



SLOVENSKI STANDARD
oSIST prEN 1338:2010
01-oktober-2010

Betonski tlakovci - Zahteve in preskusne metode

Concrete paving blocks - Requirements and test methods

Pflastersteine aus Beton - Anforderungen und Prüfverfahren

Pavés en béton - Prescriptions et méthodes d'essai

Ta slovenski standard je istoveten z: prEN 1338

PREVIEW
(standards.iteh.ai)
<https://standards.iteh.ai/catalog/standards/sist/9f1f1a22-0a16-43fd-b671-20436436c625/osist-pren-1338-2010>

ICS:

91.100.30	Beton in betonski izdelki	Concrete and concrete products
93.080.20	Materiali za gradnjo cest	Road construction materials

oSIST prEN 1338:2010

en,fr,de

iTeh STANDARD PREVIEW
(standards.iteh.ai)

[oSIST prEN 1338:2010](#)

<https://standards.iteh.ai/catalog/standards/sist/9f1fa22-0a16-43fd-b671-20436436c625/osist-pren-1338-2010>

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 1338

July 2010

ICS 93.080.20

Will supersede EN 1338:2003

English Version

Concrete paving blocks - Requirements and test methods

Pavés en béton - Prescriptions et méthodes d'essai

Pflastersteine aus Beton - 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.

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 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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland 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.

[oSIST prEN 1338:2010](https://standards.iteh.ai/catalog/standards/sist/9f1fla22-0a16-43fd-b671-9d36430c625/osist-prEN-1338-2010)

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

Foreword.....	3
1 Scope	3
2 Normative references	3
3 Terms and definitions	4
4 Requirements for materials	6
5 Requirements for products.....	7
6 Evaluation of conformity criteria	12
7 Marking.....	17
8 Test report	17
Annex A (informative) Inspection schemes	19
Annex B (normative) Procedure for acceptance testing of a consignment at delivery.....	23
Annex C (normative) Measurement of the dimensions of a single block	25
Annex D (normative) Determination of freeze/thaw resistance with de-icing salt	29
Annex E (normative) Determination of total water absorption.....	35
Annex F (normative) Measurement of strength	37
Annex G (normative) Measurement of abrasion resistance	41
Annex H (normative) Measuring of abrasion according to the Bohme test	48
Annex I (normative) Method for the determination of unpolished slip resistance value (USRV).....	52
Annex J (normative) Verification of visual aspects.....	59
Annex K (informative) Example of the application of the method for checking conformity of tensile splitting strength by variables (6.3.8.3.B)	60
Annex ZA (informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Directive (89/106/EEC).....	63

Foreword

This document (prEN 1338:2010) has been prepared by Technical Committee CEN/TC 178 "Paving units and kerbs", the secretariat of which is held by BSI.

This document is currently submitted to the CEN Enquiry.

This document will supersede EN 1338:2003.

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.

1 Scope

This European Standard specifies materials, properties, requirements and test methods for unreinforced cement bound concrete paving blocks and complementary fittings. It is applicable to precast concrete paving blocks and complementary fittings for pedestrian use, vehicular use and roof coverings, e.g. footpaths, precincts, cycle tracks, car parks, roads, highways, industrial areas (including docks and harbours), aircraft pavements, bus stations, petrol filling stations.

This standard does not deal with the tactility or visibility of blocks.

<https://standards.iteh.ai/catalog/standards/sist/9f1fa22-0a16-43fd-b671-20136426625/iec/en-1338-2010>

Blocks with side features to provide wider joints for permeable pavements are included.

Permeable blocks with large holes or voids or with an interconnected pore structure to allow water to pass through the block to provide a porous pavement are not included.

In case of regular use of studded tyres additional requirements are sometimes needed.

This standard provides for the product marking and the evaluation of conformity of the product to this European Standard.

2 Normative references

This European Standard incorporates by dated and undated references, 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 (including amendments).

EN 10083-2, *Quenched and tempered steels — Part 2: Technical delivery conditions for unalloyed quality steels*.

EN 13369, *Common rules for precast concrete products*.

EN ISO 4288, *Geometric product specification (GPS) - Surface texture: Profile method - Rules and procedures for the assessment of surface texture (ISO 4288:1996)*.

prEN 1338:2010 (E)

EN ISO 6506-1, *Metallic materials - Brinell hardness test - Part 1: Test method (ISO 6506-1:1999)*.

EN ISO 6506-2, *Metallic materials - Brinell hardness test - Part 2: Verification and calibration of testing machines (ISO 6506-2:1999)*.

EN ISO 6506-3, *Metallic materials - Brinell hardness test - Part 3: Calibration of reference blocks (ISO 6506-3:1999)*.

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

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

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

ISO 7873, *Control charts for arithmetic average with warning limits*.

ISO 7966, *Acceptance control charts*.

ISO 8486-1, *Bond abrasives — Determination and designation of grain size distribution — Macrogrits F4 to F220*.

3 Terms and definitions

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

3.1**arris**

part of a block where two faces meet. It can be bevelled, rounded, chamfered, radiussed or splayed

3.2**concrete paving block**

precast concrete unit used as a surfacing material that satisfies the following conditions:

- at a distance of 50 mm from any edge, any cross-section does not show a horizontal dimension less than 50 mm;
- its overall length divided by its thickness is less than or equal to four.

NOTE

These two conditions are not applicable to complementary fittings.

3.3**complementary fitting**

unit, sometimes a part of a block, which is used to infill and enable an area to be completely surfaced

3.4**Permeable paving block**

block complying with this standard with side features to provide wider joints for use in permeable pavements

3.5**overall length**

longer side of the rectangle with the smallest area able to enclose the block excluding any spacer nibs

3.6**overall width**

shorter side of the rectangle with the smallest area able to enclose the block excluding any spacer nibs

3.7**thickness**

distance between the upper face and the bed face of the block

3.8**spacer ribs**

small protruding profiles on a side face of a block

3.9**upper face**

surface intended to be seen when in use

3.10**bed face**

surface generally parallel to the upper face and in contact with the bedding after laying

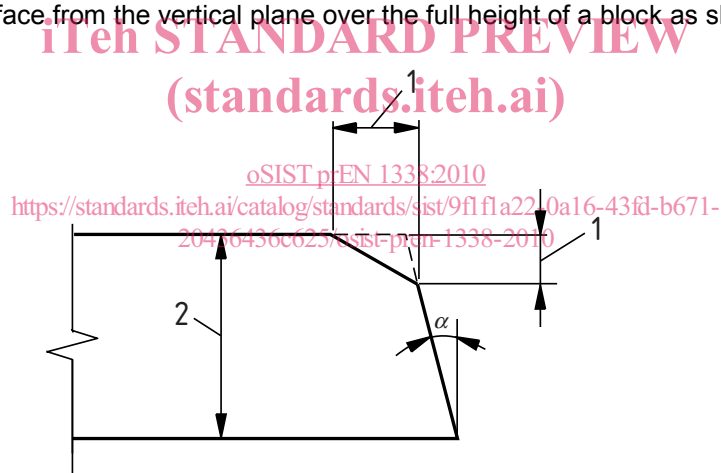
3.11**facing layer**

layer of concrete on the upper face of a block of different material and/or properties to the main body or backing layer

NOTE To be distinguished from wipe, being a fine cement mortar or slurry applied to the surface of the block.

3.12**draw**

intended angle of the side face from the vertical plane over the full height of a block as shown in Figure 1

**Key**

1 Chamfer

2 Thickness

α Draw

Figure 1 — Example of chamfer and draw

3.13**chamfer**

bevelled arris, as shown in Figure 1

prEN 1338:2010 (E)**3.14****work dimension**

any dimension of a block specified for its manufacture to which the actual dimension should conform within specified permissible deviations

3.15**secondary processing**

manufacturing process to texture the whole block or any surface, carried out after basic manufacture before or after hardening

3.16**actual dimension**

dimension of a block as measured

3.17**chased side face**

side face of a concrete paving block, having a recessed profile

3.18**skid resistance**

ability to resist relative movement between a vehicle tyre and the trafficked concrete paving block surface

3.19**slip resistance**

ability to resist relative movement between a pedestrian foot and the trafficked concrete paving block surface

3.20**format**

work dimensions of a block, specified in order of overall length, overall width and thickness

3.21**wipe**

fine cement mortar or slurry applied to the surface of the units prior to curing

3.22**permeable block**

block intended by its structure to allow the passage of water through the block. A permeable block may have large voids intended to be filled with a drainage material or small interconnecting voids that allow water to pass through.

4 Requirements for materials**4.1 General**

Only materials with suitability established in terms of their properties and performance shall be used in the manufacture of concrete paving blocks.

The suitability requirements of the materials used shall be given in the manufacturer's production control documentation.

Where, by conformity with relevant specifications, the properties and performance of materials have been demonstrated, further testing need not be performed.

A reference scheme for materials inspection is given in annex A.

4.2 Asbestos

Asbestos, or materials containing asbestos, shall not be used.

5 Requirements for products

5.1 General

The performance requirements of concrete paving blocks are defined by classes which have associated marking designations.

Blocks may be produced with a single concrete throughout or with different facing and backing layers.

When blocks are produced with a facing layer this shall have a minimum thickness of 4 mm over the area declared by the manufacturer, when measured in accordance with Annex C. Isolated particles of aggregate protruding into the facing layer shall be ignored. The facing layer shall be an integral part of the block.

A wipe shall only be carried out on a unit prior to curing, the constituents used shall be the same as in the body of the block.

An arris described as square may be bevelled or rounded, its horizontal or vertical dimensions shall not exceed 2,0 mm.

An arris with horizontal or vertical dimensions exceeding 2.0 mm shall be described as chamfered. Its dimensions and tolerances shall be declared by the manufacturer.

Blocks may be produced with functional and/or decorative profiles, which shall not be included in the work dimensions of a block.

The surface of blocks may be textured, secondary processed or treated chemically; these finishes or treatments shall be described and declared by the manufacturer.

5.2 Shape and dimensions

5.2.1 General

All references to dimensions in this sub clause are to work dimensions.

The conformity criteria corresponding to each requirement taken separately are given in 6.3.8.1. The dimensions and deviations shall be measured according to annex C.

5.2.2 Work dimensions

The work dimensions shall be stated by the manufacturer.

5.2.3 Spacer nibs, draw or chased and profiled side faces

Blocks may be produced with spacer nibs, a draw or chased and profiled side faces. When these are provided, the manufacturer shall declare their work dimensions. They are not included in the stated length or width of a block.

NOTE The size of the space allocated to the block should include an allowance for joints and deviations.

5.2.4 Permissible deviations

The permissible deviations on the manufacturers declared work dimensions are given in Tables 1, 2 and 3.

Table 1 — Permissible deviations

Block thickness mm	Length mm	Width mm	Thickness mm
< 100	± 2.0	± 2.0	± 3.0
≥ 100	± 3.0	± 3.0	± 4.0
The difference between any two measurements of the thickness of a single block shall be ≤ 3.0 mm.			

For non-rectangular blocks the deviations of the other dimensions shall be declared by the manufacturer.

When the length of the diagonals exceeds 300 mm, the maximum permissible differences between the measurement of the two diagonals of a rectangular block are given in Table 2.

Table 2 — Maximum differences

Class	Marking	Maximum difference mm
1	J	5.0
2	K	3.0
3	L	2.0

When the maximum dimension of a block exceeds 300 mm, the deviations for flatness and bow given in Table 3 shall apply to an upper face intended to be plane. When the upper face is not intended to be plane, the manufacturer shall supply the information on deviations.

Table 3 — Deviations of flatness and bow

Length of gauge mm	Maximum convex mm	Maximum concave mm
300	1,5	1,0
400	2,0	1,5

NOTE For special fields of application such as airports, other deviations can be required.

5.3 Physical and mechanical properties

5.3.1 General

The blocks shall conform to the following requirements at the time they are declared suitable for use by the manufacturer.

When complementary fittings cannot be tested according to this standard, they are considered to conform to this standard, provided they have at least the same concrete quality and manufacturing process as blocks complying with this standard.

5.3.2 Weathering resistance

5.3.2.1 Test method

The weathering resistance is determined by tests according to annex D for freeze-thaw resistance or annex E for water absorption and to the conformity criteria of 6.3.8.2.

5.3.2.2 Performance and classes

The blocks shall conform to the requirements in Table 4.1 or Table 4.2.

Recommendations as to the class(es) of weathering resistance required to ensure durability for that country, for the uses for which the product is put on the market, may be made at a national level.

Table 4.1 — Water absorption

Class	Marking	Water absorption % by mass
1	A	no performance measured
2	B	≤ 6.5

Where specific conditions exist such as frequent contact of surfaces with de-icing salts under frost conditions, the requirements defined in Table 4.2 may have to be fulfilled.

oSIST prEN 1338:2010
<https://standards.iteh.ai/catalog/standards/sist/9f1fla22-0a16-43fd-b671-26456436c029/sist-prEN-1338-2010>
Table 4.2 — Resistance to freeze-thaw with de-icing salts

Class	Marking	Mass loss after freeze/thaw test kg/m ²
3	D	≤ 1,0 as a mean with no individual value > 1,5

5.3.3 Tensile splitting strength

5.3.3.1 Test method

The characteristic tensile splitting strength T shall be determined by testing according to annex F and to the conformity criteria given in 6.3.8.3.

5.3.3.2 Performance

The characteristic tensile splitting strength T shall not be less than 3.6MPa. None of the individual results shall be less than 2.9MPa nor have a failure load less than 250N/mm of splitting length

prEN 1338:2010 (E)

5.3.3.3 Durability of strength

Under normal exposure conditions of use precast concrete blocks will continue to provide satisfactory strength, provided they conform to 5.3.3.2 and are subject to normal maintenance.

5.3.4 Abrasion resistance

5.3.4.1 Test method

Abrasion resistance is determined by the Wide Wheel Abrasion test (see annex G), or as an alternative by the Böhme test (see annex H). The Wide Wheel Abrasion test is the reference test.

5.3.4.2 Performance and classes

Requirements for abrasion resistance are given in Table 5.1

No individual result shall be greater than the required value.

Table 5.1 — Abrasion resistance classes

Class	Marking	Measured in accordance with test method Annex G	Alternatively measured in accordance with test method Annex H
1	F	No performance measured	No performance measured
3	H	$\leq 23,0 \text{ mm}$	$< 20\,000 \text{ mm}^3/5\,000 \text{ mm}^2$
4	I	$\leq 20,0 \text{ mm}$	$< 18\,000 \text{ mm}^3/5\,000 \text{ mm}^2$

oSIST prEN 1338:2010

5.3.5 Slip/skid resistance

5.3.5.1 Test Method

Slip /skid resistance is determined by testing in accordance with the test method as described in *ENV 12633*

NB If ENV 12633 is published separately as a CEN TS, the reference will need to be changed editorially before final publication

5.3.5.2 Performance and classes

Requirements for slip/skid resistance are given in Table 5.3. Both the unpolished and polished values shall, satisfy the requirements for the class

Table 5.3 — Skid Resistance classes

Class	Marking	Slip/skid resistance values
1	P	No performance measured
2	Q	≥ 35
3	R	≥ 45
4	S	≥ 55

NOTE If the surface of a block contains ridges, grooves or other surface features which prevent testing by the pendulum friction equipment, the product is deemed to satisfy the requirements of this standard without testing. Where the block is too small to provide a test area, the manufacturer shall test a larger block having the same surface finish as the block in question.

5.3.6 Fire performance

5.3.6.1 Reaction to fire

Concrete paving blocks are Class A1 reaction to fire without testing.¹⁾

5.3.6.2 External fire performance

Concrete paving blocks used as roof covering are deemed to satisfy the requirements for external fire performance without the need for testing.²⁾

5.3.7 Thermal conductivity

If concrete blocks are intended to contribute to the thermal performance of an element, then the manufacturer shall declare the thermal conductivity using design data from EN 13369.

5.4 Visual aspects

5.4.1 Appearance

The upper faces of the concrete paving blocks shall not exhibit defects such as cracking or flaking when examined in accordance with annex J. (standards.iteh.ai)

In the case of two-layer blocks and when examined in accordance with annex J there shall be no delamination (i.e. separation) between the layers.

NOTE When efflorescence occurs it is not deleterious to the performance of the blocks in use

5.4.2 Texture

In the case of blocks produced with special surface textures, the texture shall be described by the manufacturer.

If examined in accordance with annex J, conformity shall be established if there are no significant differences in texture to any samples supplied by the manufacturer and approved by the purchaser.

NOTE Variations in the texture consistency of the blocks can be caused by unavoidable variations in the properties of the raw materials and by variations in curing and are not considered significant.

5.4.3 Colour

Colours may be provided in a facing layer or throughout the block at the manufacturer's discretion.

¹⁾ Reference is made to the Commission Decision 96/603/EC, as amended.

²⁾ See Commission Decision 2000/553/EC.

prEN 1338:2010 (E)

If examined in accordance with annex J, conformity shall be established if there are no significant differences in colour to any samples supplied by the manufacturer and approved by the purchaser.

NOTE Variations in the colour consistency of the blocks can be caused by unavoidable variations in the shade and properties of the raw materials and by variations in curing and are not considered significant.

6 Evaluation of conformity criteria**6.1 General**

For the purpose of testing, the manufacturer may group products into families, where it is considered that the value of a selected property is common to all products within that family. Such families are:

- 1) strength family: blocks manufactured using the same mix design and production methods, irrespective of dimensions and colours;

NOTE Failure load is dependent upon block thickness

- 2) surface family: blocks with face mixes having the same main aggregate used in the mix (e.g. natural river gravel, crushed granite, porphyr, basalt or limestone) and the same surface treatment of the finished product, irrespective of dimensions and pigmentation.

6.1.1 Demonstration of conformity

The manufacturer shall demonstrate conformity of his product with the requirements of this standard and with the declared values (levels or classes) for the product properties by carrying out both:

type testing of the product (see 6.2);

factory production control (see 6.3), including product testing

6.1.2 Assessment of conformity

In addition, conformity of the product with this standard may be assessed:

- either by a third party inspecting the manufacturer's type testing and factory production control procedures;
- or by acceptance testing of a consignment at delivery (e.g. in the case of dispute, see annex B).

6.2 Type testing of the product**6.2.1 Initial type testing**

Initial type testing shall be performed to demonstrate conformity with this standard at the beginning of the manufacture of a new product type or a family of product types, or setting up a new production line, to confirm that the achieved properties of the product meet the requirements of this standard and the values declared for it by the manufacturer.

6.2.2 Further type testing

Whenever a change occurs in the raw materials, the proportions used or the production equipment or process, which would change significantly some or all of the properties of the finished product, the type tests shall be repeated for the selected property or properties.

NOTE Examples of major changes:

- 1) change from natural river gravel to crushed rock aggregates or change of cement type or class;
- 2) partial substitution of cement by additions.

For abrasion and weathering resistance, type testing shall be repeated periodically with the frequency given in Table 6 even when no change occurs.

Table 6 — Periodically repeated type testing

Property	Frequency
Abrasion (only classes 3 and 4)	Once per year per surface family
Weathering resistance (only class 3)	Once per year per surface family ¹⁾
¹⁾ If for a surface family the result of a type test (mass loss) is lower than 50 % of the required value the test frequency may be reduced to once per two years. If for a surface family, routine water absorption testing at the frequency for class 2 products (see 6.3.8.2.) is carried out to demonstrate consistency with blocks submitted to freeze/thaw testing, the required test frequency may be reduced to once per two years.	

6.2.3 Sampling, testing and conformity criteria

SIST prEN 1338:2010
<https://standards.iteh.ai/catalog/standards/sist/9f1fa22-0a16-43fd-b671-2b436436-f25/sist-pr-en-1338-2010>

The number of blocks to be tested shall be in accordance with Table 7 for the selected property.