the lower edge of the breast guard and the mid point of the subject's shoulder. *B* -- the minimum breadth of the breast guard at any point. *C* -- the minimum length between the mid point on the upper edge and the mid point on the lower edge of the breast guard.			

4.4 Surface continuity

The components of the stone shields shall be constructed so that there are no gaps that admit a circular probe as described in 5.2.

4.5 Attachments

All rigid attachments and straps as well as fasteners and adjusters shall be able to withstand a pulling force of 120 N without failure, when tested according to 6.4.

4.6 Ergonomic requirements

Stone shields shall be designed to minimise the discomfort of wearing them and shall not unduly restrict arm movements.

Rough edges shall not be present on the shells.

A padding element shall be applied to each shell on any desired area and can be sewn, glued, riveted or else on the inner surfaces provided it is not easily removed where the padding is located on the edges it shall extend outward not less than 0,5 cm and shall have minimum thickness of 0,5 cm. Figure 3 shows an example of application.

Examination shall be made according to 6.2 and 6.5.

4.7 Impact performance requirements

The average peak force recorded below the anvil in the tests described in 6.6 shall be below 27 kN. No shell shall crack or shatter during the test.

5 Test equipment

5.1 Apparatus

5.1.1 Dropping apparatus

The apparatus shall be such that a mass (hemispherical impactor) may be released in order to drop along a guided vertical path onto the sample placed on a test anvil. The centre of the mass of the hemispherical impactor shall lie over the centre of the test anvil.

NOTE The equipment for testing stone shields could be common to a number of European Standards such as EN 1621-1.

5.1.2 Hemispherical impactor

The hemispherical impactor, with an end radius of (12,5 ± 0,1) mm, is attached to a dropping block so that it has a total mass of (1000 ± 10) g and its kinetic energy on impact shall be (10 ± 1) J.

5.1.3 Anvil

The anvil shall be made of polished steel with the following dimensions l_1 equal to (190 ± 20) mm, l_2 equal to (100 ± 2) mm and r_1 equal to (150 ± 5) mm, and the anvil shall be surrounded by a “guard ring”. The guard ring shall have an internal diameter l_3 of (120 ± 2) mm, a wall thickness l_4 of (20 ± 1) mm. The guard ring shall be solidly mounted to the base around the piezoelectric load cell or force transducer. The top of the guard ring shall be (10 ± 0,5) mm above the centre of the top of the anvil. Figure 4 illustrates the design of the apparatus.

The anvil shall be attached through a piezoelectric load cell or equivalent force transducer to a mass of at least 1000 kg. The load cell or force transducer shall be preloaded to the manufacturer’s instructions.

5.1.4 Force measurement instrumentation

The anvil shall be mounted so that during impact testing the whole force between the anvil and the massive base of the apparatus passes through a quartz force transducer in line with it’s sensitive axis. The force transducer shall have a calibrated range of not less that 50 kN and a lower threshold of less than 0,5 kN. The output of the force transducer shall be processed by a charge amplifier and displayed and recorded on suitable instruments. The recording system shall show a continuous force with a time record, or shall have a peak force detection capability. Digital sampling systems shall have a minimum rate of 10 kHz. The measuring system including the drop assembly shall have a frequency response in accordance with channel frequency class (CFC) 1000 of ISO 6487.