



BSI Standards Publication

**Agglomerated stone - Slabs and cut-to-size products
for flooring and stairs (internal and external)**

National foreword

This British Standard is the UK implementation of EN 16954:2018.

The UK participation in its preparation was entrusted to Technical Committee B/545, Natural stone.

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

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English Version

Agglomerated stone - Slabs and cut-to-size products for flooring and stairs (internal and external)

Pierre agglomérée - Plaques et produits coupés sur mesure pour revêtements de sols et escaliers (intérieurs et extérieurs)

Künstlich hergestellter Stein - Platten und zugeschnittene Produkte für Boden- und Stufenbeläge (innen und außen)

This European Standard was approved by CEN on 27 December 2017.

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European foreword

This document (EN 16954:2018) 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of an identical text or by endorsement, at the latest by November 2018 and conflicting national standards shall be withdrawn at the latest by February 2020.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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

For relationship with EU Regulation(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 agglomerated stone products which includes the following:

- EN 15285, *Agglomerated stone — Modular tiles for flooring and stairs (internal and external)*
- EN 16954, *Agglomerated stone — Slabs and cut-to-size products for flooring and stairs (internal and external)* [the present document]
- EN 15286, *Agglomerated stone — Slabs and tiles for wall finishes (internal and external)*
- EN 15388, *Agglomerated stone — Slabs and cut-to-size products for vanity and kitchen tops*

NOTE An overview on standards for agglomerated stone products is given below.

Standards for agglomerated stone products			
<i>Harmonized product standards</i>	EN 15285 <i>Modular tiles for flooring and stairs (int. and ext.) (under M/119)</i>	EN 16954 <i>Slabs and cut-to-size products for flooring and stairs (int. and ext.) (under Mandate M/119)</i>	EN 15286 <i>Cladding slabs and tiles for wall finishes (int. and ext.) (under Mandate M/121)</i>
<i>Non-harmonized product standards</i>	EN 15388 <i>Slabs and cut-to-size products for vanity and kitchen tops</i>		
<i>Main supporting standards</i>	EN 14617 (all parts), <i>Test methods</i>	EN 14618, <i>Terminology and classification</i>	

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

1 Scope

This European Standard specifies characteristics and appropriate test methods for slabs and cut to size products (cut to size slabs, special pieces, treads and risers) of agglomerated stones, which are made for use as flooring and stairs in pedestrian areas for internal and external uses including those in enclosed public transport premises. It also provides for the assessment and verification of constancy of performance (AVCP) and marking of the products to the requirements of this European Standard.

This European Standard covers tactility but only for products the intended use of which requires this performance.

This European Standard does not cover visibility requirements. Rough slabs are excluded from the scope of this European Standard.

Products covered by the standards EN 15285, EN 13198, EN 13748-1 and EN 13748-2 are also excluded from the scope of the present European Standard.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 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 data from reaction to fire tests*

EN 14617 (all parts), *Agglomerated stone - Test methods*

EN 14618, *Agglomerated stone - Terminology and classification*

CEN/TS 15209, *Tactile paving surface indicators produced from concrete, clay and stone*

CEN/TS 16165:2016, *Determination of slip resistance of pedestrian surfaces - Methods of evaluation*

EN ISO 10456, *Building materials and products - Hygrothermal properties - Tabulated design values and procedures for determining declared and design thermal values (ISO 10456)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 14618 and the following apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1

rough slab

semi-finished agglomerated stone product with edges obtained either by sawing from a block or by moulding, the size of which is given by nominal dimensions (length - width -, thickness, in this order), expressed in millimetres and the surface of which may or may not be the finished surface

Note 1 to entry: Examples are given in Figure 1.

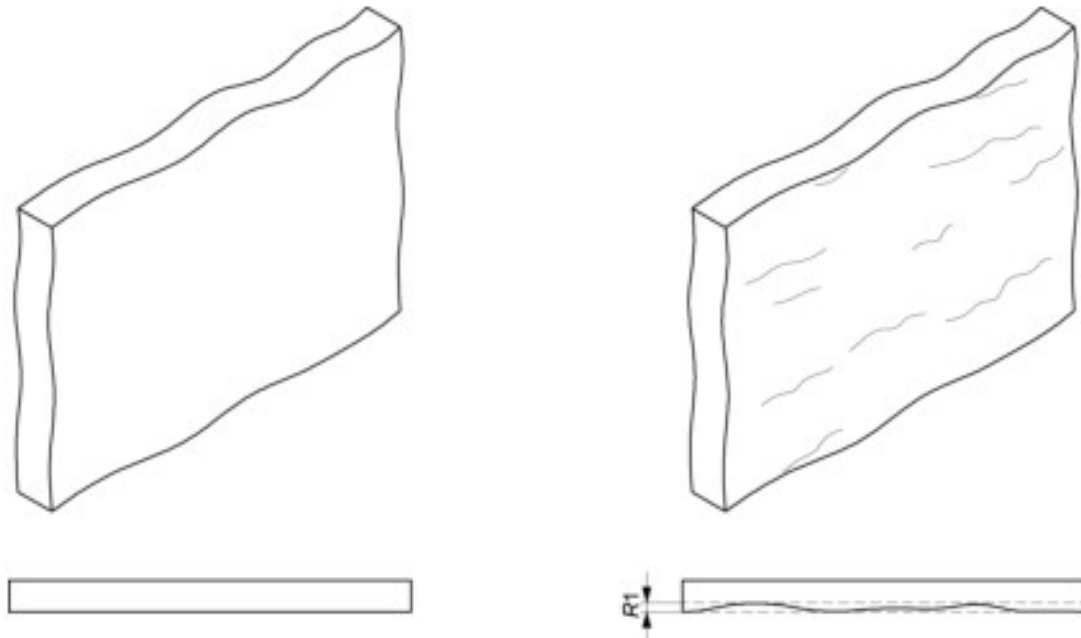


Figure 1 — Examples of rough slabs

3.2

slab

finished agglomerated product obtained from rough slabs, the dimensions of which are given by length - width - thickness (in this order), expressed in millimetres according to defined tolerances and the surface of which is a finished surface ready to use

3.3

cut-to-size product

finished agglomerated product obtained from a rough slab or a slab, the dimensions of which need to be referred to a template or a drawing

Note 1 to entry: Examples are given in Figure 2.

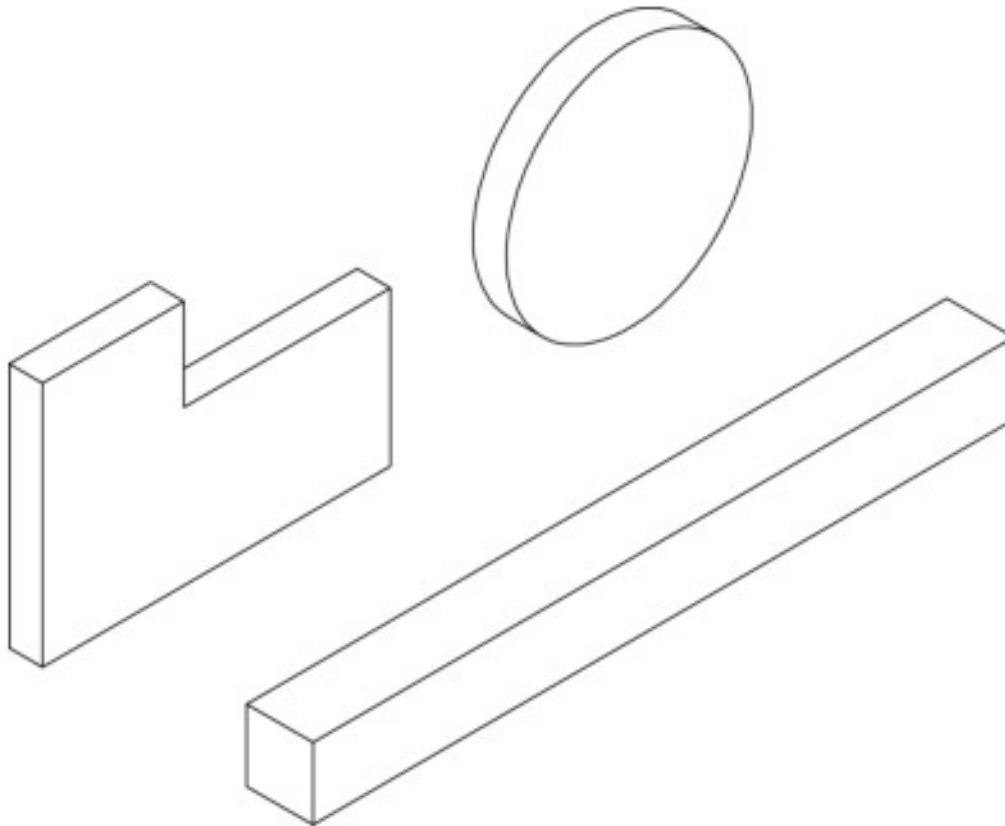


Figure 2 — Examples of cut-to-size products

4 Characteristics

4.1 Geometric characteristics

4.1.1 Dimensions

The dimensions (length l , width b and thickness d , in this order, expressed in millimetres) of a slab and a cut-to-size product may be declared by the manufacturer.

The dimensions of cut to size products shall be referred to a template or a drawing.

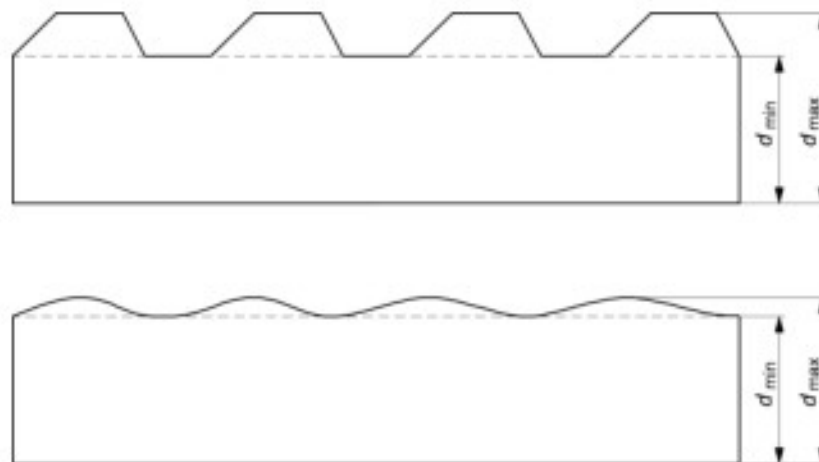
4.1.2 Tolerances for dimensions for slabs and cut-to-size products

Tolerances in dimensions of slabs and cut to size products shall be as given in Table 1. The dimensions (i.e. length, width and thickness) of slabs and cut to size products shall be determined according to EN 13373.

Stricter deviations may be declared by the manufacturer.

Table 1 — Tolerances in dimensions for slabs and cut to size products

Characteristics	Tolerances on dimensions of		
	slabs		cut-to-size products
Length and width	< 1 000 mm ±1 mm	> 1 000 mm - 10 mm/+20 mm	±0,5 mm ^a
Other dimensions with reference to the template	-		±0,5 mm
Thickness ^b	±0,7 mm		
Squareness	±0,2 % ^a		
Flatness: - centre curvature - edge curvature - warping	±0,4 %		
^a For rectangular products. ^b Tolerances for thickness (d) should not apply for slabs and cut-to-size products with textured upper surface where $d_{max} - d_{min} > 1$ mm (see Figure 3).			



Key

d_{min} minimum thickness
 d_{max} maximum thickness

Figure 3 — Cross section examples of the textured upper surface slabs and cut-to-size products

4.1.3 Surface finish

Surface finishes shall extend uniformly to the edges of slabs and cut-to-size products.

Surfaces of slabs and cut-to-size products shall have a regular appearance as a result of the finishing process and may be worked to meet the finish declared.

4.2 Physical and mechanical characteristics

4.2.1 General

The values for the characteristics in 4.2.2 to 4.2.14 shall be assessed when relevant.

The performance of slabs and cut-to-size products for flooring and stairs according to water absorption, flexural strength, abrasion resistance and chemical resistance shall be expressed with letters corresponding to their values as indicated in Table 2.

Table 2 — Performance list of slabs and cut-to-size products according to their characteristics

Reference	Characteristics	Performance			
4.2.4	Water absorption (%)	$W_1 > 2,0$	$2,0 \geq W_2 > 0,5$	$0,5 \geq W_3 > 0,05$	$W_4 \leq 0,05$
4.2.5	Flexural strength (MPa)	$F_1 < 12,0$	$12,0 \leq F_2 < 25,0$	$25,0 \leq F_3 < 40,0$	$F_4 \geq 40,0$
4.2.9	Abrasion resistance (mm)	$A_1 > 36,5$	$36,5 \geq A_2 > 33,0$	$33,0 \geq A_3 > 29,0$	$A_4 \leq 29,0$
4.2.10	Chemical resistance ^a	C_1	C_2	C_3	C_4

^a Refer to EN 14617-10.

Contractual specifications can be used to establish reference values, e.g. stated in design or supplier data sheet.

4.2.2 Visual appearance

When required, the colour, roughness, of the slabs and cut-to size products shall be identified visually, e.g. by a range of samples selected following the criteria given in EN 14617-16.

Any visual variations, e.g. inclusions and veins, are permissible provided that they are characteristic of the relevant type of agglomerated stone and provided that they do not adversely affect any performance of the other characteristics of the slabs and cut-to-size products.

Reference sample, visual inspection and acceptance criteria shall be described in accordance with Annex A.

4.2.3 Reaction to fire

When slabs or cut-to-size products are intended to be used in areas subjected to reaction to fire, the reaction to fire performance shall be declared according to the following:

A slab or a cut-to-size product may be classified without the need for testing (CWT) as the reaction to fire Class A1_{FL}, when it is made of an agglomerated stone containing:

- an organic material as a binder, if any, of not more than 0,1 % by mass or volume, whichever is the most onerous, and
- a homogeneously distributed organic material as an aggregate, if any, of not more than 1 % by mass or volume, whichever is the most onerous.

A slab or a cut-to-size product made of agglomerated stone which does not comply with the provisions a) and b) given above and having an intended use subject to the reaction to fire regulatory requirements shall be in accordance with EN 13501-1 after being tested in accordance with the test standards given therein.

NOTE For materials to be considered as reaction to fire Classes A1 and A1_{FL}, see the Commission Decision 96/603/EC amended by the Decisions 2000/605/EC and 2003/424/EC.

4.2.4 Apparent density and water absorption

The values for apparent density and water absorption shall be determined according to EN 14617-1 and the result of the water absorption shall be declared in accordance with Table 2.

4.2.5 Flexural tensile strength

The flexural strength shall be determined according to EN 14617-2 and the result expressed and declared in accordance with Table 2.

4.2.6 Thermal conductivity

The value for requirements the value for thermal conductivity shall be declared.

Thermal conductivity shall be based on the apparent density value, determined using the test method indicated in 4.2.4. This value shall be used to calculate the thermal conductivity according to EN ISO 10456.

4.2.7 Thermal shock resistance

Where slabs or cut-to-size products is expected to be subject to critical thermal cycles, thermal shock resistance shall be determined according to EN 14617-6 and the result expressed and declared as thermal shock resistance value.

4.2.8 Linear thermal expansion coefficient

Where slabs or cut-to-size products is expected to be subject to relevant dimensional variations due to temperature changes, linear thermal expansion shall be determined according to EN 14617-11 and the result expressed and declared as linear thermal expansion coefficient.

4.2.9 Abrasion resistance

Where the slabs and cut-to size products are expected to be subject to aggressive abrasion actions, resistance to abrasion shall be determined according to EN 14617-4 and the result expressed and declared in accordance with Table 2.

4.2.10 Chemical resistance

Where the slabs and cut-to size products are expected to be subject to aggressive chemical actions, chemical resistance shall be determined according to EN 14617-10 and the result expressed and declared in accordance with Table 2.

4.2.11 Slip resistance

When relevant the value for slipperiness of slabs and cut-to-size products shall be determined using test method described in CEN/TS 16165:2016, Annex C, taking into account the following test parameters:

- slider 57 rubber;
- wet testing conditions;
- three specimens;
- measurement of the pendulum test value (PTV) in 0°, 45° and 90° from a reference line for every specimen; the specimen slip resistance value is the mean value of the three PTV.

The results shall be expressed as the mean value of the three specimens slip resistance values.

4.2.12 Electrical resistivity

Where slabs or cut-to-size products are expected to be subject to the condition described in EN 14617-13, electrical resistivity shall be determined as given therein and the result expressed and declared as value.

4.2.13 Tactility

When slabs or cut-to-size products are intended to be used in places with tactility requirements it shall be specified according to CEN/TS 15209.

4.2.14 Durability

4.2.14.1 Freeze/thaw resistance

Where slabs or cut-to-size products are expected to be subject to freeze/thaw cycles, freeze/thaw resistance shall be determined according to EN 14617-5 and the result expressed and declared as value.

4.2.14.2 Impact resistance

Where slabs or cut-to-size products are expected to be subject to impact of hard falling objects, impact resistance shall be determined according to EN 14617-9 and the result expressed and declared as value.

4.2.15 Release of dangerous substances

Materials used in products shall not release any dangerous substances in excess of the maximum permitted levels specified in a relevant European Standard for the material or permitted in the national regulations of the member state of destination.

National regulations on dangerous substances may require verification and declaration on release, and sometimes content, when construction products covered by this standard are placed on those markets.

5 Test methods

Test methods are described in the specific parts of the EN 14617 series and in the specific annexes of this document.

6 Assessment and verification of constancy of performance – AVCP

6.1 General

The compliance of slabs and cut-to-size products made of agglomerated stones with the requirements of this standard and with the performances declared by the manufacturer in the DoP shall be demonstrated by:

- determination of the product-type on the basis of type testing,
- factory production control by the manufacturer, including product assessment.

The manufacturer shall always retain the overall control and shall have the necessary means to take responsibility for the conformity of the product with its declared performance(s).

6.2 Type testing

6.2.1 General

All performances related to characteristics included in this standard shall be determined when the manufacturer intends to declare the respective performances unless the standard gives provisions for declaring them without performing tests. (e.g. use of previously existing data or Classification Without Further Testing CWFT).

Assessment previously performed in accordance with the provisions of this standard, may be taken into account provided that they were made to the same or a more rigorous test method, under the same AVCP system on the same product or products of similar design, construction and functionality, such that the results are applicable to the product in question.

NOTE Same AVCP system means testing by an independent third party.

- For the purposes of assessment, the manufacturer's products may be grouped into families, where it is considered that the results for one or more characteristics from any one product within the family are representative for that same characteristics for all products within that same family.

Products may be grouped in different families for different characteristics.

Reference to the assessment method standards should be made to allow the selection of a suitable representative sample.

In addition, the determination of the product-type shall be performed for all characteristics included in the standard for which the manufacturer declares the performance:

- at the beginning of the production of a new or modified slab and cut-to-size product made of agglomerated stones using a new type of rough slab, or
- at the beginning of a new or modified method of production (where this may affect the stated properties); or

they shall be repeated for the appropriate characteristic(s), whenever a change occurs in the slabs and cut-to-size products made of agglomerated stones, in the rough slab, or in the method of production (subject to the definition of a family), which would affect significantly one or more of the characteristics.

Where the rough slabs are used whose characteristics have already been determined, by the rough slabs manufacturer, on the basis of assessment methods of other product standards, these characteristics need not be re-assessed.

6.2.2 Test samples, testing and compliance criteria

The number of samples slabs and cut-to-size products made of agglomerated stones to be tested/assessed shall be in accordance with Table 3.

Table 3 — Number of samples to be tested and compliance criteria

Characteristic	Requirement	Assessment method	No. of samples (specimens)	Compliance criteria
Dimensions and tolerances	4.1.1, 4.1.2	EN 13373	10	Table 1
Surface finish	4.1.3	4.1.3	10	4.1.3
Visual appearance	4.2.2	Annex A	Adequate number	Annex A
Reaction to fire	4.2.3	4.2.3	Adequate number	EN 13501-1
Apparent density and water absorption	4.2.4	4.2.4	6	Table 2
Flexural tensile strength	4.2.5	4.2.5	6	Table 2
Thermal conductivity	4.2.6	4.2.6	6	EN ISO 10456
Thermal shock resistance	4.2.7	4.2.7	14	4.2.7
Linear thermal expansion coefficient	4.2.8	4.2.8	3	4.2.8
Abrasion resistance	4.2.9	4.2.9	6	Table 2
Chemical resistance	4.2.10	4.2.10	4	Table 2
Slip resistance	4.2.11	4.2.11	3	CEN/TS 16165:2016 (Annex C)
Electrical resistivity	4.2.12	4.2.12	1	4.2.12
Impact resistance	4.2.14.2	4.2.14.2	4	4.2.14.2
Tactility	4.2.13	4.2.13	Description	CEN/TS 15209
Release of dangerous substances	4.2.15	4.2.15	As relevant	As relevant
Durability - Freeze/thaw resistance	4.2.14.1	4.2.14.1	10	4.2.14.1

6.2.3 Test reports

The results of the determination of the product type shall be documented in test reports. All test reports shall be retained by the manufacturer for at least 10 years after the last date of production of the slabs and cut-to-size products made of agglomerated stones to which they relate.

6.2.4 Shared other party results

A cut-to-size manufacturer (e.g. stone masonry, etc.) may use the results of the product type determination obtained by the manufacturer of the rough slab to justify his own declaration of performance regarding a product that is manufactured according to the same design and with raw materials and constituents of the rough slab and manufacturing methods of the same kind, provided that:

- a) the results are known to be valid for products with the same essential characteristics relevant for the product performance;
- b) in addition to any information essential for confirming that the product has such same performances related to specific essential characteristics, the other party who has carried out the determination of the product type concerned or has had it carried out, has expressly accepted¹⁾ to transmit to the cut-to-size manufacturer the results and the test report to be used for the latter's product type determination, as well as information regarding production facilities and the production control process that can be taken into account for FPC;
- c) the cut-to-size manufacturer using other party results accepts to remain responsible for the product having the declared performances and he also:
 - 1) ensures that the product has the same characteristics relevant for performance as the one that has been subjected to the determination of the product-type, and that there are no significant differences with regard to production facilities and the production control process compared to that used for the product that was subjected to the determination of the product type; and
 - 2) keeps available a copy of the determination of the product-type report that also contains the information needed for verifying that the product is manufactured according to the same design and with raw materials, constituents and manufacturing methods of the same kind.

6.3 Factory production control (FPC)

6.3.1 General

The manufacturer of the slab and cut-to-size product shall establish, document and maintain an FPC system to ensure that the products placed on the market comply with the declared performance of the essential characteristics.

The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product.

All the elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures.

This factory production control system documentation shall ensure a common understanding of the evaluation of the constancy of performance and enable the achievement of the required product performances and the effective operation of the production control system to be checked. Factory production control therefore brings together operational techniques and all measures allowing maintenance and control of the compliance of the product with the declared performances of the essential characteristics.

In case the manufacturer has used shared product-type results, the FPC shall also include the appropriate documentation as foreseen in 6.2.4.

1) The formulation of such an agreement can be done by licence, contract, or any other type of written consent.

6.3.2 Requirements

6.3.2.1 General

The manufacturer of the slab and cut-to-size product is responsible for organizing the effective implementation of the FPC system in line with the content of this product standard. Tasks and responsibilities in the production control organization shall be documented and this documentation shall be kept up-to-date.

The responsibility, authority and the relationship between personnel that manages, performs or verifies work affecting product constancy, shall be defined. This applies in particular to personnel that need to initiate actions preventing product non-constancies from occurring, actions in case of non-constancies and to identify and register product constancy problems.

Personnel performing work affecting the constancy of performance of the product shall be competent on the basis of appropriate education, training, skills and experience for which records shall be maintained.

In each factory the manufacturer may delegate the action to a person having the necessary authority to:

- identify procedures to demonstrate constancy of performance of the product at appropriate stages;
- identify and record any instance of non-constancy;
- identify procedures to correct instances of non-constancy.

The manufacturer of the slab and cut-to-size product shall draw up and keep up-to-date documents defining the factory production control. The manufacturer's documentation and procedures should be appropriate to the product and manufacturing process. The FPC system should achieve an appropriate level of confidence in the constancy of performance of the product. This involves:

- a) the preparation of documented procedures and instructions relating to factory production control operations, in accordance with the requirements of the technical specification to which reference is made;
- b) the effective implementation of these procedures and instructions;
- c) the recording of these operations and their results;
- d) the use of these results to correct any deviations, repair the effects of such deviations, treat any resulting instances of non-conformity and, if necessary, revise the FPC to rectify the cause of non-constancy of performance.

Where subcontracting takes place, the manufacturer shall retain the overall control of the product and ensure that he receives all the information that is necessary to fulfil his responsibilities according to this European Standard.

If the manufacturer has part of the product designed, manufactured, assembled, packed, processed and/or labelled by subcontracting, the FPC of the subcontractor may be taken into account, where appropriate for the product in question.

The manufacturer who subcontracts all of his activities may in no circumstances pass the above responsibilities on to a subcontractor.

NOTE Manufacturers having an FPC system, which complies with EN ISO 9001 standard and which addresses the provisions of the present European Standard are considered as satisfying the FPC requirements of the Regulation (EU) No 305/2011.

6.3.2.2 Equipment

6.3.2.2.1 Testing

All weighing, measuring and testing equipment shall be calibrated and regularly inspected according to documented procedures, frequencies and criteria.

6.3.2.2.2 Manufacturing of the slab and cut-to-size product

All equipment used in the manufacturing process shall be regularly inspected and maintained to ensure use, wear or failure does not cause inconsistency in the manufacturing process. Inspections and maintenance shall be carried out and recorded in accordance with the manufacturer's written procedures and the records retained for the period defined in the manufacturer's FPC procedures.

6.3.2.3 Rough slabs

The performance values of all incoming rough slabs shall be documented, as shall the inspection scheme for ensuring their compliance.

6.3.2.4 Traceability and marking

Individual batches of slabs and cut-to-size products of agglomerated stones shall be identifiable and traceable with regard to their production origin. The manufacturer shall have written procedures ensuring that processes related to affixing traceability codes and/or markings are inspected regularly.

6.3.2.5 Controls during manufacturing process of slabs and cut-to-size products

The manufacturer of slabs and cut-to-size products shall plan and carry out production under controlled conditions.

6.3.2.6 Product testing and evaluation

The manufacturer of slabs and cut-to-size products shall establish procedures to ensure that the stated values of the characteristics he declares are maintained. The characteristics, and the means of control, are:

- dimensions, tolerances for size and shape, surface finish and visual appearance: shall be subject to the tests indicated in subclauses 4.1.1, 4.1.2, 4.1.3, 4.2.2, at least every production lot;
- flexural tensile strength, abrasion resistance, chemical resistance: shall be subject to the tests indicated in subclauses 4.2.5, 4.2.9, 4.2.10, at least every year;
- reaction to fire: shall be subject to the tests indicated in subclause 4.2.3, at least every 5 years;
- all other characteristics: shall be subject to the tests indicated in Clause 6, Table 3, at least every 3 years.

6.3.2.7 Non-complying products

The manufacturer of slabs and cut-to-size products shall have written procedures which specify how non-complying products shall be dealt with. Any such events shall be recorded as they occur and these records shall be kept for the period defined in the manufacturer's written procedures.

Where the product fails to satisfy the acceptance criteria, the provisions for non-complying products shall apply, the necessary corrective action(s) shall immediately be taken and the products or batches not complying shall be isolated and properly identified.

Once the fault has been corrected, the test or verification in question shall be repeated.

The results of controls and tests shall be properly recorded. The product description, date of manufacture, test method adopted, test results and acceptance criteria shall be entered in the records under the signature of the person responsible for the control/test.

With regard to any control result not meeting the requirements of this European Standard, the corrective measures taken to rectify the situation (e.g. a further test carried out, modification of manufacturing process, throwing away or putting right of product) shall be indicated in the records.

6.3.2.8 Corrective action

The manufacturer of slabs and cut-to-size products shall have documented procedures that instigate action to eliminate the cause of non-conformities in order to prevent recurrence.

6.3.2.9 Handling, storage and packaging

The manufacturer of slabs and cut-to-size products shall have procedures providing methods of product handling and shall provide suitable storage areas preventing damage or deterioration.

6.3.3 Product specific requirements

The FPC system shall address this European Standard and ensure that the products placed on the market comply with the declaration of performance.

The FPC system shall include a product specific FPC, which identifies procedures to demonstrate compliance of the product at appropriate stages, i.e.:

- a) the controls and tests to be carried out prior to and/or during manufacture according to a frequency laid down in the FPC test plan,

and/or

- b) the verifications and tests to be carried out on finished products according to a frequency laid down in the FPC test plan.

If the manufacturer of slabs and cut-to-size products uses only finished products, the operations under b) shall lead to an equivalent level of compliance of the product as if FPC had been carried out during the production.

If the manufacturer of slabs and cut-to-size products carries out parts of the production himself, the operations under b) may be reduced and partly replaced by operations under a). Generally, the more parts of the production that are carried out by the manufacturer, the more operations under b) may be replaced by operations under a).

In any case the operation shall lead to an equivalent level of compliance of the product as if FPC had been carried out during the production.

The operations under a) refer to the intermediate states of the product as on manufacturing machines and their adjustment, and measuring equipment, etc. These controls and tests and their frequency shall be chosen based on product type and composition, the manufacturing process and its complexity, the sensitivity of product features to variations in manufacturing parameters, etc.

The manufacturer of slabs and cut-to-size products shall establish and maintain records that provide evidence that the production has been sampled and tested. These records shall show clearly whether the production has satisfied the defined acceptance criteria and shall be available for at least three years.

6.3.4 Initial inspection of factory and of FPC

Initial inspection of factory and of FPC shall be carried out when the production process has been finalized and in operation. The factory and FPC documentation shall be assessed to verify that the requirements of subclauses 6.3.2 and 6.3.3 are fulfilled.

During the inspection it shall be verified:

- a) that all resources necessary for the achievement of the product characteristics included in this European Standard are in place and correctly implemented,
and
- b) that the FPC-procedures in accordance with the FPC documentation are followed in practice,
and
- c) that the product complies with the product type samples, for which compliance of the product performance to the DoP has been verified.

All locations where final assembly or at least final testing of the relevant product is performed, shall be assessed to verify that the above conditions a) to c) are in place and implemented. If the FPC system covers more than one product, production line or production process, and it is verified that the general requirements are fulfilled when assessing one product, production line or production process, then the assessment of the general requirements does not need to be repeated when assessing the FPC for another product, production line or production process.

All assessments and their results shall be documented in the initial inspection report.

6.3.5 Continuous surveillance of FPC

Surveillance of the FPC shall be undertaken at least one per year. The surveillance of the FPC shall include a review of the FPC test plan(s) and production processes(s) for each product to determine if any changes have been made since the last assessment or surveillance. The significance of any changes shall be assessed.

Checks shall be made to ensure that the test plans are still correctly implemented and that the production equipment is still correctly maintained and calibrated at appropriate time intervals.

The records of tests and measurement made during the production process and to finished products shall be reviewed to ensure that the values obtained still correspond with those values for the samples submitted to the determination of the product type and that the correct actions have been taken for non-compliant products.

6.3.6 Procedure for modifications

If modifications are made to the product, production process or FPC system that could affect any of the product characteristics declared according to this standard, then all the characteristics for which the manufacturer declares performance, which may be affected by the modification, shall be subject to the determination of the product type, as described in 6.2.1.

Where relevant, a re-assessment of the factory and of the FPC system shall be performed for those aspects, which may be affected by the modification.

All assessments and their results shall be documented in a report.

7 Marking, labelling and packaging

As a minimum of identification, each consignment of slab or cut-to-size products shall specify on a label and/or packaging and/or accompanying documents the following information:

- classification of the agglomerated stone according to EN 14618 (i.e. type of binder/mineral nature of the aggregate);
- maximum grain size: coarse (≥ 15 mm), medium (≥ 4 mm and < 15 mm) or small (< 4 mm);
- finish surface: e.g. polished surface, sand blasted, etc.;
- dimensions: length, width and thickness.

The number of labels shall be sufficient to identify the delivered products according to the type of packaging.

The slabs and cut-to-size products shall be clean before packaging and transporting.

Sensitive polished surfaces shall be protected by appropriate means.

Slabs and cut-to-size products, which are susceptible to stains, shall get special attention in order to protect them.

Packing and tapes which are likely to stain shall not be used. Products with caustic properties shall not be used.

Annex A (normative)

Reference sample, visual inspection and acceptance criteria

A reference sample shall be an adequate number of pieces of agglomerated stone of sufficient size to indicate the general appearance of the finished work. The dimensions of individual pieces shall be at least 0,01 m² (typical values are between 0,01 m² and 0,25 m² 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.

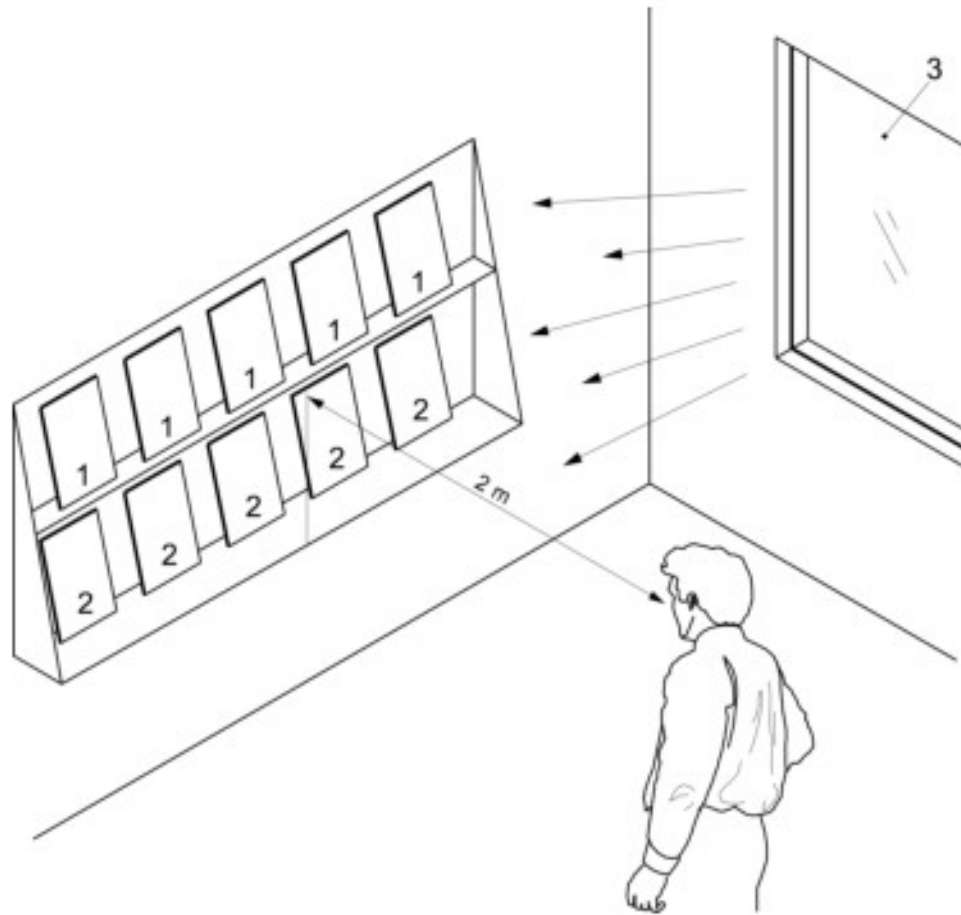
Evaluation of the reference sample does not imply strict uniformity between the sample itself and the actual supply; natural variations in tonality may always occur due to natural raw materials.

All the differences in aesthetical pattern between the slabs or cut to size products and the reference sample shall be considered typical of the agglomerated stone and not as flaws. Therefore they shall not become a reason for rejection, unless their presence exceeds 15 % of the surface and the typical pattern of the agglomerated stone is lost.

Any comparison between a production slab or cut to size product and the reference sample shall be carried out by placing the reference sample in a vertical position against the production slab or cut to size product and viewing them at a distance of about two metres under normal daylight conditions and recording any visible differences in the characteristics of the agglomerated stone (see Figure A.1). According to this method the shading tolerance and the gloss value (in the case of fine ground, honed or highly polished surfaces) measured at six different points of the slab or tile shall be evaluated.

The name and address of the manufacturer or supplier of the agglomerated stone shall also be indicated on the reference test sample.

The pieces of agglomerated stone should be analysed under similar conditions, e.g. wet/dry, light, etc.



Key

- 1 reference sample
- 2 production sample
- 3 daylight

Figure A.1 — Comparison between production sample and the reference sample of a slab or a cut to size product

Annex ZA (informative)

Relationship of this European Standard with Regulation (EU) No.305/2011

(When applying this standard as a harmonized standard under Regulation (EU) No. 305/2011, manufacturers and Member States are obliged by this regulation to use this Annex)

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under standardization request M/119 Floorings given to CEN and CENELEC by the European Commission (EC) and the European Free Trade Association (EFTA).

When this European Standard is cited in the Official Journal of the European Union (OJEU), under Regulation (EU) No 305/2011, it shall be possible to use it as a basis for the establishment of the Declaration of Performance (DoP) and the CE marking, from the date of the beginning of the co-existence period as specified in the OJEU.

Regulation (EU) No 305/2011, as amended, contains provisions for the DoP and the CE marking.

Table ZA.1.1 — Relevant clauses for agglomerated stone slabs and cut-to-size products for internal floorings and stairs

Product: agglomerated stone slabs and cut-to-size products			
Intended use: for <u>internal</u> floorings and stairs			
Essential characteristics	Clauses of this European Standard related to essential characteristics	Classes and/or threshold levels	Notes ^d
Water tightness ^c (water absorption)	4.2.4	-	a) EN 14617-1 b) see Table 2 → Class W ₁ to W ₄
Breaking strength (flexural strength)	4.2.5	-	a) EN 14617-2 b) see Table 2 → Class F ₁ to F ₄
Reaction to fire	4.2.3	Classes A1 ₀ to F ₀	A1 without testing ^a or Classes according to EN 13501-1 ^b
Slipperiness	4.2.11	-	a) CEN/TS 16165:2016 b) declared value
Tactility	4.2.13	-	Description
Thermal conductivity	4.2.6	-	a) EN ISO 10456 b) tabulated value
Release of dangerous substances	4.2.15	-	As relevant
Durability - Freeze and thaw resistance - Impact resistance (maintenance of integrity)	4.2.14.1 4.2.14.2	- -	a) EN 14617-5 b) declared value a) EN 14617-9 b) declared value

^a For agglomerated stones with less or equal than 1 % mass or volume, whichever is the most onerous, of organic materials.

^b For agglomerated stones with more than 1 % mass or volume, whichever is the most onerous, of organic materials.

^c The characteristic "water tightness" can be considered as the inverse of water permeability and it roughly coincides with water absorption because a flooring element can absorb water while not releasing any on the other side (i.e. remaining water tight).

^d Standard, clause, table or annex for test/calculation method of the product characteristics [see a)] and expression of the test result [see b)].

Table ZA.1.2 — Relevant clauses for agglomerated stone slabs and cut-to-size products for external floorings and stairs

Product: agglomerated stone slabs and cut-to-size products			
Intended use: for <u>external</u> floorings and stairs			
Essential characteristics	Clauses of this European Standard related to essential characteristics	Classes and/or threshold levels	Notes ^a
Breaking strength (flexural strength)	4.2.5	-	a) EN 14617-2 b) see Table 2 → Class F ₁ to F ₄
Slipperiness (for pedestrian areas only)	4.2.11	-	a) CEN/TS 16165:2016 b) declared value
Tactility	4.2.13	-	Description
Release of dangerous substances	4.2.15	-	As relevant
Durability		-	a) EN 14617-5 b) declared value
- Freeze and thaw resistance	4.2.14.1		
- Impact resistance (maintenance of integrity)	4.2.14.2	-	a) EN 14617-9 b) declared value
- Thermal shock resistance	4.2.7		a) EN 14617-6 b) declared value

^a Standard, clause, table or annex for test/calculation method of the product characteristics [see a)] and expression of the test result [see b)].

ZA.2 System of Assessment and Verification of Constancy of Performance (AVCP)

The AVCP systems of agglomerated stone slabs and cut-to-size products indicated in Tables ZA.1.1 to ZA.1.2, can be found in the EC legal act(s) adopted by the EC: Decision for Floorings i.e. 97/808/EC amended by Commission decision 1999/453/EC of 18 June 1999 L178 page 50 of 14.7.1999, Commission decision 2001/596/EC of 8 January 2001 L209 page 33 of 2.8.2001 and Commission Decision 2006/190/EC of 1 march 2006 L 66 page 47 of 8.3.2006

Micro-enterprises are allowed to treat products under AVCP system 3 covered by this standard in accordance with AVCP system 4, applying this simplified procedure with its conditions, as foreseen in Article 37 of Regulation (EU) No.305/2011.

ZA.3 Assignment of AVCP tasks

The AVCP systems of the agglomerated stone slabs and cut-to-size products as provided in Tables ZA.1.1 to ZA.1.2 is defined in Tables ZA.3.1 to ZA.3.3 resulting from application of the clauses of this or other European Standards indicated therein. The content of the tasks assigned to the notified body shall be limited to those essential characteristics, if any, as provided for in Annex III of the relevant standardization request and to those that the manufacturer intends to declare.

Taking into account the AVCP systems defined for the products and the intended uses the following tasks are to be undertaken by the manufacturer and the notified body respectively (except in case of AVCP system 4) for the assessment and verification of the constancy of performance of the product.

Table ZA.3.1 — Assignment of AVCP tasks for agglomerated stone slabs and cut-to-size products under system 1

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to all characteristics of Table ZA.1.1 or ZA.1.2 relevant for the intended use which are declared	6.3
	Further testing of samples taken at the manufacturing plant by the manufacturer in accordance with the prescribed test plan	All characteristics of Table ZA.1.1 or ZA.1.2 relevant for the intended use which are declared [except reaction to fire classes (A1 _n , A2 _n , B _n and C _n) ^a	6.3
Tasks for the notified product certification body	An assessment of the performance of the construction product carried out on the basis of testing (including sampling), calculation, tabulated values or descriptive documentation of the product	[Reaction to fire classes (A1 _n , A2 _n , B _n and C _n) ^a	6.2
	Initial inspection of manufacturing plant and of FPC	Parameters related to all characteristics of Table ZA.1.1 or ZA.1.2, relevant for the intended use which are declared, namely [in particular reaction to fire classes (A1 _n , A2 _n , B _n and C _n) ^a . Documentation of the FPC.	6.3.4
	Continuous surveillance, assessment and evaluation of FPC	Parameters related to all characteristics of Table ZA.1.1 or ZA.1.2, relevant for the intended use which are declared, namely [in particular reaction to fire classes (A1 _n , A2 _n , B _n and C _n) ^a . Documentation of FPC	6.3.5
^a Applicable for internal use of slabs and cut-to-size products only.			

Table ZA.3.2 — Assignment of AVCP tasks for agglomerated stone slabs and cut-to-size products under system 3

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	Factory production control (FPC)	Parameters related to all characteristics of Table ZA.1.1 relevant for the intended use which are declared	6.3
Tasks for a notified laboratory	The notified laboratory shall assess the performance on the basis of testing (based on sampling carried out by the manufacturer), calculation, tabulated values or descriptive documentation of the construction product.	[Reaction to fire classes (A1 _{fl} , A2 _{fl} , B _{fl} , C _{fl}) D _{fl} and E _{fl}] ^a	6.2
^a Applicable for internal use of slabs and cut-to-size products only.			

Table ZA.3.3 — Assignment of AVCP tasks for agglomerated stone slabs and cut-to-size products under system 4

Tasks		Content of the task	AVCP clauses to apply
Tasks for the manufacturer	An assessment of the performance of the construction product on the basis of testing, calculation, tabulated values or descriptive documentation of that product	All characteristics of Table ZA.1.1 or Table ZA.1.2 relevant for the intended use which are declared	6.2
	Factory production control (FPC)	Parameters related to all characteristics of Table ZA.1.1 or Table ZA.1.2 relevant for the intended use	6.3

Bibliography

- [1] EN 13198, *Precast concrete products - Street furniture and garden products*
- [2] EN 13748-1, *Terrazzo tiles - Part 1: Terrazzo tiles for internal use*
- [3] EN 13748-2, *Terrazzo tiles - Part 2: Terrazzo tiles for external use*
- [4] EN 15285, *Agglomerated stone - Modular tiles for flooring and stairs (internal and external)*
- [5] EN ISO 9001, *Quality management systems - Requirements (ISO 9001)*