SLOVENSKI STANDARD
SIST EN 1341:2002

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Nadomešča:
SIST EN 1341:2001

Plošče iz naravnega kamna za zunanje tlakovanje - Zahteve in preskusne metode

Slabs of natural stone for external paving - Requirements and test methods

Platten aus Naturstein für Außenbereiche - Anforderungen und Prüfverfahren

Dalles de pierre naturelle pour le pavage extérieur - Exigences et méthodes d'essai

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Slabs of natural stone for external paving - Requirements and test methods

Dalles de pierre naturelle pour le pavage extérieur - Exigences et méthodes d'essai

Platten aus Naturstein für Außenbereiche - Anforderungen und Prüfverfahren

This European Standard was approved by CEN on 14 October 2001.

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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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Contents

Foreword

This European Standard has been prepared by Technical Committee CEN/TC 178 "*Paving units and kerbs*", the secretariat of which is held by BSI.

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of an identical text or by endorsement, at the latest by June 2002, and conflicting national standards shall be withdrawn at the latest by September 2003.

This European Standard supersedes EN 1341:2000.

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).

For relationship with EU Directive(s), see informative annex ZA, which is an integral part of this standard.

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, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard specifies the performance requirements and the corresponding test methods for all natural stone slabs, for external paving use.

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

This European Standard covers also characteristics that are of importance to the trade.

It does not cover internal flooring tiles or slabs nor does it cover the effect of de-icing salts (see clause 4.2).

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 (including amendments).

EN 12371, *Natural stone tests methods — Determination of frost resistance*

EN 12372, *Natural stone test methods — Determination of flexural strength under concentrated load*

EN 12407, *Natural stone test methods — Petrographic description*

EN 10083-2:1996, *Quenched and tempered steels — Part 2: Technical delivery conditions for unalloyed quality steels*

EN 13755, *Natural stone test methods — Determination of water absorption at atmospheric pressure*

3 Terms and definitions

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

3.1
slab
any unit of natural stone used as a paving material, in which the working width exceeds 150 mm and also generally exceeds two times the thickness

3.1.1
riven slab
slab with split face

3.1.2
textured slab
slab with a modified appearance resulting from one or several surface treatments (for example mechanical or thermal)

3.2
upper face
surface of a slab intended to be seen when in use

3.3
side face
surfaces of a slab intended to be vertical in use

3.4
work dimension
any dimension of a slab specified for its manufacture to which the actual dimension should conform within specified permissible deviations

3.5
actual dimension
any dimension of a slab as measured

3.6
thickness
distance between the upper face and the bedface of the slab

3.7
overall length
the longer side of the rectangle with the smallest length able to enclose the slab

3.8
overall width
the shorter side of the rectangle with the smallest area able to enclose the slab

3.9
fine textured
surface treatment with a maximum difference of 0,5 mm between peaks and depressions (for example polished, honed or sawn with a diamond disc or blade)

3.10
honed
dull polish or matt surface

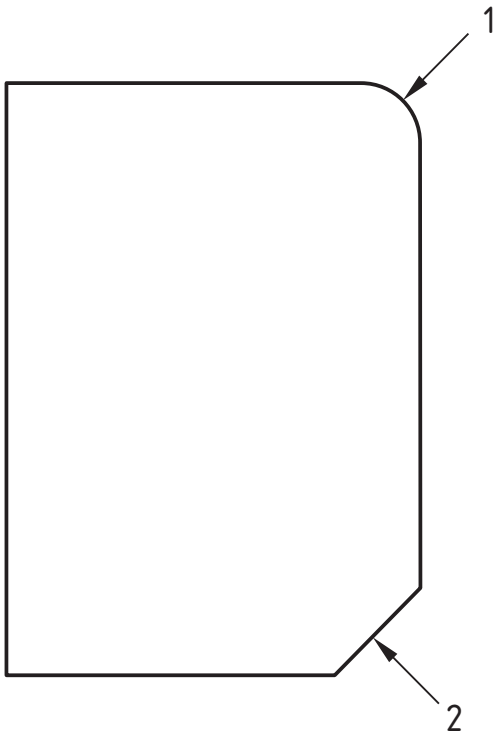
3.11
coarse textured
surface treatment with more than 2 mm difference between peaks and depressions (for example dolly pointed, tooled, shot blasted or flame textured)

3.12
dolly pointed
finish consisting of peaks and depressions achieved by using a four pointed dolly bit

3.13
tooled
finish resulting from mechanical surface treatment and showing tool marks

3.14
arris
sharp edge produced by the meeting of two surfaces

3.15
chamfer
bevelled arris as shown in Figure 1



Key

1 Rounded arris

2 Bevelled arris

Figure 1 — Chamfer

4 Requirements

4.1 Dimensions

4.1.1 General

The supplier shall state the work dimensions of each slab that is tested, unless supplied in random sizes. Where supplied in running lengths, only the widths and thickness shall be stated.

Dimensions shall be measured in accordance with annex A.

4.1.2 Permissible deviations

4.1.2.1 Plan dimensions (excluding slabs with irregular plan form)

When measured in accordance with A.2 or A.3, the deviation from the work plan dimensions shall conform to those in Table 1.

Table 1 — Deviations on plan dimension

	Class 1	Class 2
Marking Designation	P1	P2
Sawn edges ≤ 700 mm	± 4 mm	± 2 mm
Sawn edges > 700 mm	± 5 mm	± 3 mm
Riven edges	± 10 mm	± 10 mm

When measured in accordance with A.2 or A.3, the maximum difference between the measurement of the two diagonals of a rectangular slab shall not exceed the values given in Table 2.

Table 2 — Deviations on diagonals

Class	Diagonal	Difference
Marking Designation	D1	D2
1	< 700	6 mm
	≥700	8 mm
2	< 700	3 mm
	≥700	6 mm

4.1.2.2 Thickness

When measured in accordance with A.4, the deviation from the work thickness of textured slabs shall conform to Table 3.

Table 3 — Deviation on thickness

Textured slabs	Class 0	Class 1	Class 2
Marking Designation	T0	T1	T2
≤ 30 mm thick	No requirement for thickness measurement	± 3 mm	± 10 %
30 mm < thickness ≤ 60 mm		± 4 mm	± 3 mm
> 60 mm thick		± 5 mm	± 4 mm

For riven slabs there is no requirement but a producer may declare appropriate permissible deviations measured in accordance with A.4.

4.1.2.3 Face irregularities

When measured in accordance with A.5 the face irregularities on riven slabs shall be a maximum of 20 mm above work thickness and not below work thickness.

4.1.2.4 Flatness and straightness

4.1.2.4.1 Arrises

When measured in accordance with A.6 the flatness deviation along the arrises of textured slabs shall conform to Table 4.

Table 4 — Deviation on flatness along arrises

Longest test straight edge	0,5 m	1 m	1,5 m
Fine textured face	± 2 mm	± 3 mm	± 4 mm
Coarse textured face	± 3 mm	± 4 mm	± 6 mm

4.1.2.4.2 Faces

When measured in accordance with A.6 the deviations from flatness and bow shall conform to Table 5 unless the surface is riven in which case the supplier/manufacturer shall supply information on deviations.

Table 5 — Deviation on flatness for faces

Fine texture		
Gauge length[a]	**Max. convex deviation**	**Max. concave deviation**
(mm)	(mm)	(mm)
300	2,0	1,0
500	3,0	2,0
800	4,0	3,0
1000	5,0	4,0
Coarse texture		
Gauge length[a]	**Max. convex deviation**	**Max. concave deviation**
(mm)	(mm)	(mm)
300	3,0	2,0
500	4,0	3,0
800	5,0	4,0
1000	8,0	6,0
[a] See Figure A.1.		

4.1.2.5 Arrises

Arrises described as square or sharp may have a bevel with horizontal or vertical dimensions not exceeding 2 mm at the manufacturer's discretion.

When slabs are supplied with a chamfered or rounded arris, the dimensions shall be declared by the producer and the vertical and horizontal dimension shall be within ± 2 mm of the declared dimensions.

4.2 Freeze/thaw resistance

The producer shall declare the freeze/thaw resistance of the stone in accordance with Table 6 when tested in accordance with EN 12371.The number of cycles shall be 48. The test is carried out to determine the effect of freeze/thaw cycles on performance characteristics (EN 12372 flexural strength).

For some specific uses it may be appropriate to use different test cycles, for example freezing in water, freezing to a lower temperature, or testing specimens embedded in non-porous siliceous granules or a different number of cycles. In these cases national specification standards may be followed but these variations shall be clearly stated in the test report.

If there is no requirement for freeze/thaw resistance or no performance has been determined, then this shall be stated.

Table 6 — Freeze/thaw resistance

Class	Class 0	Class 1
Marking designation	F0	F1
Requirement	No requirements for freeze/thaw resistance	Resistant (≤ 20% change in flexural strength)

4.3 Flexural strength

The producer shall declare a flexural strength in megapascals (MPa) as the minimum value expected for individual test specimens when tested in accordance with EN 12372. If no performance has been determined this shall be stated.

NOTE Guidance on the appropriate breaking load for different classes of use is given in annex B.

4.4 Abrasion resistance

The producer shall declare the abrasion resistance (length of chord in millimetres (mm)) as the maximum value expected for individual test specimens when tested in accordance with annex C. If no performance has been determined this shall be stated.

4.5 Slip/Skid resistance

The producer shall declare the minimum Unpolished Slip Resistance Value (USRV) expected for individual test specimens of fine textured slabs when tested in accordance with annex D. If no performance has been determined this shall be stated.

If a national requirement on durability of slip/skid resistance exists, this requirement shall be determined as described in the national standard valid in the country where this requirement is operational.

NOTE 1 Coarse textured and riven slabs are assumed to give satisfactory slip resistance. They cannot be reliably tested.

NOTE 2 The unpolished slip resistance value relates to slabs as manufactured and helps to ensure adequate slip/skid resistance on installation.

NOTE 3 Experience has indicated that a USRV measurement made using a wide slider / full swing on a TRL type pendulum that is greater than 35 can usually be considered safe.

4.6 Aspects

4.6.1 Appearance

Stone is a naturally occurring material giving rise to variations in colour, veining and texture, therefore, general characteristics of the appearance may be given by one or more specimens (see 4.6.2).

4.6.2 Reference sample

A reference sample shall be a number of pieces of natural stone of sufficient size to indicate the appearance of the finished work. The dimensions shall be between 0,01 m^2 and 0,25 m^2 in face area and shall indicate the approximate appearance regarding the colouring, the vein pattern, the physical structure and face finish.

It shall show the general tonality and finish of the natural stone, but does not imply any total uniformity in colour and veins between the sample and supply.

The reference sample shall be provided and delivered to the customer as an indication to show specific characteristics such as holes for travertine, worm holes for marble, glass seams, spots, crystalline veins and rusty spots of the offered materials.

NOTE These characteristics should not be considered as flaws and should not be used as a reason for rejection.

The name and address of the producer or the supplier shall be indicated on the sample as well as identification of the material including trade name, petrographic name, country of origin and extraction area.

Reference samples shall also show the surface finish proposed.

Any comparison between test and reference samples shall be carried out by placing the reference sample against the test specimens and viewing them at a distance of two metres under normal lighting conditions and recording any visible differences in appearance, texture or colour.

4.7 Water absorption

Where required the producer shall declare the water absorption (% by mass) as the maximum value expected for individual specimens when tested in accordance with EN 13755.

4.8 Petrographical description

The producer shall provide a petrographical description, including a petrographic name, of the stone type, in accordance with EN 12407.

4.9 Chemical surface treatment

The producer/supplier shall declare if the product has been subjected to a chemical surface treatment and what the treatment was.

5 Evaluation of conformity

5.1 General

The compliance of this product with the requirements of this standard and with the declared values or classes for the current properties shall be demonstrated by carrying out initial testing and factory production control. Where tests have previously been done in conformity with the requirements of this standard (same product, same characteristic, test method and sampling method) the results may be taken into account for initial type testing.

The value declared shall be representative of the current production, for example the lowest expected value or the minimum test value in normal production.