SLOVENSKI STANDARD
oSIST prEN 12230:2021

01-november-2021

Podloge za športne dejavnosti - Preskusne metode za ugotavljanje nateznih lastnosti športnih podlog iz umetnih snovi

Surfaces for sports areas - Test method for the determination of tensile properties of synthetic sports surfaces

Sportböden - Prüfverfahren für die Bestimmung der Zugfestigkeitseigenschaften von Kunststoffflächen

Sols sportifs - Méthode d'essai pour la détermination des caractéristiques de traction des surfaces sportives synthétiques

Ta slovenski standard je istoveten z: **prEN 12230**

ICS:

97.220.10	Športni objekti	Sports facilities

oSIST prEN 12230:2021 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

DRAFT
prEN 12230

September 2021

ICS 97.220.10

Will supersede EN 12230:2003

English Version

Surfaces for sports areas - Test method for the determination of tensile properties of synthetic sports surfaces

Sols sportifs - Méthode d'essai pour la détermination des caractéristiques de traction des surfaces sportives synthétiques

Sportböden - Prüfverfahren für die Bestimmung der Zugfestigkeitseigenschaften von Kunststoffflächen

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 217.

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, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, 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

Ref. No. prEN 12230:2021 E

Contents

Page

European foreword

This document (prEN 12230:2021) has been prepared by Technical Committee CEN/TC 217 “Surfaces for sports areas”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 12230:2003.

1 Scope

This document specifies three methods for the determination of the tensile properties of materials used as surfaces, elastic layers and shockpads for sports areas.

Method 1 measures the tensile strength of homogenous test specimens that are less than 25 mm in thickness.

Method 2 measures the transversal tensile strength of homogenous test specimens that are more than 25 mm in thickness.

Method 3 measures the tensile strength of sports surfaces or shockpads that are non-homogenous and contain slots or grooves cut into their structure.

This document is applicable both to prefabricated sheet materials and to materials formed by casting of liquid systems cured in- situ.

NOTE If the nature of the sports surface is such that a properly representative test piece cannot be prepared in the manner described in this document, then determination of tensile properties should not be attempted for quality control purposes, or as a predictor of performance in use. With such materials, it can be more appropriate to determine their compressive properties or other dynamic characteristics for these purposes.

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.

ISO 291, *Plastics — Standard atmospheres for conditioning and testing*

3 Terms and definitions

For the purposes 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 https://www.electropedia.org/
- ISO Online browsing platform: available at https://www.iso.org/obp

3.1
peak-to-valley height
geometric measure of the roughness of the top of surfacing. The magnitude of regularly or irregularly recurring vertical deviations of a surface

4 Method 1 – Determination of the tensile properties of homogenous test specimens less than 25 mm thick

4.1 Principle

A test specimen of a given shape is subjected to tensile stress transmitted to it by means of a suitable device. The resulting stress-strain curve is plotted, from which various parameters are subsequently deduced.

4.2 Apparatus

4.2.1 Test machine

A test machine, such that:

a) the test specimen may be held in the fixing grips of the test apparatus. These fixing grips shall meet the following conditions:

   1) The test specimen may be held sufficiently tight to avoid slipping.

   2) No localized pressure that could tear or rupture the ends is exerted on any part of the test specimen.

b) under no load the movable grip may be moved away from the fixed grip at a constant speed of (50 ±5) mm/min in a direction parallel to the longitudinal axis of the test piece;

c) the force exerted on the test specimen may be read with a maximum error of 1 % and may be recorded; and

d) if an extensometer is used, it exerts a minimum force on the test specimen and elongation of the test specimen may be read to an accuracy of 0,1 mm.

4.2.2 Thickness gauge

Thickness gauge, accurate to 0,01 mm with a plunger and a flat measuring surface of nominally 4 mm diameter applied to the surface under a load of (0,9 ± 0,1) N.

4.2.3 Dial gauge

Dial gauge capable of reading to 0,1 mm with a plunger, having a flat circular contact surface with a diameter of nominally 1,5 mm applied to the surface under a load of (0,9 ± 0,1) N.

4.3 Test specimens

4.3.1 Dimensions

Cut the test specimens in accordance with the shape and dimensions shown in Figure 1.

If the distance between the parallel surfaces of the extensometer gauge length varies by more than 5 % (tolerance on parallelism), discard the test specimen and cut a further specimen.

Dimensions in millimetres

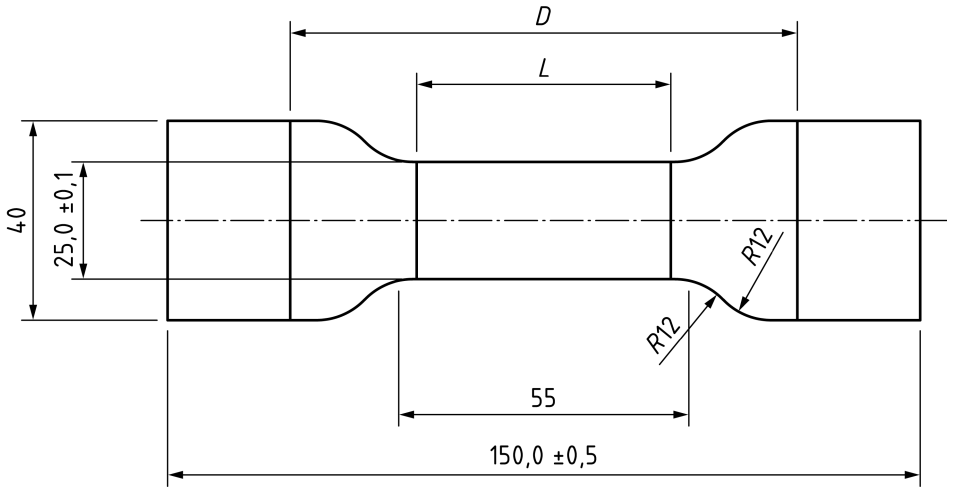

Figure 1 — Dimensions and shape of tensile test specimen – Method 1

4.3.2 Thickness

Ensure that the thickness of the test specimen equals the thickness of the installed surfacing, except in the following cases, where further preparation is required:

a) Where the thickness of the installed sports surface and/or the sample provided for test is greater than 25 mm, reduce the thickness of the test specimen by machining or cutting to between 20 mm and 25 mm, taking care during this operation that the structure of the material is not altered, and the test specimen remains as representative as possible of the installed sports surface.

b) Where the material carries a surface texture, embossing or granular finish, prepare the upper surface and underside of the test specimen as described in 4.3.

Preparation of the underside of the test specimen to remove irregularities is necessary, for example, where a once-liquid system has been removed from a textured or porous substrate.

After preparation, measure the thickness of each test specimen using the thickness gauge (4.2.2) and a measurement force of between 0,8 N and 1,0 N. Measure the thickness of the test piece at a minimum of five positions along the extensometer gauge length and calculate the average thickness to the nearest 0,1 mm. If any one reading differs from the average thickness by more than 5 % of the average value, discard the test specimen.

4.4 Preparation and conditioning

4.4.1 Remove any surface embossing or granular texture from the two parallel surfaces of the extensometer gauge length by grinding the irregular surface with abrasive paper (grain 60) to enable the thickness of the test specimen to be measured. Grind until a peak-to-valley height of (0,5 ±0,1) mm is achieved, or 50 % of the surface texture height has been worn away or until further rubbing no longer produces any change in the surface condition.

4.4.2 Measure the peak-to-valley height by means of a dial gauge (4.2.3). Take the reference surface as a flat metal plate, pressed against the test surface under a force of 3 N.

4.4.3 On the prepared area, make measurements at nine evenly distributed points and take the mean of the nine measurements as the peak-to-valley height of the surface being examined.

4.4.4 Where necessary, mark the test specimens to indicate their orientation in relation to the direction of anisotropy.

4.4.5 Condition the test specimens in accordance with one of the standard atmospheres given in ISO 291, for a period of not less than 24 h.

4.4.6 Where the material of the test specimens has been formed by curing or chemical cross-linking of liquid constituents, prepare the test specimen under conditions which represent as closely as possible the conditions under which the sports surface was, or is to be, installed. Do not test specimens from such materials until at least five days have elapsed from mixing the constituents.

4.5 Number of test specimens

Carry out the test on at least six test specimens. In the case of prefabricated sheet materials, cut at least three test specimens from the longitudinal (machine) direction and at least three from the transverse direction. For materials formed in-situ, take at least three test specimens from each of the two directions at 90 °.

4.6 Procedure

Carry out the test under the same atmospheric conditions as that used for conditioning the test specimens (4.3).

Clamp a test specimen in the fixing grips. Mark the original gauge length on the test specimen (see Figure 1).

Apply the force to be exerted on the test specimen so that it is uniformly distributed by means of the movable grip, at a rate of displacement of (50 ±5) mm/min until rupture occurs.

Reject any test specimen that breaks outside the extensometer gauge length and prepare and test a further specimen so that the number of valid results is not less than six.

If an extensometer is not used, record the elongation corresponding to a given force, at suitable intervals. Plot the resulting stress-strain curve.

Repeat the procedure for the remaining test specimens until six valid results are obtained.

4.7 Calculation and expression of results

4.7.1 Tensile stress at rupture

4.7.1.1 Calculate the tensile stress at rupture, *O*r, expressed in megapascal, from the following formula:

$$Or = \frac{F_r \times 10^{-6}}{b \times d}$$

where

O_r is the tensile stress at rupture, expressed in megapascals (MPa);

F_r is the force applied to the test piece at the moment of rupture, expressed in newtons (N);

b is the original width of the parallel length of the narrow section of the test piece, expressed in millimetres (mm);

d is the original thickness of the parallel length of the narrow section of the test piece, expressed in millimetres (mm).

4.7.1.2 Calculate the mean tensile strength at rupture of the six tests.

4.7.2 Maximum tensile strength

4.7.2.1 Calculate the tensile stress at rupture, from the following formula:

$$Om = \frac{F_{\mathrm{m}} \times 10^{-6}}{\mathrm{b} \times \mathrm{d}}$$

where

Om is the tensile stress at rupture, expressed in megapascals (MPa);

*F*r is the maximum force applied to the test piece during the test, expressed in newtons (N);

b is the original width of the parallel length of the narrow section of the test piece, expressed in millimetres (mm);

d is the original thickness of the parallel length of the narrow section of the test piece, expressed in millimetres (mm).

4.7.2.2 Calculate the mean tensile strength at rupture of the six test specimens.

4.7.3 Relative elongation at rupture

Calculate the relative elongation at rupture, *E*, expressed as a percentage of the original gauge length, from the following formula:

$$E = \frac{\Delta_{\mathrm{L}} \times 100}{L}$$

Δ_{L} Is the variation in length corresponding to a given force, measured by the variation in distance between gauge marks, expressed in millimetres;

L Is the original gauge length of the test piece, expressed in millimetres (mm).

After determination on the stress-strain curve of the corresponding elongations, calculate:

a) the relative elongation, *Me*, for the maximum stress, if applicable, as a percentage of the original gauge length; and

b) the relative elongation, *E*r, at a rupture, as a percentage of the original gauge length.

4.8 Test report

The test report shall contain the following information:

a) reference to this document;

b) the type and designation of the material;

c) the conditioning procedure used;

d) the number of test specimens used;

e) where applicable, the direction of the tensile force in relation to the direction of anisotropy;