
Skrilavec in drugi izdelki iz naravnega kamna za polaganje streh in zidov - 1. del:
Specifikacije proizvoda

Slate and stone products for discontinuous roofing and cladding - Part 1: Product specification

Schiefer und andere Natursteinprodukte für überlappende Dachdeckungen und Außenwandbekleidungen - Teil 1: Produktspezifikation

Ardoises et éléments en pierre pour toiture et bardage pour pose en discontinu - Partie 1: Spécifications produit

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English version

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Produktspezifikation

This European Standard was approved by CEN on 23 April 2004.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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 Central Secretariat 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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Foreword

This document (EN 12326-1:2004) has been prepared by Technical Committee CEN/TC 128 "Roof covering products for discontinuous laying and products for wall cladding", the secretariat of which is held by IBN.

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of an identical text or by endorsement, at the latest by January 2005, and conflicting national standards shall be withdrawn at the latest by January 2005.

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.

This document includes a Bibliography.

This European Standard EN 12326-1 is one of a series of product standards for building materials. It is published in two parts as follows:

Part 1: Product specification

Part 2: Methods of test

No existing European Standard is superseded.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Introduction

The evaluation of the performance of the products has been defined, as far as possible, in terms of a number of type tests. A distinction has been made between product appraisal (type test) and routine factory production control requirements.

The performance of a roof or wall constructed with these products depends not only on the properties of the product as required by this document, but also on the design, construction and performance of the roof or wall as a whole in relation to the environment and conditions of use.

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1 Scope

This document specifies requirements for slate and stone products for roofing and external cladding, as defined in 3.1, 3.2 and 3.3, used for assembly into discontinuous roofing and external cladding (except bonded cladding).

This document does not apply to products for roofing or external cladding made from the following:

- a) stone other than those defined in 3.1, 3.2 and 3.3;
- b) concrete;
- c) polymeric materials;
- d) fibre reinforced cement;
- e) metal;
- f) clay.

This document is not applicable to roofing and cladding slates used internally.

NOTE 1 Requirements for internal wall lining slate are specified in prEN 1469.

This document is not applicable to bonded cladding (cladding fixed with adhesives).

For the purposes of this document, slates for roofing and external cladding have been classified according to the product type and the stone from which they are made.

This document does not include requirements for appearance.

NOTE 2 Some general guidance for appearance is given in Annex A.

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 12326-2:2000, *Slate and stone products for discontinuous roofing and cladding — Part 2: Methods of test.*

EN ISO 9001, *Quality management systems - Requirements (ISO 9001:2000).*

ISO 2859-1:1999, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection.*

3 Terms and definitions

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

3.1

slate (commercial definition)

rock which is easily split into thin sheets along a plane of cleavage resulting from a schistosity flux caused by very low or low grade metamorphism due to tectonic compression

NOTE 1 It is distinguished from sedimentary (stone) slate, which invariably splits along a bedding or sedimentation plane.

NOTE 2 Slate originates from clayey sedimentary rocks and belongs petrographically to a range which begins at the boundary between sedimentary and metamorphic formations and ends at the epizonal-metamorphic phyllite formations.

3.2
roofing slate
rock used for roofing and external cladding, in which phyllosilicates are the predominant and most important components and exhibiting a prominent slaty cleavage

3.3
roofing carbonate slate
rock used for roofing and external cladding, containing phyllosilicates and a minimum carbonate content of 20 % and exhibiting a prominent slaty cleavage

3.4
vein
separately identifiable band of slate rock within the geological formation of a quarry or mine

3.5
vein
(in a roofing or external cladding slate), localized occurrence, usually passing through the thickness of a slate, of minerals that have intruded or infiltrated into a joint or fissure in the parent rock

3.6
grain
orientation of the minerals in slate which results in an anisotropic bending strength

NOTE In the bending strength test, grain is perpendicular to the load bar in the test that usually gives the highest failure result.

3.7
Student's *t*-test
standard parametric statistical test used to test hypotheses about population means when the variance(s) are known

NOTE 1 See ISO 3534-1.

NOTE 2 In this document, the Student's *t*-test is used to test for significant differences between the means of two populations.

3.8
rectangular slate
slate which is square or rectangular including such slates which have been shouldered

3.9
shouldering
removal of the upper corners of a roofing or external cladding slate to facilitate laying

NOTE This description does not apply to special designs of slates.

3.10
shouldered slate
slate from which the upper corners have been removed

3.11
type test
product appraisal test concerned with one or more of the following, the effect of which cannot be anticipated on the basis of previous tests:

- the operation of a new quarry, mine or vein of slate for the first time;
- an unanticipated change in the geology of the rock

3.12**factory production control test**

test performed on samples drawn from continuous production to establish whether a lot conforms to this document

3.13**nominal thickness**

thickness of slates declared by the manufacturer

3.14**packed thickness**

thickness of 100 packed slates divided by 100 and reduced by a factor depending on the type of slate measured

NOTE See EN 12326-2:2000, Table 2 and 8.1.

3.15**basic individual thickness**

thickness of slates determined from the modulus of rupture, as shown in Annex B, and/or from traditional construction methods

NOTE See informative Annex B and informative Annex C.

3.16**minimum individual thickness**

minimum thickness of slates determined by adjusting the basic individual thickness in accordance with 5.2.3

3.17**modulus of rupture**

maximum stress sustained by a slate test piece when a bending moment is applied

NOTE In this document, the arrangement of the test is three point bending.

3.18**random slates**

slates or sets of slates produced to undefined dimensions

4 Symbols and abbreviations

AQL	acceptable quality level
$A1, A2$	codes applied to the result of the water absorption test
b	width of a slate, in millimetres
e_{bi}	basic individual thickness of roofing slates determined from the modulus of rupture and/or traditional construction methods, in millimetres
e_i	individual thickness of roofing slates, in millimetres
e_l	thickness of a slate calculated as a function of its longitudinal modulus of rupture and the X factor, in millimetres
e_{mi}	minimum thickness of individual slates, in millimetres
e_p	the thickness of packed slates, in millimetres
e_s	depth of softening in the sulfur dioxide exposure test for slates with a carbonate content greater than or equal to 20 %, in millimetres

e_t	thickness of a slate calculated as a function of its transverse modulus of rupture and the X factor, in millimetres
l	length, in millimetres
R_{cl}	characteristic longitudinal modulus of rupture, in megapascals
R_{ct}	characteristic transverse modulus of rupture, in megapascals
S1, S2, S3	codes applied to the result of the sulfur dioxide exposure test for slates with a carbonate content of less than 20 %
S-3	inspection level defined in ISO 2859-1
T1, T2, T3	codes applied to the result of the thermal cycle test
X	nationally designated constant determined as a function of climate and/or construction techniques, in root newtons.root millimetres ($N^{1/2}.mm^{1/2}$)

5 Requirements

5.1 Origin and petrography

A petrographic examination as specified in EN 12326-2:2000, Clause 17, shall be carried out for identification purposes and to decide whether the product falls within the scope of this document.

Every slate in a consignment shall be supplied from the declared source quarry, mine or vein of slate and shall be of the declared slate type as defined in 3.2 or 3.3.

5.2 Thickness

5.2.1 General

A flow chart for the control of nominal and individual thickness of slates is given in Figure 1.

5.2.2 Nominal thickness

Manufacturers shall declare the nominal thickness of each roofing slate product in millimetres, and the amount by which the individual thickness varies as a percentage of the nominal thickness.

5.2.3 Individual thickness

5.2.3.1 The measurement of individual thickness shall be carried out in accordance with 8.2 of EN 12326-2:2000. The individual thickness of the slates shall not be less than 2,0 mm.

5.2.3.2 The minimum individual thickness of slates (e_{mi}) shall be determined as a function of their mechanical resistance — the bending strength and modulus of rupture (determined in accordance with EN 12326-2:2000, Clause 10) — and the climatic conditions or the traditional construction techniques in the country of use, increased by the appropriate value given in 5.2.3.3, 5.2.3.4 and/or 5.2.3.5. The minimum individual thickness shall be the largest value determined using any of the above factors.

NOTE 1 The mechanical resistance of a slate is a function of both the inherent strength of the rock from which it is made and its thickness. Annex B of this document provides a method of calculating the basic individual thickness (e_{bi}).

NOTE 2 The usual construction techniques can be given in national regulations or national standards for execution. A list of documents is given in Annex C.

NOTE 3 Member States can explain their national rules used to determine the minimum thickness of slates in an informative national annex.

5.2.3.3 The increase in the basic individual thickness of slates (e_{bi}) with a carbonate content equal to or less than 20 % (determined in accordance with EN 12326-2:2000, Clause 14) shall not be less than the appropriate value shown in Table 1 for the relevant sulfur dioxide exposure code S1 or S2 in 5.9.1 (as determined in accordance with EN 12326-2:2000, 15.1).

5.2.3.4 Slates with a carbonate content equal to or less than 20 %, (determined in accordance with EN 12326-2:2000, Clause 14) and achieving a sulfur dioxide exposure code S3 in 5.9.1 (determined in accordance with EN 12326-2:2000, 15.1) shall have a minimum individual thickness of not less than 8,0 mm or the thickness determined in accordance with EN 12326-2:2000, 15.2, and 5.2.3.5 of this document.

5.2.3.5 The increase in basic individual thickness of slates (e_{bi}) with a carbonate content greater than 20 % (determined in accordance with EN 12326-2:2000, Clause 14) or of slates achieving a sulfur dioxide exposure code S3 (determined in accordance with EN 12326-2:2000, 15.1) shall not be less than the value obtained using the following equation:

$$e_{mi} = e_{bi} + 0,5 + (7 e_s^2)$$

where

e_{mi} is the minimum individual thickness, in millimetres;

e_{bi} is the basic individual thickness, in millimetres (see Annex B);

e_s is the thickness of the softened layer, in millimetres.

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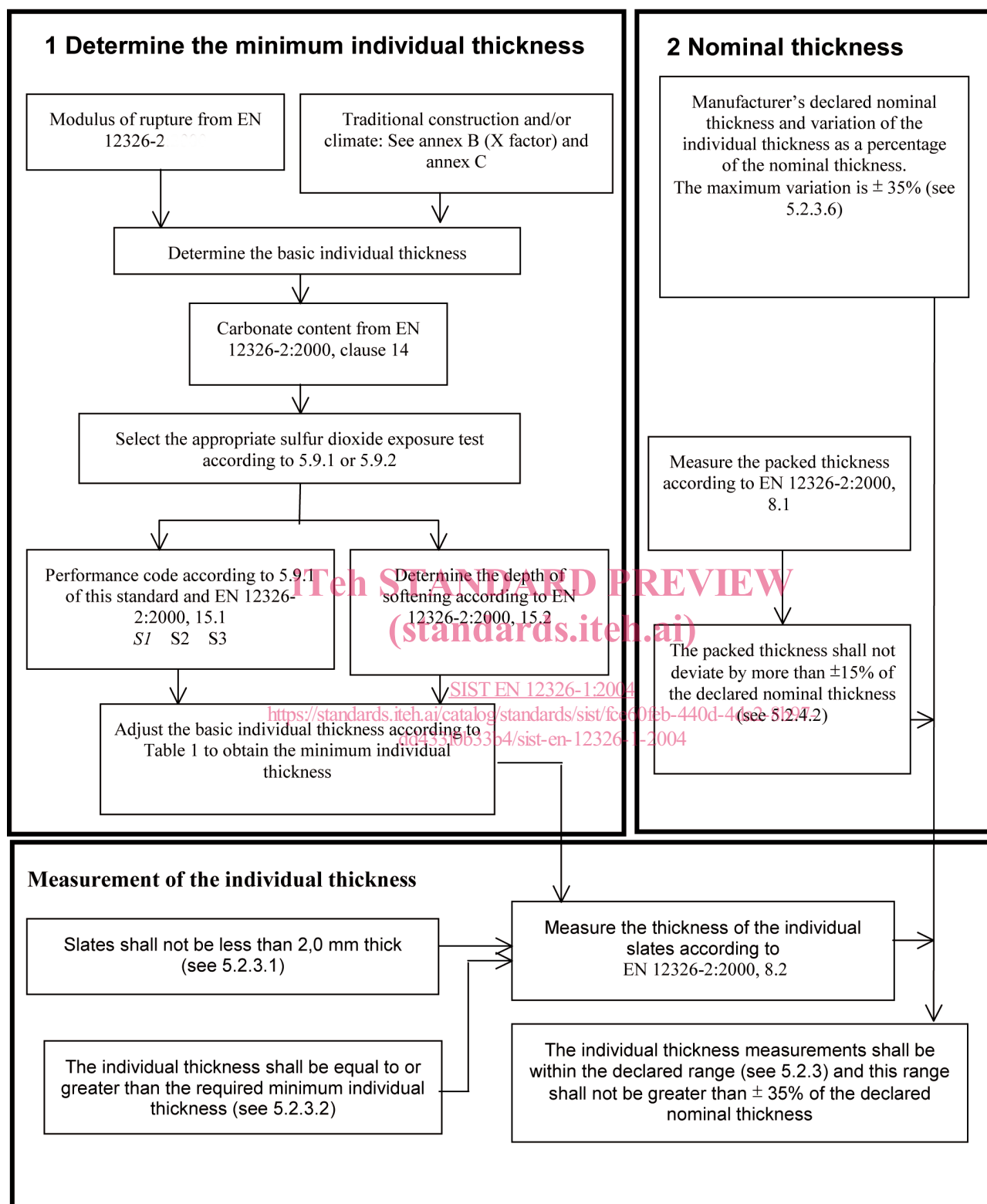


Figure 1 — Flow chart for the control of the nominal and individual thickness of slates