

Concrete paving blocks — Requirements and test methods

The European Standard EN 1338:2003 has the status of a
British Standard

ICS 93.080.20

National foreword

This British Standard is the official English language version of EN 1338:2003, including Corrigendum May 2006.

EN 1338 is a candidate “harmonized” European Standard and fully takes into account the requirements of the European Commission mandates M/119, *Floorings*, and M/122, *Roof Coverings*, given under the EU Construction Products Directive (89/106/EEC), and intended to lead to CE marking. The date of applicability of EN 1338 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 the Member States have agreed a transition period for the co-existence of harmonized European Standards and their corresponding national standard(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 At the end of this co-existence period, the national standard(s) will be withdrawn.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 1338 is the subject of transitional arrangements agreed under the Commission mandate. In the UK, the corresponding national standard is:

— BS 6717:2001, *Precast, unreinforced concrete paving blocks — Requirements and test methods*;

and based on this transition period of twenty-one months, BS 6717:2001 would be withdrawn in February 2005.

NOTE This date is approximate. Users of this standard should contact BSI Customer Services for confirmation of withdrawal.

The UK participation in the preparation of EN 1338:2003 was entrusted by Technical Committee B/507, Paving units, kerbs, screeds and in-situ floorings, to its Subcommittee, B/507/1, Paving units and kerbs — (precast concrete), 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 subcommittee can be obtained on request to its secretary.

Attention is drawn to National Annex NA (informative), which contains additional information and advice on the use of different performance classes for users in the UK.

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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Pavés en béton - Prescriptions et méthodes d'essai

Pflastersteine aus Beton - Anforderungen und
Prüfverfahren

This European Standard was approved by CEN on 16 October 2002.

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 Management Centre or to any CEN member.

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Foreword

This document (EN 1338:2003) has been prepared by Technical Committee CEN/TC 178 "Paving units and kerbs", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by November 2003, and conflicting national standards shall be withdrawn at the latest by February 2005.

 This document has been prepared under Mandates M/119 and M/122 given to CEN by the European Commission and the European Free Trade Association, and supports essential requirements of EU Directive(s). 

For the relationship with the Construction Products Directive see informative Annex ZA, which is an integral part of this document.

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

No existing European Standard is superseded.

The annexes B, C, D, E, F, G, H, I and J are normative, the annexes A, K and ZA are informative.

1 Scope

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

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

This standard does not deal with the tactility or visibility of blocks nor with permeable blocks.

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

2 Normative references

This European Standard incorporates by dated and undated references, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references, the latest edition of the publication referred to applies (including amendments).

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

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

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

EN ISO 6506-1, *Metallic materials - Brinell hardness test - Part 1: Test method*  (ISO 6506-1:2005). 

EN ISO 6506-2, *Metallic materials - Brinell hardness test - Part 2: Verification and calibration of testing machines*  (ISO 6506-2: 2005). 

EN ISO 6506-3, *Metallic materials - Brinell hardness test - Part 3: Calibration of reference blocks*  (ISO 6506-3: 2005). 

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

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

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

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

ISO 7966, *Acceptance control charts*.

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

3 Terms and definitions

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

3.1

arris

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

3.2

concrete paving block

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

$\frac{3}{4}$ at a distance of 50 mm from any edge, any cross-section does not show a horizontal dimension less than 50 mm;

$\frac{3}{4}$ its overall length divided by its thickness is less than or equal to four.

NOTE These two conditions are not applicable to complementary fittings.

3.3

complementary fitting

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

3.4

permeable paving block

block intended by its structure to allow the passage of water through the block

3.5

overall length

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

3.6

overall width

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

3.7

thickness

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

3.8

spacer nibs

small protruding profiles on a side face of a block

3.9

upper face

surface intended to be seen when in use

3.10

bed face

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

3.11

facing layer

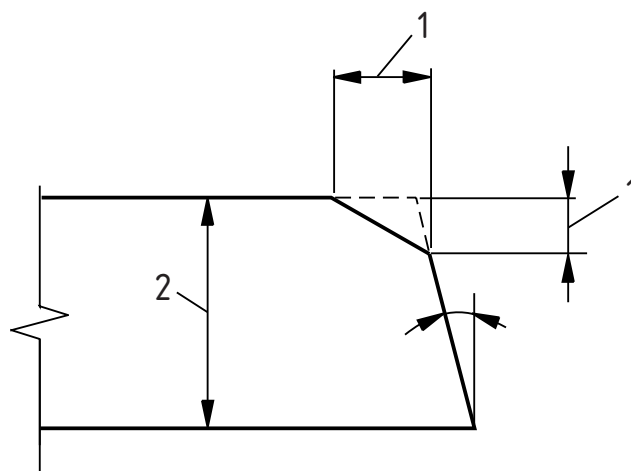
layer of concrete on the upper face of a block of different material and/or properties to the main body or backing layer

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

3.12

draw

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



Key

1 Chamfer

2 Thickness

Draw

Figure 1 — Example of chamfer and draw

3.13

chamfer

bevelled arris, as shown in Figure 1

3.14

work dimension

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

3.15

secondary processing

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

3.16

actual dimension

dimension of a block as measured

3.17

chased side face

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

3.18

skid resistance

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

3.19**slip resistance**

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

3.20**format**

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

3.21**wipe**

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

4 Requirements for materials

4.1 General

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

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

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

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

4.2 Asbestos

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

5 Requirements for products

5.1 General

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

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

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

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

A bevelled arris exceeding 2 mm shall be described as chamfered. Its dimensions shall be declared by the manufacturer.

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

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

5.2 Shape and dimensions

5.2.1 General

All references to dimensions in this subclause are to work dimensions.

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

5.2.2 Work dimensions

The work dimensions shall be stated by the manufacturer.

5.2.3 Spacer nibs, draw or chased and profiled side faces

Blocks may be produced with spacer nibs, a draw or chased and profiled side faces. When these are provided, the manufacturer shall declare their work dimensions.

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

5.2.4 Permissible deviations

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

Table 1 — Permissible deviations

Block thickness mm	Length mm	Width mm	Thickness mm
< 100	± 2	± 2	± 3
100	± 3	± 3	± 4
The difference between any two measurements of the thickness of a single block shall be 3 mm.			

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

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

Table 2 — Maximum differences

Class	Marking	Maximum difference mm
1	J	5
2	K	3

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

Table 3 — Deviations of flatness and bow

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

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

5.3 Physical and mechanical properties

5.3.1 General

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

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

5.3.2 Weathering resistance

5.3.2.1 Test method

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

5.3.2.2 Performance and classes

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

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

Table 4.1 — Water absorption

Class	Marking	Water absorption % by mass
1	A	no performance measured
2	B	6 AC text deleted AC

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

Table 4.2 — Resistance to freeze-thaw with de-icing salts

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

5.3.3 Tensile splitting strength

5.3.3.1 Test method

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

5.3.3.2 Performance

The characteristic tensile splitting strength T shall not be less than 3,6 MPa. None of the individual results shall be less than 2,9 MPa, nor have a failure load less than 250 N/mm of splitting length.

5.3.3.3 Durability of strength

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

5.3.4 Abrasion resistance

5.3.4.1 Test method

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

5.3.4.2 Performance and classes

Requirements for abrasion resistance are given in Table 5.

No individual result shall be greater than the required value.

Table 5 — Abrasion resistance classes

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

5.3.5 Slip/skid resistance

5.3.5.1 Conditions

Concrete paving blocks have satisfactory slip/skid resistance provided that their whole upper surface has not been ground and/or polished to produce a very smooth surface.

5.3.5.2 Test method

If in an exceptional case a value for slip/skid resistance is required, the test method as described in annex I shall be used and the minimum slip/skid resistance value shall be declared.

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

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

5.3.5.3 Durability of slip/skid resistance

Under normal conditions of use precast concrete blocks provide satisfactory slip/skid resistance during the working life of the product, provided they are subjected to normal maintenance and unless a major proportion of aggregates which polish excessively have been exposed on the upper face.

NOTE The development of a performance based test method for the durability of slip/skid resistance is proceeding in TC 178 WG4.

5.3.6 Fire performance

5.3.6.1 Reaction to fire

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

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

5.3.6.2 External fire performance

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

5.3.7 Thermal conductivity

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

5.4 Visual aspects

5.4.1 Appearance

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

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

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

5.4.2 Texture

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

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

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

5.4.3 Colour

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

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

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

6 Evaluation of conformity

6.1 General

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

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

²⁾ See Commission Decision 2000/553/EC.

NOTE Failure load is dependent upon block thickness

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

6.1.1 Demonstration of conformity

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

- ¾ type testing of the product (see 6.2);
- ¾ factory production control (see 6.3), including product testing.

6.1.2 Assessment of conformity

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

- ¾ either by a third party inspecting the manufacturer's type testing and factory production control procedures;
- ¾ or by acceptance testing of a consignment at delivery (e.g. in the case of dispute, see annex B).

6.2 Type testing of the product

6.2.1 Initial type testing

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

Where the product has previously been tested according to this standard (same product, same characteristics, same or more demanding test method and sampling procedure), the result may be used to satisfy initial type testing.

6.2.2 Further type testing

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

NOTE Examples of major changes:

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

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

Table 6 — Periodically repeated type testing

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

6.2.3 Sampling, testing and conformity criteria

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

Table 7 — Sampling plan and conformity criteria for initial and further type testing

Property	Requirements	Testing method	Number of blocks	Conformity criteria
Visual aspects	5.4	Annex J	20 ¹⁾	No block shall show cracking, flaking or delamination ²⁾
Thickness of facing layer	5.1	C.6 ²⁾	8	Each block shall meet the requirements
Shape and dimensions	5.2	Annex C ²⁾	8 ¹⁾	Each block shall meet the requirements for the declared class
Tensile splitting strength and failure load	5.3.3	Annex F	8	No block shall have a tensile strength less than 3,6 MPa nor a failure load less than 250 N/mm
Abrasion resistance (only classes 3 and 4)	5.3.4	Annex G or H	3	Each block shall meet the requirements for the declared class
Slip/skid resistance (only where tested)	5.3.5	Annex I	5	The mean of the five blocks shall be declared
Weathering resistance - class 2	5.3.2	Annex E	3	No block shall have a water absorption greater than 6 % by mass
- class 3	5.3.2	Annex D	3	The mean of the three blocks shall not be greater than 1,0 kg/m ² with no individual result greater than 1,5 kg/m ²

¹⁾ These blocks may be used for subsequent tests.

²⁾ C.6 only applies for blocks with a facing layer.

The type tests shall be carried out in accordance with the reference test methods called up in this standard.

Type testing is normally carried out with the manufacturer's test equipment.

The test results shall be recorded.

6.3 Factory production control

6.3.1 General

The manufacturer shall establish, document and maintain a factory production control system to ensure that the products placed on the market will conform with the specified or declared values.

The factory production control system shall consist of procedures, regular inspection and tests and the utilisation of the results to control raw and other incoming materials, equipment, the production process and the product.

An example of a suitable inspection scheme for factory production control is given in annex A.

The results of inspections requiring action and the results of tests shall be recorded.

The action to be taken when control values or criteria are not met shall be given.

6.3.2 Equipment

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

An inspection scheme for equipment is given in A.1.

6.3.3 Raw and other incoming materials

The specifications of all incoming materials shall be documented.

An inspection scheme for raw materials is given in A.2.

6.3.4 Production process

The relevant features of the plant and production process shall be defined giving the frequency of the inspection checks and tests, together with the criteria required both on equipment and on work in progress.

An inspection scheme for the production process is given in A.3.

6.3.5 Product testing

A sampling and testing plan of products shall be prepared and implemented.

The sample shall be representative of production.

The tests shall be carried out in accordance with the methods called up in this standard or applying alternative test methods with a proven correlation to the standard methods.

The results of testing shall meet the specified conformity criteria (see 6.3.8) and be available.

An example of an inspection scheme for product testing is given in A.4.1.

Switching rules for product testing are given in A.5.

6.3.6 Marking, storage and delivery of products

The marking, storage and delivery control, together with procedures for dealing with non-conforming products (see 6.3.7), shall be documented.

Products may be released before the final test results of factory production control testing are received, if they are subject to a positive recall procedure.

An example of inspection scheme for marking, storage and delivery is given in A.4.2.

6.3.7 Non-conforming products

If the results of the tests on a product are unsatisfactory, the manufacturer shall take the necessary steps in order to rectify the shortcoming.

Products which do not conform to the requirements shall be set aside and marked accordingly.

If any non-conformity of the product is established after delivery, the customer shall be notified.

6.3.8 Product conformity criteria

When the conformity criteria in this clause may be considered either by attributes or variables, the method applied shall be at the manufacturer's discretion.

6.3.8.1 Shape and dimensions

A. Attributes

The conformity of the production with 5.2 shall be assessed for each machine per production day (see sampling according to A.4.1.3). Each of the requirements in 5.2 shall be considered separately.

- a) If the sample consists of less than eight blocks (see switching rules in A.5) and each of the requirements in 5.2 for the declared class is complied with by all of the blocks, then the sample and the corresponding production shall be accepted. If not, this sample shall be increased to eight blocks and the procedure given in b) shall apply.
- b) If the sample consists of eight blocks and not more than one of the blocks does not conform to any one of the requirements in 5.2 considered separately for the declared class, the sample and the corresponding production shall be accepted. If not, this sample shall be increased to 16 blocks and the procedure given in c) shall be applied.
- c) If the sample consists of 16 blocks and not more than two of the blocks do not conform to any one of the requirements in 5.2 considered separately for the declared class, the sample and the corresponding production shall be accepted. If more than two of the blocks do not conform to any one of the requirements considered separately for the declared class, the sample and the corresponding production are not accepted and 6.3.7 applies.

B. Variables

When the standard deviation of a machine is known and regularly checked, the conformity of the production with 5.2 shall be assessed for each machine per day or consecutive production days not exceeding five (see sampling according to A.4.1.3). Each of the requirements in 5.2 shall be considered separately.

The conformity is assessed on a 10 % fractile.

The acceptability of the samples considered shall be checked using a control chart conforming to either ISO 7966 or ISO 7873 and taking into account 5.2, provided the probability of acceptance is equivalent to that resulting from assessment by attributes.

 If the sample and the corresponding production are not accepted, 6.3.7 applies. 

6.3.8.2 Weathering resistance (class 2 - water absorption)

The conformity of the production with 5.3.2 (class 2) shall be assessed for each family and for five production days, or more according to the switching rules (see sampling according to A.4.1.6).

- a) If the sample consists of three or six blocks (see switching rules in A.5) and the requirements in 5.3.2 (class 2) are complied with, the sample and the corresponding production shall be accepted. If not, this sample shall be increased to nine blocks and the procedure given in b) shall apply.
- b) If the sample consists of nine blocks and the requirements in 5.3.2 (class 2) are complied with, the sample and the corresponding production shall be accepted. If not, the sample and the corresponding production are not accepted and 6.3.7 applies.

6.3.8.3 Tensile splitting strength

A. Attributes

The conformity of the production with 5.3.3 shall be assessed for each machine per production day (see sampling according to A.4.1.4).

- a) If the sample consists of eight blocks or fewer (see switching rules in A.5) and the strength T of each of the blocks is not lower than 3,6 MPa and the failing load not lower than 250 N/mm, the sample and the corresponding production shall be accepted. If not, this sample shall be increased to 16 blocks and the procedure given in b) shall apply.
- b) If the sample consists of 16 blocks and the strength T of not more than one of the blocks is lower than 3,6 MPa but not lower than 2,9 MPa and no failing load is lower than 250 N/mm, the sample and the corresponding production shall be accepted. If not, the sample and the corresponding production are not accepted and 6.3.7 applies.

B. Variables

When the standard deviation for a machine is known and regularly checked, the conformity of the production with 5.3.3 shall be assessed for each machine per production day or consecutive production days not exceeding five (see sampling according to A.4).

The conformity is assessed on a 5 % fractile.

The acceptability of the samples considered shall be checked using a control chart complying either with ISO 7966 or ISO 7873 and taking into account 5.3.3, provided the probability of acceptance is equivalent to that resulting from testing by attributes (see annex K).

If the sample and the corresponding production are not accepted, 6.3.7 applies.

6.3.8.4 Visual aspects

The conformity of the production with 5.4 shall be assessed in case of doubt (see sampling according to A.4). The sample tested shall satisfy the requirements of the standard. If not, the sample and the corresponding production are not accepted and 6.3.7 applies.

7 Marking

The following particulars relating to blocks shall be supplied:

1	2
*	*
	*
* or *	
*	*

Identification of the manufacturer or the factory

Identification of the date of production and,

if delivered earlier than the date on which the blocks are declared suitable for use, the identification of this date

Identification of the class(es) where applicable (see below)

*	* The number of this European Standard
*	Identification of the product.

- 1: On the delivery note or on the invoice or on the manufacturer's declaration.
- 2: On 0,5 % of the blocks with a minimum of one marking per package or on the packaging itself if not reused.

Classes and their identification:

Requirement	Marking
weathering resistance	A, B or D
abrasion resistance	F, H or I
Diagonals	J or K

Where ZA.3 covers the same information as this clause 7, the requirements of this clause are met for CE marked products.

8 Test report

The following particulars shall be supplied in the test report (other than for tests for factory production control):

- 1) the name of the organisation carrying out the test;
- 2) the name of the person carrying out the test;
- 3) the date of the test;
- 4) the name of the source providing the sample;
- 5) the sample reference including the date of production;
- 6) the name of the person taking the sample;
- 7) the relevant EN number and annex;
- 8) the name of the test;
- 9) the test result;
- 10) any pertinent remarks about the sample or test result.

Annex A (informative)

Inspection schemes

A.1 Equipment inspection

Subject		Aim	Method	Frequency
A.1.1 Testing and measuring equipment				
All testing and measuring equipment		Correct functioning and accuracy	Where applicable calibrating against equipment which has been calibrated traceable to national standards and is used exclusively for this purpose except as indicated in the test method	On (re)installation, after major repair or once per year
A.1.2 Storage and production equipment				
1	Storage of materials	Absence of contamination	Visual inspection or other appropriate method	- On installation - Weekly
2	Weighing or volumetric batching equipment	Correct functioning	Visual inspection	Daily
3		Block manufacturer's declared accuracy	Calibrating against equipment which has been calibrated traceable to national standards and is used exclusively for this purpose	- On (re)installation - Weighing: once a year. Volumetric: twice a year - In case of doubt
4	Mixers	Wear and correct functioning	Visual inspection	Weekly
5	Moulds	Cleanliness and condition	Visual inspection	Daily