



SLOVENSKI STANDARD
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Clay pavers - Requirements and test methods

Pflasterziegel - Anforderungen und Prüfverfahren

Pavés en terre cuite - Spécifications et méthodes d'essais

Ta slovenski standard je istoveten z: prEN 1344

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EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

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November 2009

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English Version

Clay pavers - Requirements and test methods

Pavés en terre cuite - Spécifications et méthodes d'essais

Pflasterziegel - Anforderungen und Prüfverfahren

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 178.

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.

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COMITÉ EUROPÉEN DE NORMALISATION
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prEN 1344:2009 (E)

Foreword

This document (prEN 1344:2009) has been prepared by Technical Committee CEN/TC 178 “Paving units and kerbs”, the secretariat of which is held by BSI.

This document is submitted to the CEN Enquiry.

This document will supersede EN 1344:2002.

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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1 Scope

This European Standard specifies the requirements of pavers and accessories manufactured from clay for use in the flexible form of construction (pavers laid with narrow sand-filled joints on a sand bed) and in the rigid form of construction (pavers laid with cementitious mortar joints on a similar mortar bed, itself placed on a rigid base).

The standard applies to rectangular and other shaped units intended as construction products mainly for exterior use in pavements but which may also be used internally. The flexible form of construction will be subjected to pedestrian and vehicular traffic, while the rigid form of construction is usually subjected to pedestrian traffic. It excludes products intended for refractory and chemical engineering applications and clay floor tiles. It also excludes clay masonry units. This Standard does not deal with the tactility or visibility of units.

This European Standard specifies the characteristics and classes of performance measured according to test methods given in normative annexes. It provides for product marking and for the evaluation of conformity of the product to this European Standard.

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 1745, *Masonry and masonry products — Method for determining design thermal values*

ISO 48, *Rubber, vulcanized or thermoplastic. Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

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ISO 630, *Structural steels*

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ISO 3310, *Test sieves — Technical requirements and testing*

ISO 4662, *Rubber — Determination of rebound resilience of vulcanizates*

ISO 7619, *Rubber — Determination of indentation hardness by means of pocket hardness meters*

ISO 8486, *Bonded Abrasives — Grain Size Analysis — Designation and determination of grain size distribution of macrogrits F4 to F220*

3 Terms and definitions

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

3.1

clay paver

unit satisfying certain shape and dimensional requirements (see 4.1) used for the surface course of pavements and manufactured predominantly from clay or other argillaceous material, with or without any additions, by shaping, drying and firing at a sufficiently high temperature to form a durable ceramic product

3.2

accessory

specially shaped unit intended to fulfil a particular function in the finished pavement. Fittings for use in flexible paving allow completion of the pavement at the perimeter and around obstructions by bonding with pavers laid in a prescribed pattern (e.g. squares, bishops mitre units). Fittings for use with rigid paving being bedded, jointed and pointed in mortar may be used to fulfil functions in both rigid laid paving, such as the provision of surface water drainage, e.g. channel units, or to fulfil particular functions in flexible paving schemes and/or to provide edge restraint for flexible pavements

3.3

work dimension

any dimension of a paver specified for its manufacture to which the actual dimension should conform within specified permissible deviations (see Figure 1)

NOTE For rectangular pavers, the dimensions of length, width and thickness are indicated in Figure 1. Some pavers may be used in two or more orientations.

3.4

spacer nib

small protruding profile on side face of paver (see Figure 1)

NOTE As the spacer nib is intended to project into the joint, its presence is ignored when stating plan work dimensions e.g. for the length and width of rectangular pavers.

3.5

chamfer

bevelled or rounded arris on paver (see Figure 2)

3.6

wearing face

surface intended to be seen when in use

3.7

overall length

longer side of the rectangle to enclose the wearing face of the paver excluding any spacer nibs

3.8

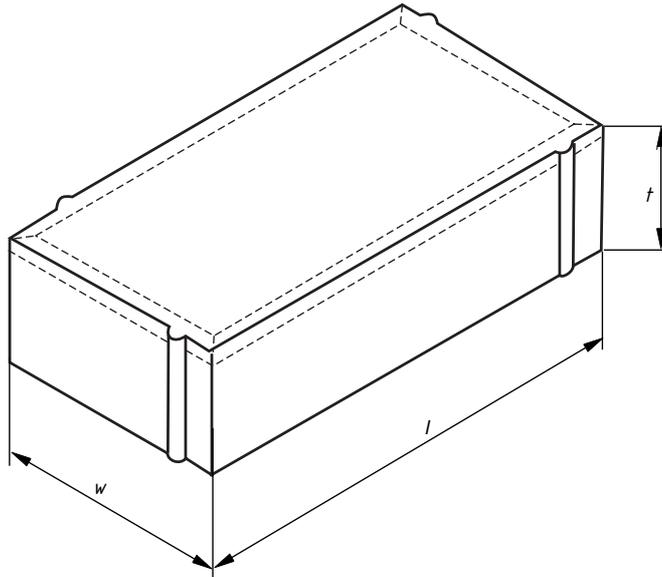
overall width

shorter side of the rectangle to enclose the wearing face of the paver excluding any spacer nibs

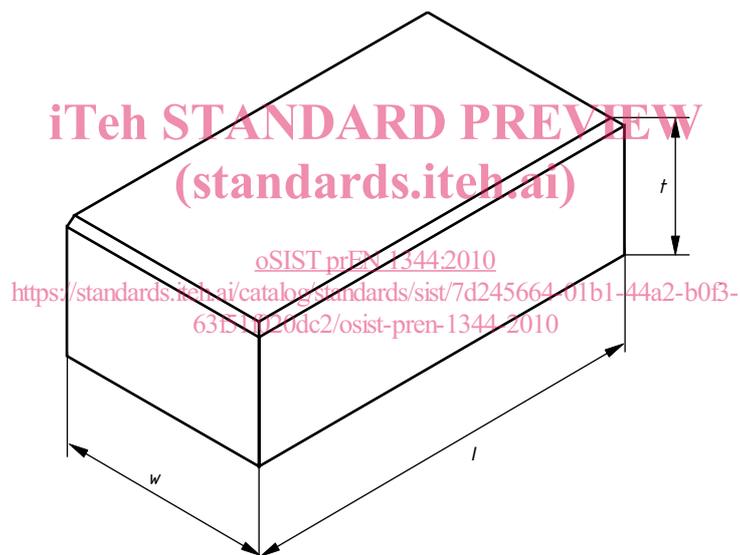
3.9

overall thickness

distance between the upper wearing face of the paver and the opposite face of the paver



Paver dimensions for paver intended for flexible laying.



Paver dimensions for pavers intended for rigid paving, or flexible paving

Nibs in drawing rounded.

Key

l – length

w – width

t - thickness

NOTE 1 Position of spacer nibs and chamfers can vary with different pavers.

NOTE 2 Certain pavers without nibs or chamfers can be used for flexible laying.

Figure 1 — Paver dimensions

prEN 1344:2009 (E)**4 Requirements****4.1 Shape and dimensions****4.1.1 Form**

Pavers shall be rectangular or any other shape that allows them to be laid in a repeating pattern. They may be provided with a chamfer on the arrises around one or more of the paver surfaces that are intended to form the wearing face. If a chamfer having a work dimension greater than 7 mm in width or depth (see Figure 2) is provided, this shall be stated by the manufacturer.

NOTE 1 The restriction on the size of the chamfer prevents the formation of an excessively wide recessed joint.

Pavers for flexible paving may also be provided with spacer nibs on two or more of the paver surfaces that will be vertical in use.

Pavers for rigid paving shall either be rectangular or shaped so that they may be laid in a combination with each other separated only by a nominal 10 mm mortar joint.

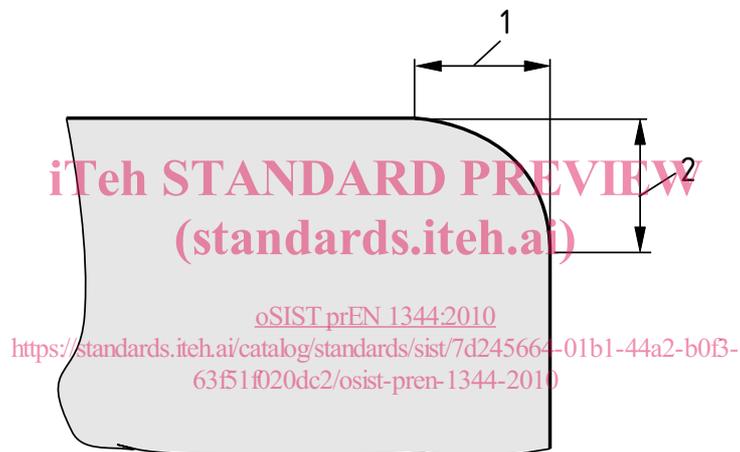
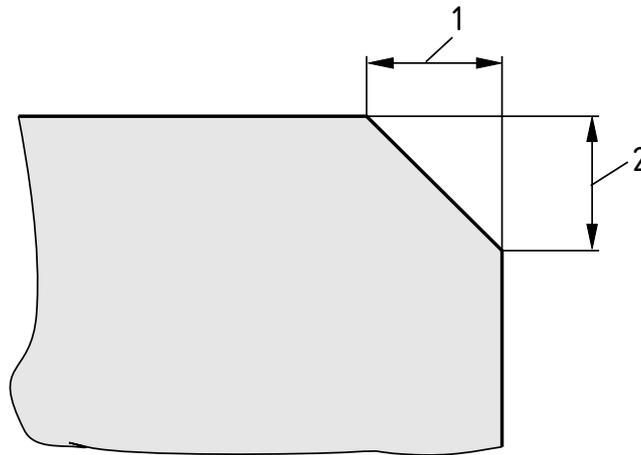
NOTE 2 Pavers for rigid paving should not incorporate spacer nibs.

4.1.2 Work dimensions

The work dimensions of length, width and thickness of rectangular pavers shall be stated in millimetres in that order. It shall also be declared in which orientation(s) the pavers may be used (i.e. which is/are the wearing face(s)). The geometry of non-rectangular pavers shall be given if necessary by reference to a scale drawing or sketch upon which the work size dimensions are marked.

The work thickness of pavers for flexible paving shall be not less than 40 mm and the work dimensions shall be such that the ratio of overall length to thickness is not greater than 6.

The work thickness for pavers for rigid paving shall be not less than 30 mm.



Key

- 1 Chamfer width
- 2 Chamfer depth

Figure 2 — Chamfer width and depth

4.1.3 Dimensional deviations

4.1.3.1 Mean

When sampled in accordance with Annex A and measured in accordance with Annex B, the mean value for a given dimension of a sample of 10 pavers shall not differ from the declared work dimension by more than $0,4\sqrt{d}$ rounded to the nearest mm, where d is the work dimension in millimetres.

NOTE Some manufacturers may be able to supply pavers to a closer deviation of the mean from the declared work dimension than is given by the above expression, in which case the appropriate declaration may be made.

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4.1.3.2 Range

The difference between the largest and the smallest measurement of any given measured dimension to be found within a sample of 10 pavers, taken from a consignment in accordance with Annex A and measured in accordance with Annex B, shall be stated by reference to one of the two classes given in Table 1.

Table 1 — Range

Class	Range (not greater than) mm
R0	No determination
R1	$0,6\sqrt{d}$

NOTE Some manufacturers may be able to supply pavers having a smaller range than indicated by class R1 in which case an appropriate declaration may be made.

The requirement for dimensional deviations does not apply to associated fittings.

4.2 Post firing chemical treatment

The test methods for freeze/thaw resistance, transverse breaking load, abrasion resistance and unpolished slip/skid resistance are determined using pavers which have had no post firing chemical treatment applied to them. If following testing to establish the performance of the paver and accessories in accordance with the requirements of this European Standard, the manufacturer wishes to apply a post firing chemical treatment, the products shall be tested both with and without the post firing chemical treatment. The testing shall be in accordance with the requirements of the relevant clause of this European Standard and the results shall be stated in accordance with the requirements of the relevant clause.

4.3 Freeze/thaw resistance

It shall be stated whether the pavers are intended to meet the criteria for freeze/thaw resistance included in the method given in Annex C.

When sampled in accordance with Annex A and tested by the chosen method the pavers shall meet the relevant criteria given in the test method. Classification of the pavers shall be indicated by the appropriate marking shown in Table 2.

Table 2 — Freeze/thaw resistance

Class	Mark	Classification
F0	F0	No determination
FP100	FP100	Freeze/thaw resistant

NOTE The freeze/thaw characteristics of FP100 clay pavers are not affected by commonly used de-icing salts.

4.4 Transverse breaking load

The transverse breaking load of the pavers for each of the orientations in which the pavers may be used shall be stated by reference to Table 3. When sampled in accordance with Annex A and tested

in accordance with Annex D, with their wearing faces uppermost, the mean value and the minimum individual value of the transverse breaking load of a sample of ten pavers shall be not less than the appropriate value given in Table 3 and be classified accordingly.

NOTE Some pavers have more than one orientation. Manufacturers who are able to supply pavers with more than one orientation should state the orientation upon which the test was performed.

Table 3 — Transverse breaking load

Class	Transverse breaking load not less than (N/mm)	
	Mean value	Minimum individual value
T0	No declaration	No declaration
T1	30	15
T2	30	24
T3	80	50
T4	80	64

NOTE 1 This requirement for transverse breaking load does not apply to accessories or to pavers whose overall length is less than 80 mm.

NOTE 2 Class T0 is only suitable for pavers intended for use for rigid laying where the pavers are laid with cementitious mortar joints on a similar mortar bed itself placed on a rigid base.

NOTE 3 The manufacturer may declare a mean value and minimum individual value higher than those corresponding to class T4.

NOTE 4 The manufacturer may declare a mean and minimum bending tensile strength value calculated from the formula given in D.4.2.51

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4.5 Abrasion resistance

The abrasion resistance value of the pavers shall be stated by reference to one of the classes given in Table 4.

When sampled in accordance with Annex A, and tested in accordance with Annex E, the mean abraded volume for a sample of five pavers obtained from two measurements on each paver shall be not greater than the appropriate value given in Table 4.

Table 4 — Abrasion resistance

Class	Mean abraded volume (not greater than) mm ³
A1	2 100
A2	1 100
A3	450

4.6 Slip/skid resistance**4.6.1 Conditions**

Clay pavers have satisfactory slip/skid resistance provided that their whole upper surface has not been ground and/or polished, or manufactured, such that a very smooth surface is produced.

4.6.2 Test method

If in an exceptional case the unpolished slip/skid resistance value (USRV) is required, the USRV of the pavers shall be stated by reference to one of the classes given in Table 5. If the pavers may be used in more than one orientation, the values for the intended wearing faces shall be declared.

NOTE The unpolished slip/skid resistance value relates to pavers as manufactured and helps to ensure adequate slip/skid on installation.

When sampled in accordance with Annex A, and tested in accordance with Annex F the mean USRV of the sub-sample of five pavers shall be not less than the value for the appropriate declared class given in Table 5 and be classified accordingly.

Table 5 — Classification of unpolished slip/skid resistance value (USRV)

Class	Mean USRV
U0	No determination
U1	35
U2	45
U3	55

NOTE Some manufacturers may declare higher values.

4.6.3 Durability of slip/skid resistance

Clay pavers have satisfactory slip/skid resistance during the working life of the product providing they are subject to normal maintenance and have not been subject to grinding and/or polishing to produce a very smooth surface.

NOTE The development of a performance based test method for the durability of slip/skid resistance is proceeding in TC 178/WG 4.

4.6.4 Requirements for the durability of slip/skid resistance

Where a requirement on durability of slip/skid resistance exists, this requirement shall be determined as described in the standard or other Technical Specification valid in the country of use of the product.

4.7 Fire performance

4.7.1 Reaction to fire

Clay paving units are “Class A1” reaction to fire without testing. Reference is made to the Commission decision 96/603/EC.

4.7.2 External fire performance

Clay pavers used as a roof covering are deemed to satisfy the requirements for external fire performance without the need for testing. See Commission decision 2000/553/EC.

4.8 Emission of asbestos

Clay pavers shall not contain asbestos material.

4.9 Emission of formaldehyde

Clay pavers shall not contain formaldehyde. After manufacture, any applied surface coating will either not contain formaldehyde or will not release formaldehyde that is in excess of safety levels.

4.10 Thermal conductivity

If clay pavers are used internally and if required, design data on thermal conductivity shall be taken from EN 1745.

4.11 Acid resistance

Where there is a requirement for resistance to acid attack as the result of accidental spillage of acid in trafficked areas, the percentage loss in mass of a sample of five pavers sampled in accordance with Annex A and tested in accordance with Annex G shall not exceed 7 %. Pavers meeting this requirement may be designated “Class C”. Manufacturers may declare a lower value than 7 %.

No post-firing surface chemical treatment shall be applied to the pavers or accessories prior to testing.