SLOVENSKI STANDARD
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Varovalna obleka za uporabnike ročnih verižnih žag - 3. del: Preskusne metode za obutev

Protective clothing for users of hand-held chain-saws - Part 3: Test methods for footwear

Schutzkleidung für die Benutzer von handgeführten Kettensägen - Teil 3: Prüfverfahren für Schuhwerk

Vetements de protection pour utilisateurs de scies a chaîne tenues a la main - Partie 3: Méthodes d'essai des chaussures

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English version

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

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Foreword

This European Standard 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of an identical text or by endorsement, at the latest by August 1996, and conflicting national standards shall be withdrawn at the latest by August 1996.

This European Standard 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).

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0 Introduction

This Standard forms part of a series concerned with personal protective equipment designed to protect against the risks arising from the use of hand-held chain saws.
No personal protective equipment can ensure a 100% protection against cutting from a hand-held chain saw.

Nevertheless, experience has shown that it is possible to design personal protective equipment which offers a certain degree of protection.

Different functional principles can be applied in order to give protection.

These include:

- chain slipping: on contact, the chain does not cut the material
- clogging: fibres are drawn with the chain into the drive sprocket and block chain movement
- chain braking: fibres have a high resistance to cutting and absorb rotational energy, thereby reducing the chain speed

Often more than one principle is applied.

1 Scope

This Standard, Part 3, specifies test methods to be used to assess the resistance of footwear to cutting by hand-held chain saws.

Methods for other forms of foot and leg protection e.g. gaiters against hand-held chain saws will be covered in other standards.

This standard only covers footwear with integral protection.

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.

prEN 190 [1)] Additional requirements and test methods for safety, protective and occupational footwear for professional use

prEN 191 [1)] Additional specifications for safety footwear for professional use

EN 344:1992 [1)] Requirements and test methods for safety, protective and occupational footwear for professional use

EN 381-1:1993 Protective clothing for users of hand held chainsaws - Part 1: Test rig for testing resistance to cutting by a chainsaw

1) prEN 190 and prEN 191 were submitted to Formal Vote respectively as prEN 344-2 and prEN 345-2. EN 344 will be renumbered into EN 344-1 further to their publication.

ISO 3386-1:1986 Polymeric materials, cellular flexible - Determination of stress-strain characteristic in compression - Part 1: Low-density materials

3 Definitions

For the purposes of this standard the following definition apply:

3.1 Footwear with integral protection

Footwear in which the chain saw protective material either comprises the material of the footwear or is permanently attached to the footwear.

4 Test specimen

For footwear with metallic toe-caps : Three pairs, size 42 (Paris points), size 8 (UK).
For footwear with non-metallic toe-caps : Four pairs, size 42 (Paris points), size 8 (UK).

5 Checking of protective coverage

5.1 Apparatus

Sizing body for laced footwear : A cylindrical - conical - cylindrical body with total height minimum 500 mm and
Ankle cylinder : height (76 ± 1) mm : diameter (84 ± 1) mm.
Conical section : height (274 ± 1) mm.
Upper cylinder : height minimum 150 mm : diameter (110 ± 1) mm.
(see figure 1)

5.2 Procedure

Insert the sizing body for laced footwear into the leg of the footwear and tighten any fastenings (e.g. laces or straps) about it. Check that the coverage requirements given in prEN 190 and prEN 191 are fulfilled.

6 Testing of resistance to cutting

6.1 Apparatus

6.1.1 Test rig

The test rig is described in EN 381-1 with additional elements to fulfill clause 6.2.

6.1.2 Footwear mounting devices

6.1.2.1 Base

A base for mounting the footwear, capable of holding the footwear in the required positions.

The base may have holes (for bolts) or devices for fixing the footwear. Such devices shall not interfere with the chain saw protective material of the footwear.

6.1.2.2 Artificial shinbone

Artificial shinbone (see figure 2)

Material: Hardwood or similar covered with a (14 ± 2) mm thick layer of flexible cellular material of copolymer foam of ethylene vinyl acetate with specific density (50 ± 2) kg/m^3 and a compression stress value at 40% compression (CV 40) of (75 ± 10) kPa as tested in accordance with ISO 3386-1:1986.
Length at least 700 mm, circular cross section diameter (50 ± 1) mm plus the thickness of the cellular material.

6.1.3 Material for filling footwear

Dried peas of diameter approximately 7 mm.

Bag containing (2 ± 0,1) kg of lead shot or similar.

6.2 Test procedure

6.2.1 General

Calibration procedures are as in EN 381-1. After calibration the following changes are introduced.

a) The chain saw unit is arranged as in part 1, but the load shall be 30 N ± 0,5 N instead of 15 N (clause 5.3.5 in EN 381-1:1993).

b) The horizontal distance from the point of contact to the centre of the sprocket shall be (300 ± 2) mm (see figure 3 in EN 381-1:1993).

Test cuts are performed on both right and left footwear at the positions shown in Figure 3, ie :

- on the left side of the vamp (position 1)
- at the throat (position 2)
- at the leg front (position 3)
- on the toecap (position 4) (footwear with non-metallic toe-caps)

Where possible, avoid cutting into any fastenings which may be fitted to the footwear as this could lead to anomalous results. Should this not be possible, such cutting should be recorded in the test report.

A total of six cuts, or eight cuts for footwear with non-metallic toecaps, should be made for each complete test, with no more than one cut being made on any one sample.

Test cuts according to this standard may be carried out with the following chain speeds:

Class 0 : 16 m/s NOTE: Class 0 is valid until 1999-12-31.
Class 1 : 20 m/s
Class 2 : 24 m/s
Class 3 : 28 m/s

After each test the specimen is checked for cut through and the result is reported.

6.2.2 Cuts on vamp area

The footwear is first securely fixed to the base in such a way that :

a) the sole of the footwear is in contact with the base in both the heel and forepart without changing the natural shape of the footwear.

b) the test axis as defined in EN 344:1992 clause 5.3.2.1, coincides with that of the base.

The base is then tilted at 30° ± 2° to the horizontal in such a manner that the right side of the footwear is lowermost and nearest the pivot of the test rig, and the test axis of the footwear is at an angle of 90° ± 3° to the guide bar (see figure 4).

Sufficient dried peas are poured into the footwear to completely fill the foot section and at least half of the leg. The peas are kept in place with the bag of lead shot descibed in clause 6.1.3.

Test cuts are performed in the positions indicated in Figure 3, Position 1 (ie. on the left side of the footwear, (15 ± 5) mm to the rear of the toecaps).

6.2.3 Cuts on throat area

The footwear is securely fixed to the base as in clause 6.2.2.

The base is then tilted 45° ± 2° to the horizontal in such a manner that the heel of the footwear is lowermost, and the test axis of the footwear is vertical and at an angle of 90° ± 3° to the guide bar of the test rig. The right side of the footwear shall be nearest to the pivot (see figure 5).

Test cuts are performed in the position marked in Figure 3, Position 2.

6.2.4 Cuts on leg region

If the leg of the footwear is fitted with any fastening devices (eg laces or straps), fasten these around sizing body for laced footwear (clause 5.1) Remove sizing body for laced footwear from the footwear.

If necessary cut away the heel and as little as possible of the quarter region of the footwear taking care not to damage nor interfere with any of the chain saw protective material. If the protective material is damaged or interfered with, report this.

Mount the leg of the footwear over the artificial shinbone taking care that any damage caused to the footwear does not interfere with the chain saw protective material. If such damage does occur, report this.

Securely fasten the footwear to the artificial shinbone. The fastening should be on the left side of the footwear. An example of a suitable fastening system is shown in figure 6, but alternative systems are also allowed.

A line loading of (50 ± 1) N/m shall be applied.

The artificial shinbone is then positioned so that the front of the leg of the footwear is uppermost, and the central plane of the footwear is vertical and at an angle of 90° ± 2° to the guide bar of the test rig.

The left side of the footwear shall be opposite to the pivot (see figure 6).

Carry out the test cut at a distance of (150 ± 30) mm from the upper surface of the insock of the middle of the heel and at an angle of 90° ± 3° to the line of the leg (see figure 3, position 3) without deforming its shape and taking care to avoid any fastenings (eg hooks or eyelets).

6.2.5 Additional cuts for footwear with non-metallic toecaps

If the footwear are supplied with non-metallic toecaps, extra cuts are performed to check that the toecaps can withstand chain saw cutting. One left and one right footwear should be mounted as described in clause 6.2.2 and the tests carried out in the positions shown on figure 3, position 4.

7 Test Report

The report shall at least include:

- identification and description of the test specimen e.g. manufacturer, style, design, size, components
- type of toecap with reference to EN 344:1992, clause 4.3.2.
- test result for each test area cut
- chain speed and class
- evaluation of damages and chain stopping mechanism
- result of inspections and other checks which have no specific test methods.