BRITISH STANDARD

BS EN
1469:2004

Natural stone products — Slabs for cladding — Requirements

The European Standard EN 1469:2004 has the status of a British Standard

ICS 91.100.15

BSI
British Standards

National foreword

This British Standard is the official English language version of EN 1469:2004.

EN 1469 is a candidate "harmonized" European Standard and fully takes into account the requirements of the European Commission mandate M121 — Internal and external wall and ceiling finishes given under the EU Construction Products Directive (89/106/EEC), and is intended to lead to CE marking. The date of applicability of EN 1469 as a "harmonized" European Standard, i.e. the date after which this standard may be used for CE marking purposes, is subject to an announcement in the Official Journal of the European Communities. The Commission in consultation with Member States has agreed a transition period for the co-existence of "harmonized" European Standards and their corresponding national standards(s). It is intended that this period will comprise a period, usually nine months, after the date of availability of the European Standard, during which any required changes to national regulations are to be made, followed by a further period, usually of 12 months, for the implementation of CE marking. At the end of this co-existence period, the national standard(s) will be withdrawn.

EN 1469:2004 is the subject of transitional arrangements agreed under the Commission mandate. In the UK, there are no corresponding national standards.

The UK participation in its preparation was entrusted to Technical Committee B/545, Natural stone, which has the responsibility to:

— aid enquirers to understand the text;
— present to the responsible international/European committee any enquiries on the interpretation, or proposals for change, and keep the UK interests informed;
— monitor related international and European developments and promulgate them in the UK.

A list of organizations represented on this committee can be obtained on request to its secretary.

Cross-references

The British Standards which implement international or European publications referred to in this document may be found in the *BSI Catalogue* under the section entitled "International Standards Correspondence Index", or by using the "Search" facility of the *BSI Electronic Catalogue* or of British Standards Online.

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EUROPEAN STANDARD

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EUROPÄISCHE NORM

EN 1469

November 2004

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English version

Natural stone products - Slabs for cladding - Requirements

Pierre naturelle - Produits finis, dalles de revêtement mural - Spécifications

Natursteinprodukte - Bekleidungsplatten - Anforderungen

This European Standard was approved by CEN on 2 September 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.

CEN members are the national standards bodies of 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.

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

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Contents

Foreword

This document (EN 1469:2004) has been prepared by Technical Committee CEN/TC 246 “Natural stones”, the secretariat of which is held by UNI.

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 May 2005, and conflicting national standards shall be withdrawn at the latest by August 2006.

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 European Standard is one of a series of standards for specifications of natural stone products which includes the following:

EN 1467:2003, *Natural stone - Rough blocks - Requirements*.

EN 1468:2003, *Natural stone - Rough slabs - Requirements.*

EN 1469:2004, *Natural stone products - Slabs for cladding - Requirements*.

EN 12057:2004, *Natural stone products - Modular tiles - Requirements*.

EN 12058:2004, *Natural stone products - Slabs for floors and stairs - Requirements*.

prEN 12059:2003, *Natural stone products - Dimensional stone work - Requirements*.

Other standards on natural stone are produced by:

CEN/TC 178 Paving units and kerbs

EN 1341, *Slabs of natural stone for external paving - Requirements and test methods.*

EN 1342, *Setts of natural stone for external paving - Requirements and test methods.*

EN 1343, *Kerbs of natural stone for external paving - Requirements and test methods.*

CEN/TC 128 Roof covering products for discontinuous laying and products for wall cladding

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

EN 12326-1, *Slate and stone products for discontinuous roofing and cladding - Part 1: Product specification.*

CEN/TC 125 Masonry

EN 771-6, *Specification for masonry units - Part 6: Natural stone masonry units.*

Other standards are relevant to stone aggregates for concrete, roads, railways and armourstone (under study within CEN/TC 154).

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.

1 Scope

This document specifies requirements for slabs of natural stone which are made for use as cladding and ceiling finishes. It does not cover aggregates and artificially agglomerated stony material and does not cover installation for cladding.

NOTE It does not cover roofing slates used as external cladding.

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 1925, *Natural stone test methods - Determination of water absorption coefficient by capillarity*.

EN 1936, *Natural stone test method - Determination of real density and apparent density and of total and open porosity.*

EN 12371, *Natural stone test 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 examination.*

EN 12440, *Natural stone - Denomination criteria*.

EN 12524, *Building materials and products - Hygrothermal properties - Tabulated design values.*

EN 12670:2001, *Natural stone - Terminology*.

EN 13161, *Natural stone test methods - Determination of flexural strength under constant moment.*

EN 13364:2001, *Natural stones test methods - Determination of breaking load at a dowel hole*.

EN 13373, *Natural stone test methods - Determination of geometric characteristics on units.*

EN 13501-1, *Fire classification of construction products and building elements - Part 1: Classification using test data from reaction to fire tests.*

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

EN 14066, *Natural stone test methods - Determination of resistance to ageing by thermal shock.*

EN ISO 12572, *Hygrothermal performance of building materials and products - Determination of water vapour transmission properties (ISO 12572:2001).*

NOTE Besides the European Standards for test methods mentioned in this clause, there exist further standards which can be used for scientific examinations, but which are not relevant for the application in practice according to this standard.

3 Terms and definitions

For the purpose of this document the terms and definitions given in EN 12670:2001 and the following apply.

3.1
slab for cladding
slab cut to size which forms a wall covering and ceiling finishes for outside or inside use, fixed to a structure either mechanically or by means of mortar or adhesives

NOTE Mortar as defined in EN 998-1.
Adhesives as defined in EN 12004.

3.2
dimensions of slabs for cladding
the length *l*, width *b* and thickness *d* are the dimensions of a slab for cladding. They are given in the stated sequence in millimetres (see Figure 1)

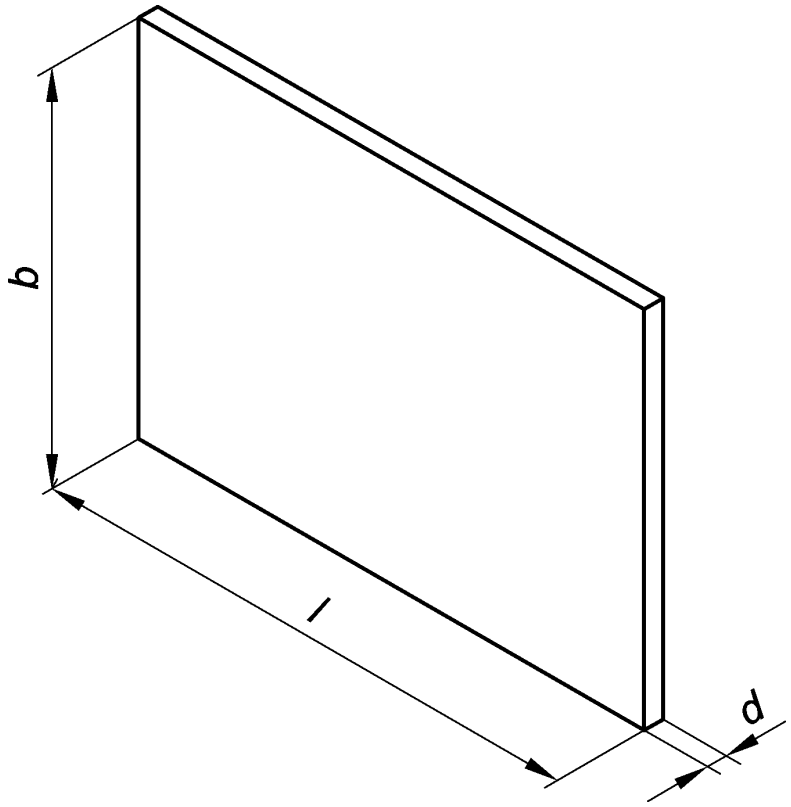


Figure 1 — Dimensions of a slab for cladding

4 Requirements

4.1 Requirements for geometric characteristics

4.1.1 General

All measurements shall be carried out in accordance with EN 13373 and all measured values of individual units shall fall within the required tolerances.

4.1.2 Requirements for thickness

The thickness shall not deviate from the nominal thickness by more than given in Table 1.

Table 1 — Tolerances on the nominal thickness

Nominal thickness in mm	Tolerance
More than 12 Up to and including 30	± 10 %
More than 30 Up to and including 80	± 3 mm
More than 80	± 5 mm

Stricter tolerances may be declared by the manufacturer. This is particularly important when the edges of the slabs will be visible.

NOTE If the slab is to be fixed by adhesive or a thin mortar bed, stricter tolerances may be needed.

The required thickness of slabs shall result from a structural analysis or similar procedure which takes into account the technical and physical properties of the stone and the intended application.

For natural cleft/riven faces, Table 1 does not apply and the tolerances on thickness shall be declared by manufacturer.

4.1.3 Requirements for flatness

The deviation from flatness of the surface (except for natural cleft faces) shall not exceed 0,2 % of the slab length, and shall not exceed 3 mm. For natural cleft faces, the tolerance on flatness shall be declared by manufacturer.

4.1.4 Requirements for length and width

The length or width shall not deviate from the nominal size by more than given in Table 2.

Table 2 – Tolerances on length and width

Nominal length or width in mm	< 600	≥ 600
Sawn edges thickness ≤ 50 mm	± 1 mm	± 1,5 mm
Sawn edges thickness > 50 mm	± 2 mm	± 3 mm

Stricter tolerances may be declared by the manufacturer.

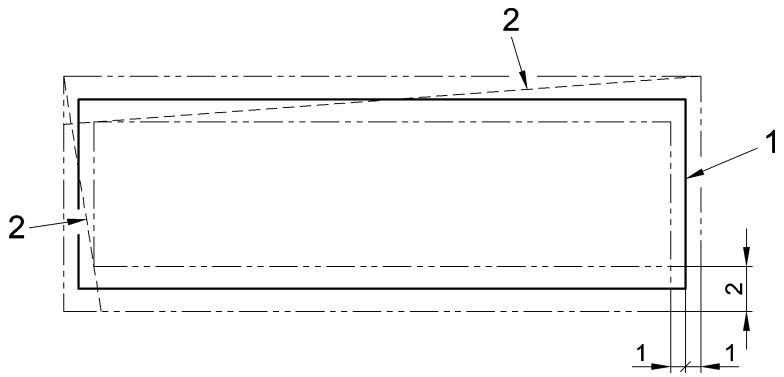
4.1.5 Requirements for angles and special shapes

The permissible tolerance at any point shall be as stated in Table 2 (see Figure 2).

Each slab angle shall be in accordance with the agreed geometry. Pieces of special or irregular shape shall be checked for compliance with the required shape by use of a suitable template, the permissible tolerance at any point shall be as stated in Table 2.

Stricter tolerances may be declared by the manufacturer. This is particularly important when the edges of the slabs will be visible.

Dimensions in millimetres



Key
1 Nominal size
2 The slab sides shall fall within the two dotted lines indicating the tolerances of length and width according to Table 2

Figure 2 — Example of tolerances on angles

4.1.6 Requirements for location of dowel holes

The specified location, depth and diameter (shape) of dowel holes shall be as follows:

- Location measured along the length or width of the slab: ± 2 mm
- Location measured along thickness: ± 1 mm (to be measured from the exposed face)
- Depth: + 3 / - 1 mm
- Diameter: + 1 / - 0,5 mm

Stricter tolerances may be declared by the manufacturer.

For other fixing systems (e.g. slots), specific tolerances shall be declared by the manufacturer.

4.1.7 Commercial sizes of slabs for cladding

Commercial sizes shall be based on the area of the smallest possible circumscribed rectangle measured in square metres accurate to two decimal places.

NOTE For small units it may be necessary to agree a minimum size, for example 0,25 m^2.

4.1.8 Requirements for surface finish

4.1.8.1 General

Surface finishes shall be carried out uniformly to the edges of the cladding slab.

The surface finishing of some types of stones may typically involve the use of patching, fillers or other similar products for natural holes, faults or cracks; this is to be considered as part of the normal processing. In such cases the type of treatment, as well as the type and nature of additional materials, shall be declared.

4.1.8.2 Requirements for surfaces after surface finishing

Surfaces shall have a regular appearance as a function of the finishing process and shall be worked to meet the specified finish (e.g. making reference to samples, see 4.2.3) on all exposed surfaces.

NOTE 1 Surfaces obtained by grinding are, for example:

– rough ground surfaces obtained, e.g. by means of a grinding disk of grain size F 60;

– medium ground surfaces obtained, e.g. by means of a grinding disk of grain size F 120;

– fine ground surfaces obtained, e.g. by means of a grinding disk of grain size F 220;

– matt finished surfaces obtained, e.g. by means of a grinding disk with grain size F 400;

– highly polished surfaces obtained, e.g. by means of a polishing disk or felt.

NOTE 2 Surfaces obtained by means of percussion tools are, for example:

– bush hammered surfaces (see EN 12670:2001, 2.3.8)*;

– trimmed surfaces: finish obtained by using pointed chisel and mallet or a grooving machine;

– striated surfaces: finish obtained by using a claw chisel (percussion tool for roughening a surface, with the cutting edge consisting of several teeth of various size) or a ruling machine.

NOTE 3 Surfaces obtained by other finishing operations are, for example:

– flamed finish (see EN 12670:2001, 2.3.22)**;

– sand blasted finish (see EN 12670:2001, 2.3.46)***;

– water jet streamed finish: a matt textured surface finish, accomplished by exposing the surface to a jet of water under pressure;

– machine tooled finish (see EN 12670:2001, 2.3.54)****;

– riven cut finish: rugged surface produced by splitting stone with a guillotine or chisel.

* finish obtained by using a bush hammer (percussion tool for roughening a surface, with a square head and with few pyramidal percussion teeth or points) or a bush hammering machine (machine consisting of feed rolls and a overhanging beam, supporting a pneumatic bush hammer).

** surface texture obtained by thermal treatment of the stone using a high temperature flame.

*** a matt finishing resulting from the impact of sand or other abrasive grains expelled by a sand jet.

**** this term has two different meanings:

1) finish resulting from a mechanical surface treatment with tools;

2) dressed finish clearly showing tool marks.

4.2 Requirements of natural stone for cladding

4.2.1 General

Due to the natural variations of the stone materials, deviations from the declared values may occur.

Whenever stone processing is likely to change the characteristics of the raw material then this has to be considered when determining the characteristics requested by this standard (e.g. as a consequence of strong bush hammering or flaming of the surface or heating or back reinforcing the slabs, or because of the use of patching, fillers or other similar products for natural holes, faults, cracks and similar).

The following characteristics shall be declared where requested by this standard or with reference to the intended use conditions.

4.2.2 Denomination

The denomination shall always be declared in accordance with EN 12440 (meaning traditional name, petrological family, typical colour and place of origin).

The petrographic name shall be declared in accordance with EN 12407.

4.2.3 Visual appearance

4.2.3.1 General

This characteristic shall always be declared.

The colour, veining, texture, etc. of the stone shall be identified visually, typically by a reference sample of the same stone suitable for providing a general description of visual appearance. The reference sample shall be provided by the supplier.

4.2.3.2 Reference sample, visual inspection and acceptance criteria

A reference sample shall be an adequate number of pieces of natural stone of sufficient size to indicate the general appearance of the finished work. The dimensions of individual pieces shall be at least 0,01 square metres (typical values are between 0,01 and 0,25 square metres in face area but may be more), and shall indicate the range of appearance regarding the colouring, the vein pattern, the physical structure and the surface finish. In particular the reference sample shall show specific characteristics of the stone, such as holes for travertine, worm holes for marble, glass seams, spots, crystalline veins and rusty spots.

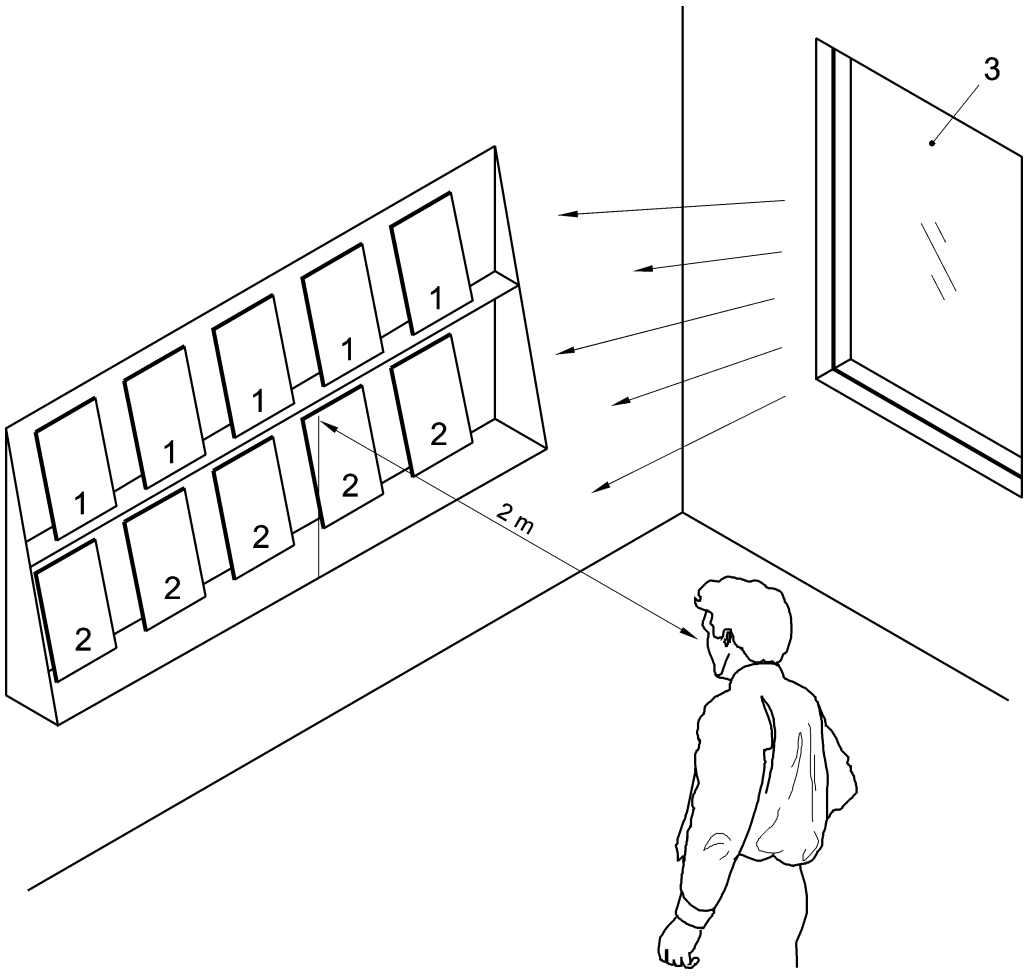
The reference sample does not imply strict uniformity between the sample itself and the actual supply; natural variations may always occur.

If the processing of the stone involves the use of patching, fillers or other similar products for natural holes, faults or cracks, then the reference sample shall similarly display the impact of the same on the finished surface.

All the characteristics as shown by the reference sample shall be considered typical of the stone and not as flaws, therefore they shall not become a reason for rejection, unless their concentration becomes excessive and the typical character of the stone is lost.

The name and address of the producer or the supplier, as well as the denomination of the stone in accordance with 4.2.2 above, shall be indicated on the reference sample.

Any comparison between production sample and reference sample shall be carried out by placing the reference sample against the production samples and viewing them at a distance of about two metres under normal daylight conditions and recording any visible differences in the characteristics of the stones (see Figure 3).



Key

1 Reference sample

2 Production sample

3 Daylight

Figure 3 — Comparison between production sample and reference sample

All visible variations such as cracks, inclusions, cavities, stylolites and veins are permitted as far as they are typical for the stone and the performance of the stone is not adversely affected.

4.2.4 Flexural strength

This characteristic shall always be declared.

The flexural strength shall be determined using the test method in EN 12372 or EN 13161 and the mean value, lower expected value and standard deviation shall be declared.

NOTE An identification test as defined in EN 12372 or EN 13161 is usually carried out for the purpose of CE marking. However, where the surface finish of the delivered product is known, the test may be carried out with this finish, in accordance with the technological tests defined in EN 12372 or EN 13161.

4.2.5 Breaking load at a dowel hole

The characteristic breaking load at a dowel hole shall be declared when the slabs are to be mechanically fixed using dowels on the edges.

The breaking load at a dowel hole shall be determined using the test method in EN 13364 and the mean value, lower expected value and standard deviation shall be declared.

NOTE 1 An identification test as defined in EN 13364:2001 (6.2.5) is usually carried out for the purpose of CE marking. However, where the surface finish of the delivered product is known, the test may be carried out with this finish, in accordance with the technological tests defined in EN 13364.

NOTE 2 If a different mechanical fixing is to be used, the breaking load is recorded as "No performance determined" (NPD) and the suitability of the stone is determined from a structural analysis taking into account the location and the technical properties of the material.

NOTE 3 It is recommended not to drill anchor holes by percussion drilling machines.

4.2.6 Water absorption at atmospheric pressure

This characteristic shall be declared on request.

The water absorption shall be determined using the test method in EN 13755 and the results expressed accordingly.

4.2.7 Reaction to fire

This characteristic shall always be declared.

Natural stones are considered reaction to fire Class A1 following Commission Decision 96/603/EC, as amended, with the following exceptions:

- Natural stones containing asphalt at greater than 1 % by mass or volume, whichever is the more onerous, and having a final use subject to fire regulations, shall be tested for reaction to fire and classified in accordance with EN 13501-1.

- Whenever processing of natural stones involves the use of organic patching, fillers or other similar products for natural holes, faults, cracks or similar, at greater than 1 % by mass or volume, whichever is the more onerous and the same stones have a final use subject to fire regulations, then they shall be tested for reaction to fire and classified in accordance with EN 13501-1.

4.2.8 Water absorption by capillarity

This characteristic shall be declared upon request (e.g. when the cladding slab is to be used for elements in contact with a horizontal surface where water may be present).

The water absorption by capillarity shall be determined using the test method in EN 1925 and the results expressed accordingly.

For stone having an open porosity less than 1,0 % this test shall not be performed.

4.2.9 Apparent density and open porosity

This characteristic shall always be declared.

The apparent density and open porosity shall be determined using the test method in EN 1936 and the results expressed accordingly.

4.2.10 Frost resistance

This characteristic shall be declared where subject to regulatory requirements. The frost resistance shall be determined using the test method in EN 12371 and the results expressed:

- as the change in mean flexural strength after 12 cycles of freeze/thaw;

- or as the number of cycles necessary to initiate cracks, rupture, etc.

When the slabs are to be used in areas not subjected to freeze/thaw cycles, the resistance shall be recorded as "No performance determined" (NPD).

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 specifications may be followed but these variations shall be clearly stated in the test report and in the product marking.

NOTE 1 The selection of the stone is subjected to climatic zone and/or to codes of practice.

NOTE 2 When the mean value of flexural strength decreases by less than 20 %, this should not be considered as significant because of the variability of natural stone.

NOTE 3 The frost damage which a stone may suffer when installed in a building will depend on the climatic conditions of the place of use, the relative position in the building (which determines the degree of saturation) and the predicted service life of the building. Consequently, each country may feel it appropriate to introduce in the standard a national informative annex that may be used to determine the number of the freeze-thaw cycles to be carried out in the laboratory for a technological test. This number of cycles will be appropriate to a specific project and will help to provide guidance for the interpretation of the test results.

4.2.11 Thermal shock resistance

This characteristic shall be declared where subject to regulatory requirements.

The resistance to thermal cycles shall be determined using the test method in EN 14066 and the changes both in mass and in dynamic modulus of elasticity expressed accordingly.

In cases where the test has not been carried out the resistance shall be recorded as "No performance determined" (NPD).

4.2.12 Water vapour permeability

This characteristic shall be declared upon request (e.g. when the slab is to be used in a location subject to vapour control requirements, and fixed by means of mortar or adhesives).

The permeability shall be given by making reference to tabulated values in EN 12524.

5 Marking and packaging

As a minimum of identification, each consignment shall carry the following indications:

a) the denomination of the natural stone in accordance with EN 12440;

b) quantities and dimensions of the slabs for cladding.

Additional information is advisable:

c) the mass of the slabs for cladding;

d) dimensions and mass of packaging.

These indications shall be given on labels, packaging or on accompanying documents.

An identification system may be used in order to identify individual slabs; in such a case individual stones shall be clearly marked accordingly. Marking will usually consist of alphanumeric codes and symbols (e.g. to define proper orientation at installation).

The slabs for cladding shall be clean before packaging.

Packaging shall allow adequate, solid and durable protection for packed stones, both during transport and during handling and storage. Movement of slabs inside the packaging has to be prevented by securing individual pieces.

Packaging shall be of appropriate mass and size in consideration of transportation and lifting facilities; the top and bottom of the packaging as well as stacking possibility shall be indicated.

The supplier shall ensure safety against contamination caused by packaging materials, in wet or dry conditions.

Packaging and tapes which are likely to stain shall not be used. Sensitive polished surfaces shall be protected by appropriate means (for example plastic foil). Products with caustic properties shall not be used.

6 Evaluation of conformity

6.1 General rules

The compliance with the requirements of this standard and with the stated values or classes of reaction to fire shall be demonstrated by carrying out initial type testing. Additionally the manufacturer shall exercise a permanent factory production control (FPC) and keep record of the results at least until the next control.

Declared values shall be representative of the current production.

6.2 Initial type testing

Initial type testing of a natural stone product, as given in Table 3, shall be carried out:

– on first application of this standard or at the beginning of the production of a new type of stone,

– when significant variations occur in the material, determined visually or by significant changes in FPC results.

Tests previously performed in accordance with the provisions of this standard (same type of stone, same characteristic measured with the same test method, same sampling procedure and system of attestation of conformity) may be taken into account.

The declared values may be supported by a test report supplied with the block or raw slabs provided that the tests have been performed according to the requirements and test methods of this standard.

The results of the selected tests shall be expressed as referred to in 4.2.

Table 3 — List of properties of slabs for claddings for initial type testing

Reference to clause for applicability [a]	Properties/characteristics	Test method in accordance with
4.2.2	Petrographic description	EN 12407
4.2.3	Visual appearance	Visual
4.2.4	Flexural strength	EN 12372 or EN 13161
4.2.5	Breaking load at a dowel hole	EN 13364
4.2.6	Water absorption at atmospheric pressure	EN 13755
4.2.7	Reaction to fire (only where testing is required)	EN 13501-1
4.2.8	Water absorption by capillarity	EN 1925
4.2.9	Apparent density and open porosity	EN 1936
4.2.10	Frost resistance	EN 12371
4.2.11	Thermal shock resistance	EN 14066
4.2.12	Water vapour permeability	EN 12524 and/or EN ISO 12572
[a] Reference shall be made to these clauses in order to decide which characteristics need to be declared.		

6.3 Factory production control

6.3.1 A factory production control system (FPC) shall be established and documented. The factory production control system shall consist of procedures for the internal control of production. The results of the tests carried out during FPC shall demonstrate that products placed on the market conform with this standard and with the manufacturer's declared values or classes in accordance with 4.1 and 4.2.

In cases when the processing of the stone is likely to change the characteristics of the finished product relative to the initial material (e.g. as a consequence of the type of processing or because of the use of patching, fillers or other similar products for natural holes, faults, cracks and similar), then this has to be considered within FPC as requested by this standard.

6.3.2 The internal control shall consist of regular inspection checks and tests and the utilisation of the results to control incoming materials, equipment, the production process and the finished product.

6.3.3 The tests and inspection checks shall be in accordance with Table 4. The results of the tests carried out during FPC shall demonstrate conformity to the requirements declared in accordance with 4.1 and 4.2.

Table 4 – Control frequency for factory production control

Reference to clause for applicability [c]	Characteristics	Control frequency	Test method in accordance with
4.1 4.2.3	Geometrical characteristics Visual appearance	Every production lot [a]	EN 13373 Visual
4.2.4 4.2.6 and/or 4.2.9	Flexural strength [d] Water absorption [d] and/or Apparent density and open porosity [d]	In accordance with the FPC system but at least every 2 years	EN 12372 or EN 13161 EN 13755 and/or EN 1936
4.2.2 4.2.5 4.2.7 4.2.8 4.2.10 4.2.11 4.2.12	Petrographic examination [d] Breaking load at dowel hole [d] Reaction to fire [b] Water absorption by capillarity [d] Frost resistance [d] Thermal shock resistance [d] Water vapour permeability [d]	In accordance with the FPC system but at least every 10 years	EN 12407 EN 13364 EN 13501-1 EN 1925 EN 12371 EN 14066 EN 12524 and/or EN ISO 12572

[a] The dimension or amount of a production lot shall be determined by the manufacturer having as reference a daily production quantity, the number of deliveries and the final destination of the considered quantity of slabs.

[b] Only where testing is required.

[c] Reference shall be made to these clauses in order to decide which characteristics need to be declared.

[d] When the tests carried out on initial material are relevant for the final product, the manufacturer may refer to them.

6.3.4 Manufacturers' records shall include at least the following:

a) identification of the product tested;

b) information on sampling:

– place and date of sampling;

– identification of the production lot sampled;

– frequencies of sampling;

– size and number of samples;

c) the test methods applied;

d) the results of the tests carried out;

e) calibration records of apparatus.

Annex A
(normative)

Sampling

A.1 General

This annex specifies methods for obtaining samples of natural stone from quarries, plants or buildings. Sampling from buildings may be necessary if the delivered natural stone product is already applied in a building.

The aim of sampling is to obtain a bulk sample that is representative of the average properties of the batch and of its variability.

The methods described are based on manual procedures. The methods described are limited to building and civil engineering purposes.

It is important that samplers are accordingly trained in the application of the methods set out in this standard.

In case of dispute or if tests are to be done by more than one organization, all interested parties shall have the opportunity to observe the sampling and shall agree upon the number of sampling increments to be taken.

A.2 Principles of sampling

Proper and careful sampling and sample transport is a prerequisite for an analysis that will give reliable results. An adequate number of samples have to be taken to obtain a good estimation of the natural heterogeneity of the batch.

The sampler shall be informed of the aim of the sampling.

A.3 Taking bulk samples

The number and sizes of samples depend on the test methods for which they are taken. The number and shape of specimens are given in the relevant test methods.

A.4 Preparing a sampling plan

A sampling plan shall be prepared, prior to sampling, taking into account the following:

– type of natural stone (following EN 12440 and EN 12670);

– aim of the sampling, including a list of the properties to be tested;

– identification of sampling points;

– approximate size of samples;

– number of samples;

– sampling apparatus to be used;

– methods of sampling;

– marking, packaging and dispatch of the samples.

A.5 Sampling apparatus

Any suitable cutting equipment for natural stone may be used for sampling. In addition, drills, which are suitable for taking drill cores, may be used.

A.6 Sampling methods

A.6.1 General

The sampling methods will inevitably involve the samplers working at a quarry, plant or building. Regulations for safety and ergonomics shall be followed.

A.6.2 Sampling from quarries

A.6.2.1 General

The sample shall be taken by a qualified specialist, experienced in the examination of natural stone deposits. The main objective of sampling from such deposits is to establish the average, the range of variations and the differences in the structure and properties of the natural stone, taking account of the fabric and geological structure and the anticipated quarrying conditions.

A.6.2.2 Sampling of solid rock

a) Identification of anisotropy and orientation of samples

If the exploratory work reveals a pronounced fabric or geological structure which is not necessarily visible at the sample scale (e.g. stratification, massive bedding, lamination, cleavage or rift), the sample shall be marked accordingly.

b) Sampling for petrographic analysis

For petrographic analysis, hand specimens shall be taken from all distinct types and varieties which characterize the rock in terms of mineral composition, fabric and geological structure.

Samples from drilling (cores and pieces) may also be used.

In addition to samples of fresh material, samples shall also be taken to illustrate the effects of weathering.

c) Sampling for physical testing

For physical testing, sample blocks shall be used as samples, their number and location depending on the results of the petrographic analysis and the required test methods.

The sample blocks shall measure approximately 0,40 m x 0,25 m x 0,25 m, or more where a coarse-grained and/or a large-pored rock is to be sampled.

It is recommended that they are taken from larger natural stones which have been least affected by blasting. Care has to be taken to ensure that the sample blocks do not show any hairline cracks resulting from the removal process.

Samples may also be cut from rough blocks, slabs or dimension stones, the number and size of samples depending on the particular test method.

A.6.3 Sampling from plants

A representative sample of adequate size and characteristic of the natural stone in terms of mineral composition, fabric and geological structure, shall be taken from the material to be tested (e.g. slabs, dimension stones), taking into account the intended use of the material.

A.6.4 Sampling from buildings

Sampling points shall be selected according to the rules for obtaining a representative sample, taking into consideration any differences in properties visible to the naked eye. Where necessary, taking a single slab to assess the mechanical properties of slabs for cladding in situ will be sufficient.

The location of the sample in the building shall be reported.

A.7 Marking, packaging and dispatch of the samples

The samples or containers shall be clearly and durably marked. Marking shall include:

a) a unique code, or

b) identification of the laboratory samples, place of sampling, date of sampling and denomination of the material.

The laboratory samples shall be packed and transported in such a way that they are protected from damage.

A.8 Sampling report

A.8.1 The sampler shall prepare a sampling report for each laboratory sample or for each group of laboratory samples from a single source. The sampling report shall refer to this document and state:

a) sampling report identification (serial number);

b) laboratory sample identification mark(s);

c) date and place of sampling;

d) sampling point(s) or identification of the batch sampled;

e) reference to the sampling plan prepared according to A.4;

f) name of the sampler(s).

A.8.2 Depending on the circumstances, other information might be relevant. Table A.1 shows an example of a comprehensive sampling report.

Table A.1 – Example of a sampling report

Sampling report identification (serial n°):
Laboratory sample identification mark: no. of package

Description of the natural stone and sampling places

Name of the quarry or production plant or building:
Name of producer:
Origin of batch:
Purpose for which the natural stone is to be used:
Location of sampling point(s):
Identification of the batch:
Size of the batch:
Other comments (e.g. warnings, if appropriate):

Description of the sampling method

Date and time of sampling:
Reference to sampling plan used:
Sampling procedure (drilling, cutting, etc.):
Purpose of the sampling:

Samples

No. and dimensions of samples:
Other comments:
Dispatch of the samples:
Sampler(s) (print name):

Contract details

Contract identification:
Name and address of party requesting the sampling:…….. ……
Name of person(s) present at sampling:……. ……
Signatures:…… …… ……

Annex ZA
(informative)

Clauses of this European Standard addressing essential requirements or other provisions of EU Directives

ZA.1 Scope and relevant characteristics

With reference to clause 1, this annex ZA applies to natural stone slabs for cladding, for use in construction for finishing of walls and ceilings (internal and external), fixed with adhesives, mortar or mechanically.

This European Standard has been prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

The clauses of this European Standard shown in this annex meet the requirements of the Mandate M/121 given under the EU Construction Products Directive (89/106/EC).

Compliance with these clauses confers a presumption of fitness of the construction products covered by this European Standard for their intended use(s).

WARNING: Other requirements and other EU Directives, not affecting the fitness for intended use may be applicable to the construction products falling within the scope of this European Standard.

NOTE In addition to any specific clauses relating to dangerous substances contained in this standard, there may be other requirements applicable to the products falling within its scope (e.g. transposed European legislation and national laws, regulations and administrative provisions). In order to meet the provisions of the EU Construction Products Directive, these requirements need also to be complied with, when and where they apply. *An informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA (accessed through* http://europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm.

Construction products: Slabs for cladding.

Intended use(s): Internal and external wall cladding and ceiling finishing.

Table ZA.1.1 – Relevant clauses for natural stone slabs for internal wall and ceiling finishing

Essential characteristics	Requirement clause in this document	Mandated levels and/or classes	Notes and test methods
Reaction to fire *(intended for uses subject to reaction to fire regulations)*	4.2.7	Class A1 All classes	No test required (1) EN 13501-1 (2)
Release of dangerous substances* (*as relevant)*	See ZA.1, Note	-	-
Water vapour permeability *(only for products subject to water vapour control requirements)*	4.2.12	-	EN ISO 12572 or EN 12524
Flexural tensile strength *(only for use in ceilings)*	4.2.4	-	EN 12372 or EN 13161
Resistance to fixing *(as relevant)*	4.2.5	-	EN 13364
Direct airborne sound insulation *(apparent density) (for products intended for uses subject to acoustic insulation requirements)*	4.2.9	-	EN 1936 (3)
Thermal resistance *(apparent density) (only for products intended for uses subject to thermal insulation requirements)*	4.2.9	-	EN 1936 or EN 12524 (4)
Durability	-	-	(5)

Notes

* In particular those dangerous substances defined in Directive 76/69/EC as amended.

1) No test required, see Decision 96/603/EC, as amended.

2) Only for the following two cases:

- natural stones containing asphalt at greater than 1 % by mass or volume, whichever is the more onerous;
- whenever processing of natural stones involves the use of organic patching, fillers or other similar products at greater than 1 % by mass or volume, whichever is the more onerous.

3) EN 1936 is used in order to give the apparent density as reference for calculation of acoustic behaviour.

4) EN 1936 is used in order to give the apparent density as reference for calculation of thermal behaviour. Alternatively the data may be taken from EN 12524.

5) The current state of the art suggests that, when used in internal wall and ceiling finishes, natural stones will maintain their level of performance for a normal service life. No durability test has therefore been considered.

Table ZA.1.2 – Relevant clauses for natural stone slabs for external wall and ceiling finishing

Essential characteristics	Requirement clause in this European Standard	Mandated levels and/or classes	Notes and test methods
Reaction to fire *(intended for uses subject to reaction to fire regulations)*	4.2.7	Class A1 All classes	No test required (1) EN 13501-1 (2)
Release of dangerous substances* (*as relevant)*	See ZA.1, Note	-	-
Water vapour permeability *(only for products subject to water vapour control requirements)*	4.2.12	-	EN ISO 12572 or EN 12524
Mechanical resistance *(e.g. flexural strength, as relevant)*	4.2.4	-	EN 12372 or EN 13161
Resistance to fixing *(as relevant)*	4.2.5	-	EN 13364
Thermal shock resistance (where relevant, according to material)	4.2.11	-	EN 14066
Direct airborne sound insulation *(apparent density) (for products intended for uses subject to acoustic insulation requirements)*	4.2.9	-	EN 1936 (3)
Thermal resistance *(apparent density) (only for products intended for uses subject to thermal insulation requirements)*	4.2.9	-	EN 1936 or EN 12524 (4)
Durability	4.2.10	-	EN 12371

Notes

* In particular those dangerous substances defined in Directive 76/69/EC as amended.

1) No test required, see Decision 96/603/EC, as amended.

2) Only for the following two cases:

- natural stones containing asphalt at greater than 1 % by mass or volume, whichever is the more onerous;
- whenever processing of natural stones involves the use of organic patching, fillers or other similar products at greater than 1 % by mass or volume, whichever is the more onerous.

3) EN 1936 is used in order to give the apparent density as reference for calculation of acoustic behaviour.

4) EN 1936 is used in order to give the apparent density as reference for calculation of thermal behaviour. Alternatively the data may be taken from EN 12524.

Some requirements, considered in the above tables, are not applicable in those Member States (MSs) where there are no regulatory requirements (on that characteristic) for the intended use of the product. In this case, manufacturers placing their products on the market of these MSs are not obliged to determine nor declare the performance of their products with regard to this characteristic and the option "No performance determined" (NPD) in the information accompanying the CE marking (see ZA.3) may be used. The NPD option may not be used, however, where the characteristic is subject to a threshold level.

ZA.2 Procedure for attestation of conformity

Natural stone slabs, for the intended uses listed below, shall follow the attestation of conformity systems shown in Table ZA.2.

Table ZA.2 – Attestation of conformity systems

Products	Intended uses	Levels or classes	Attestation of conformity systems
Natural stone slabs for wall and ceiling cladding	As internal or external finishes in walls or ceilings subject to reaction to fire regulations	A1**, A2**, B**, C**, D and E A1*** and F	3 4
	As internal or external finishes in walls or ceilings subject to regulations on dangerous substances, and in internal or external suspended ceilings subject to safety in use (flexural tensile strength) requirements	-	3
	As internal or external finishes in walls or ceilings for other uses	-	4
** Products/materials for which there is no clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants nor a limiting, during the production process, of organic material) *** Products/materials that do not require to be tested for reaction to fire (e.g. products/materials of Class A1 according to Commission Decision 96/603/EC, as amended)			
System 3: See Directive 89/106/EC (CPD) Annex III.2.(ii), Second possibility System 4: See Directive 89/106/EC (CPD) Annex III.2.(ii), Third possibility			

For products falling under attestation system 3, for initial type testing, the tasks of the notified test laboratory are limited to reaction to fire, flexural tensile strength and dangerous substances (where relevant).

Natural stone slabs for cladding are considered as reaction to fire Class A1, without testing, according to Decision 96/603/EC, as amended, therefore system 4 applies (provided that flexural tensile strength is not relevant and that there are no dangerous substances requirements). Only for reaction to fire for natural stone containing asphalt or processed with addition of organic patching, fillers or other similar products will system 3 be adopted, the task for the notified body being limited to test reaction to fire.

The evaluation of conformity of the slabs for cladding covered by this European Standard in respect of the relevant characteristics listed in Tables ZA.1.1 and ZA.1.2 shall be carried out in accordance with clause 6.

ZA.3 CE marking and labelling

ZA.3.1 CE marking

The manufacturer or his authorised representative established within the EEA is responsible for the affixing of the CE marking. The CE conformity marking consists exclusively of the letters “CE” in the specified form of the Directive 93/68/EC.

The CE marking symbol for slab products shall appear on the packaging and/or the accompanying commercial documents and shall be accompanied by the information shown below:

- reference to this EN 1469;
- the name or identifying mark of the producer or the importer, if the latter is responsible for ensuring the conformity of the product;
- the last two digits of the year in which the marking was affixed;
- the product classification and end uses;
- the indications to identify the characteristics of the products on the basis of the Tables ZA.1.1 and/or ZA.1.2, as shown in ZA.3.2 (for frost resistance, see 4.2.10).

ZA.3.2 Reference model for marking and labelling

ZA.3.2.1 Example according to Table ZA.1.1 - Slabs for cladding, internal use

CE Year: 2004	Reference standard: **EN 1469** Products: **Slabs of natural stone for cladding** Denomination: In accordance with EN 12440 End uses: **Internal wall and ceiling finishes**	
Name and address of the producer: yyyy		
Characteristics	**Declared values**	**Test method**
Reaction to fire	Class A1	Without testing (see Decision 96/603/EC, as amended)
Flexural strength	Lower expected value, mean value, and standard deviation, MPa	EN 12372 or EN 13161
Resistance to fixings	Lower expected value, mean value, and standard deviation, N	EN 13364
Water vapour permeability	NPD	EN ISO 12573 or EN 12524
Apparent density	From … to … kg/m^3	EN 1936

ZA.3.2.2 Example according to Table ZA.1.2, Slabs for cladding, external use

CE Year: 2004	Reference standard: **EN 1469** Products: **Slabs of natural stone for cladding** Denomination: In accordance with EN 12440 End uses: **External wall and ceiling finishes**
Name and address of the producer: xxxx	

Characteristics	**Declared values**	**Test method**
Reaction to fire	Class A1	Without testing (see Decision 96/603/EC, as amended)
Flexural strength	Lower expected value, mean value, and standard deviation, MPa	EN 12372 (or EN 13161)
Resistance to fixings	Lower expected value, mean value, and standard deviation, N	EN 13364
Frost resistance	- Change in mean flexural strength: after 12 cycles … expressed in % or - Number of cycles before failure	EN 12371
Water vapour permeability	NPD	EN ISO 12573 or EN 12524
Thermal shock resistance	After 20 cycles: – No loss of mass – Decrease of dynamic elastic modulus $\leqq$ 6 % (= …)	EN 14066
Apparent density	From … to … kg/m^3	EN 1936

In addition, the product shall also be accompanied, when and where required and in the appropriate form, by documentation listing legislation on dangerous substances for which compliance is claimed, together with any information required by that legislation.

NOTE European legislation without national derogations need not be mentioned.

ZA.4 EC Declaration of conformity

When compliance with this annex ZA is achieved, the manufacturer or his agent established in the EEA shall prepare and retain a declaration of conformity (EC Declaration of conformity), which authorises the affixing of the CE marking. This declaration shall include:

- name and address of the manufacturer, or his authorised representative established in the EEA, and place of production;
- description of the product (type, identification, use …), and a copy of the information accompanying the CE marking;
- provisions to which the product conforms (i.e. annex ZA of this EN);
- particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions);
- name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or of his authorised representative;
- name and address of the notified laboratory(ies), where relevant.

The above mentioned declaration shall be presented in the official language or languages of the Member State in which the product is to be used.

Bibliography

[1] EN 998-1, *Specification for mortar for masonry – Part 1: Rendering and plastering mortar.*

[2] EN 12004, *Adhesives for tiles – Definitions and specifications.*

[3] Commission Decision 96/603/EC as amended for the list of products belonging to Classes A "No contribution to fire"

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