

Nederlandse norm

NEN-EN 14411

(en)

Keramische tegels - Definities, classificatie, eigenschappen, evaluatie van conformiteiten en merken

Ceramic tiles - Definition, classification, characteristics, assessment and verification of constancy of performance and marking

Vervangt NEN-EN 14411:2012;
NEN-EN 14411:2015 Ontw.

ICS 91.100.23

juli 2016

Als Nederlandse norm is aanvaard:
- EN 14411:2016, IDT

Normcommissie 353016 "Gebakken tegels"



THIS PUBLICATION IS COPYRIGHT PROTECTED

DEZE PUBLICATIE IS AUTEURSRECHTELIJK BESCHERMD

Apart from exceptions provided by the law, nothing from this publication may be duplicated and/or published by means of photocopy, microfilm, storage in computer files or otherwise, which also applies to full or partial processing, without the written consent of the Netherlands Standardization Institute.

The Netherlands Standardization Institute shall, with the exclusion of any other beneficiary, collect payments owed by third parties for duplication and/or act in and out of law, where this authority is not transferred or falls by right to the Reproduction Rights Foundation.

Auteursrecht voorbehouden. Behoudens uitzondering door de wet gesteld mag zonder schriftelijke toestemming van het Nederlands Normalisatie-instituut niets uit deze uitgave worden verveelvoudigd en/of openbaar gemaakt door middel van fotokopie, microfilm, opslag in computerbestanden of anderszins, hetgeen ook van toepassing is op gehele of gedeeltelijke bewerking.

Het Nederlands Normalisatie-instituut is met uitsluiting van ieder ander gerechtigd de door derden verschuldigde vergoedingen voor verveelvoudiging te innen en/of daartoe in en buiten rechte op te treden, voor zover deze bevoegdheid niet is overgedragen c.q. rechtens toekomt aan de Stichting Reprerecht.

Although the utmost care has been taken with this publication, errors and omissions cannot be entirely excluded. The Netherlands Standardization Institute and/or the members of the committees therefore accept no liability, not even for direct or indirect damage, occurring due to or in relation with the application of publications issued by the Netherlands Standardization Institute.

Hoewel bij deze uitgave de uiterste zorg is nagestreefd, kunnen fouten en onvolledigheden niet geheel worden uitgesloten. Het Nederlands Normalisatie-instituut en/of de leden van de commissies aanvaarden derhalve geen enkele aansprakelijkheid, ook niet voor directe of indirecte schade, ontstaan door of verband houdend met toepassing van door het Nederlands Normalisatie-instituut gepubliceerde uitgaven.

NEN

©2016 Nederlands Normalisatie-instituut
Postbus 5059, 2600 GB Delft
Telefoon (015) 2 690 390, Fax (015) 2 690 190

EUROPEAN STANDARD

EN 14411

NORME EUROPÉENNE

EUROPÄISCHE NORM

July 2016

ICS 91.100.23

Supersedes EN 14411:2012

English Version

Ceramic tiles - Definition, classification, characteristics, assessment and verification of constancy of performance and marking

Carreaux céramiques - Définitions, classification, caractéristiques, évaluation et vérification de la constance de performance et marquage

Keramische Fliesen und Platten - Definitionen, Klassifizierung, Eigenschaften, Konformitätsbewertung und Kennzeichnung

This European Standard was approved by CEN on 13 May 2016.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents	Page
European foreword.....	4
1 Scope	6
2 Normative references	6
3 Terms and definitions	7
4 Classification of ceramic tiles	10
5 Requirements	11
5.1 General.....	11
5.2 Characteristics.....	11
6 Assessment and verification of constancy of performance (AVCP)	13
6.1 General.....	13
6.2 Type testing.....	13
6.2.1 General.....	13
6.2.2 Test samples, testing and compliance criteria.....	14
6.2.3 Test reports.....	14
6.2.4 Shared other party results.....	14
6.3 Factory production control (FPC).....	14
6.3.1 General.....	14
6.3.2 Requirements.....	15
6.3.3 Product specific requirements.....	18
6.3.4 Procedure for modifications.....	18
6.3.5 One-off products, pre-production products (e.g. prototypes) and products produced in very low quantity.....	19
7 Designation	19
8 Marking	19
Annex A (normative) Requirements for extruded ceramic tiles of Group AI_b (0,5 % < E_b ≤ 3 %)	21
Annex B (normative) Requirements for extruded ceramic tiles of Group AII_{a-1} (3 % < E_b ≤ 6 %)	25
Annex C (normative) Requirements for extruded ceramic tiles of Group AII_{a-2} (3 % < E_b ≤ 6 %)	29
Annex D (normative) Requirements for extruded ceramic tiles of Group AII_{b-1} (6 % < E_b ≤ 10 %)	33
Annex E (normative) Requirements for extruded ceramic tiles of Group AII_{b-2} (6 % < E_b ≤ 10 %)	37
Annex F (normative) Requirements for extruded ceramic tiles of Group AIII (E_b > 10 %)	41
Annex G (normative) Requirements for dry-pressed ceramic tiles with low water absorption of Group BI_a (E_b ≤ 0,5 %)	45
Annex H (normative) Requirements for dry-pressed ceramic tiles with low water absorption of Group BI_b (0,5 % < E_b ≤ 3 %)	49

Annex J (normative) Requirements for dry-pressed ceramic tiles of Group BII_a (3 % < E_b ≤ 6 %)	53
Annex K (normative) Requirements for dry-pressed ceramic tiles of Group BII_b (6 % < E_b ≤ 10 %)	57
Annex L (normative) Requirements for dry-pressed ceramic tiles of Group BIII (E_b > 10 %)	61
Annex M (normative) Requirements of extruded ceramic tiles with low water absorption of Group AI_a (E_b ≤ 0,5 %)	65
Annex N (informative) Classification of glazed ceramic tiles for floorings according to their resistance to surface abrasion	69
Annex O (informative) Additional information on applicability of certain characteristics	70
0.1 General	70
0.2 Characteristics	70
Annex P (informative) Symbols for indication of intended use and of performances of some characteristics of ceramic tiles	71
Annex ZA (informative) Clauses of this European Standard addressing the provisions of the EU Construction Products Regulation	73
Bibliography	84

Copyright
Preview

European foreword

This document (EN 14411:2016) has been prepared by Technical Committee CEN/TC 67 "Ceramic tiles", 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 January 2017, and conflicting national standards shall be withdrawn at the latest by April 2018.

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 supersedes EN 14411:2012.

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.

The changes with respect to the previous edition include:

Errors (editorial):

- Skipping Annex I, because ceramic tiles that comply with the requirements of EN 14411, have to include specific marking on the boxes. One of the requirements of this marking is to indicate the reference to the standard and the annex it complies with. Previous editions of EN 14411 all skipped the reference to Annex I, and only the 2012 edition included it by error. This also affects the numbering of annexes which go after I (J, K, L...) since these all shift one letter downwards. If this is not corrected, manufacturers will need to update the marking and change all the boxes. Furthermore, the letter of the annex has traditionally been connected with a specific group or type of ceramic tile, and the change will create confusion. In order to avoid all these unnecessary consequences, and increased costs, it is requested, like it has been done in the past with previous editions, to skip Annex I, and adapt the successive annexes accordingly.
- Renumbering of Annexes J to P (previous I to O)
- Annex C – dimensional tolerance limits for surface flatness were incorrect (see EN 14411:2006)
- Annex K – Eliminated note 'o' since it was duplicated (same as note 'n')
- Updated references to annexes throughout the text

Changes (technical):

- Exclusion of ceramic decorative pieces, trims and accessories (not included in mandate)
- Exclusion of meshed backed products (these are considered systems or kits, involving other non-ceramic materials, thus not covered by this standard)
- New Clause 6 on assessment and verification of the constancy of performance (previous evaluation of conformity clause) according to Doc. TF N 548 Rev 1 Guidance document.

- Clause 8 on marking: addition of text for special consideration of marking on small size tiles
- Table 2, clause *B.10d*): elimination of ‘mortar’ in the bond strength characteristic (the reference to test standard EN 1015-12 is not appropriate since it is not used to determine the adhesion properties of ceramics but of renders and plastering mortars on substrates). Eliminated references throughout the text.
- New Annex ZA according to CPR (including Delegated Regulation EU 157/2014 relative to DoP on websites and Delegated Regulation EU 574/2014 relative to model of DoP).

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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Preview

1 Scope

This European Standard defines terms and specifies characteristics for ceramic tiles, including mosaics (i.e. any piece that can fit into a square area of 49 cm²) produced by extrusion or dry-pressing techniques, used for internal and/or external floorings (including stairs) and/or walls. Furthermore, it provides the level of requirements for these characteristics and references to the test methods applied as well as provisions for the assessment and verification of the constancy of performance.

This European Standard is not applicable to:

- meshed backed products;
- ceramic decorative accessories or trims (such as edges, corners, skirting, capping, coves, beads, curved tiles and other accessory pieces);
- ceramic tiles made by processes other than extrusion or dry-pressing;
- dry-pressed unglazed ceramic tiles with water absorption greater than 10 %;
- ceramic tiles used for floorings on external road finishes;
- ceramic tiles used in ceiling finishes or suspended ceilings.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 12004:2007+A1:2012, *Adhesives for tiles - Requirements, evaluation of conformity, classification and designation*

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

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

EN ISO 10545-1, *Ceramic tiles - Part 1: Sampling and basis for acceptance (ISO 10545-1)*

EN ISO 10545-2, *Ceramic tiles - Part 2: Determination of dimensions and surface quality (ISO 10545-2)*

EN ISO 10545-3, *Ceramic tiles - Part 3: Determination of water absorption, apparent porosity, apparent relative density and bulk density (ISO 10545-3)*

EN ISO 10545-4, *Ceramic tiles - Part 4: Determination of modulus of rupture and breaking strength (ISO 10545-4)*

EN ISO 10545-5, *Ceramic tiles - Part 5: Determination of impact resistance by measurement of coefficient of restitution (ISO 10545-5)*

EN ISO 10545-6, *Ceramic tiles - Part 6: Determination of resistance to deep abrasion for unglazed tiles (ISO 10545-6)*

EN ISO 10545-7, *Ceramic tiles - Part 7: Determination of resistance to surface abrasion for glazed tiles (ISO 10545-7)*

EN ISO 10545-8, *Ceramic tiles - Part 8: Determination of linear thermal expansion (ISO 10545-8)*

EN ISO 10545-9, *Ceramic tiles - Part 9: Determination of resistance to thermal shock (ISO 10545-9)*

EN ISO 10545-10, *Ceramic tiles - Part 10: Determination of moisture expansion (ISO 10545-10)*

EN ISO 10545-11, *Ceramic tiles - Part 11: Determination of crazing resistance for glazed tiles (ISO 10545-11)*

EN ISO 10545-12, *Ceramic tiles - Part 12: Determination of frost resistance (ISO 10545-12)*

EN ISO 10545-13, *Ceramic tiles - Part 13: Determination of chemical resistance (ISO 10545-13)*

EN ISO 10545-14, *Ceramic tiles - Part 14: Determination of resistance to stains (ISO 10545-14)*

EN ISO 10545-15, *Ceramic tiles - Part 15: Determination of lead and cadmium given off by glazed tiles (ISO 10545-15)*

EN ISO 10545-16, *Ceramic tiles - Part 16: Determination of small colour differences (ISO 10545-16)*

ISO 1006:1983, *Building construction — Modular coordination — Basic module*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1006:1983 and the following apply.

3.1

ceramic tile

tile made from clays and/or other inorganic raw materials

3.2

porcelain ceramic tile

fully vitrified ceramic tile with water absorption of 0,5 % or less

3.3

glaze

vitrified covering on ceramic tile

3.4

engobed surface

clay-based covering with a matt finish which can be permeable or impermeable

3.5

polished surface

surface of a glazed or unglazed ceramic tile which has been given a glossy finish by mechanical polishing carried out after firing

3.6

extruded ceramic tile

ceramic tile whose body is shaped in the plastic state in an extruder, the column obtained being cut into tiles of pre-determined dimension

EN 14411:2016 (E)

**3.7
dry-pressed tile**

tile formed from a finely milled body mixture and shaped by pressing

**3.8
spacer lug**

projection which is located along certain edges of tiles so that when two tiles are placed together, in line, the lugs on adjacent edges separate the tiles by a distance not less than the specified width of the joint

Note 1 to entry: Lugs are positioned so that the joint between the tiles may be filled with grout without the lugs remaining exposed.

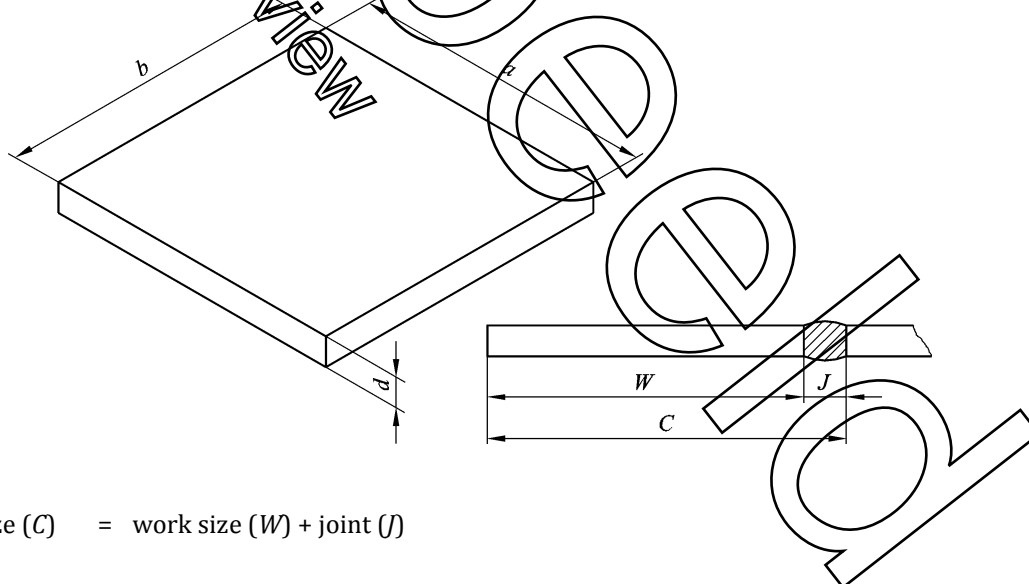
Note 2 to entry: Dry-pressed tiles may be made with other spacer lug systems and, in such cases, the manufacturer's work size applies.

Note 3 to entry: Figure 1 illustrates a ceramic tile without spacer lugs and Figure 2 ceramic tile with spacer lugs.

**3.9
water absorption (E_b)**
percentage (by mass) of water absorbed by the ceramic body

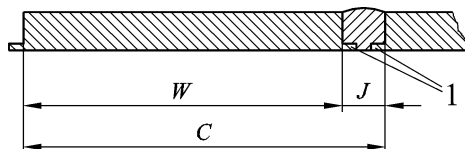
**3.10
nominal size (N)**
size used to describe the ceramic tile

Note 1 to entry: This and the following sizes are only defined for rectangular tiles. If the sizes of non-rectangular tiles are required, they are defined by the smallest rectangle into which they fit.



Key
 coordinating size (C) = work size (W) + joint (J)
 work size (W) = dimension of the visible face (a), (b) and thickness (d)

Figure 1 — Ceramic tile

**Key**

1 spacer lugs

coordinating size (C) = work size (W) + joint (J)

work size (W) = dimension of the visible face (a), (b) and thickness (d)

Figure 2 — Ceramic tile with spacer lug**3.11****work size (W)**

size of a tile specified for manufacturing to which the actual size conforms within specified permissible deviations

3.12**actual size**

size obtained by measuring the face of the tile

3.13**coordinating size (C)**

work size plus the joint width

3.14**modular size**

dimensions based on the modules M, and also their multiples or subdivisions, except for tiles with a surface area of less than 9 000 mm²

Note 1 to entry: See ISO 1006, where 1 M = 100 mm.

3.15**non-modular size**

size not based on module M

Note 1 to entry: See ISO 1006, where 1 M = 100 mm.

3.16**tolerance**

permissible deviation from work size

3.17**product group**

ceramic tiles manufactured through a defined process (extrusion or dry pressing) and featuring a specific water absorption (see Table 1)

3.18**family in a product group**

ceramic tiles manufactured for which the test results of any tile within the family are valid for all other tiles within the family

Note 1 to entry: Families can be defined in terms of body characteristics (same composition, size and thickness) or surface finish characteristics (same glaze and/or decoration composition and properties).

4 Classification of ceramic tiles

Tiles are usually shaped by extruding or dry-pressing at room temperature followed by drying and firing at temperatures sufficient to develop the required properties. They can also be formed by other processes, but these are not covered by this European Standard.

According to this European Standard, ceramic tiles shall be classified into groups according to two parameters: by their method of manufacture (also referred to 'shaping') that is, by extrusion (expressed as group "A" tiles) or dry-pressing (expressed as group "B" tiles), and by their water absorption level (see 3.9 and Table 1). The groups do not presuppose the usage of the products. The requirements for each product group shall be as given in Annexes A to M.

For the purpose of classification, the test method used to determine water absorption level is the boiling method according to EN ISO 10545-3.

Furthermore, extruded tiles can be classified as "precision" or "natural". The classification is dependent upon the different technical characteristics as listed in Annexes A to F and M.

Traditional terms used for extruded tiles are "split tiles" and "quarry tiles". They commonly indicate double extruded and single extruded tiles, respectively. The term "quarry tiles" only refers to extruded tiles with a water absorption coefficient of a mass fraction not exceeding 6 %.

Tiles can be glazed (GL) or unglazed (UGL). A tile with an engobed surface is regarded as an unglazed tile.

Ceramic tiles in groups AI_a and BI_a can be designated as porcelain tiles (see definition in 3.2).

Table 1 — Classification of ceramic tiles with respect to water absorption and shaping

Shaping	Water absorption (E_b)			
	Group I $E_b \leq 3 \%$	Group II _a $3 \% < E_b \leq 6 \%$	Group II _b $6 \% < E_b \leq 10 \%$	Group III $E_b > 10 \%$
Method A Extruded	Group AI _a $E_b \leq 0,5 \%$ (see Annex M) Group AI _b $0,5 \% < E_b \leq 3 \%$ (see Annex A)	Group AII _{a-1} ^a (see Annex B) Group AII _{a-2} ^a (see Annex C)	Group AII _{b-1} ^a (see Annex D) Group AII _{b-2} ^a (see Annex E)	Group AIII (see Annex F)
Method B Dry-pressed	Group BI _a $E_b \leq 0,5 \%$ (see Annex G) Group BI _b $0,5 \% < E_b \leq 3 \%$ (see Annex H)	Group BII _a (see Annex J)	Group BII _b (see Annex K)	Group BIII ^b (see Annex L)

^a Groups AII_a and AII_b are divided into two parts (Parts 1 and 2) with different product specification. Part 1 covers most of the tiles in the group; Part 2 covers certain specific products, which are manufactured under different names (e.g. terre cuite in France and Belgium, cotto in Italy and baldosin catalán in Spain).

^b Group BIII covers glazed ceramic tiles only. There is a low quantity of dry-pressed unglazed tiles produced with water absorption greater than 10 % that are not covered by this European Standard.

Bestelformulier

Stuur naar:

NEN Standards Products & Services
t.a.v. afdeling Klantenservice
Antwoordnummer 10214
2600 WB Delft



NEN Standards Products & Services

Postbus 5059
2600 GB Delft

Vlinderweg 6
2623 AX Delft

T (015) 2 690 390
F (015) 2 690 271

www.nen.nl/normshop

Ja, ik bestel

__ ex. NEN-EN 14411:2016 en Keramische tegels - Definities, classificatie, eigenschappen, evaluatie van conformiteiten en merken € 99.98

Wilt u deze norm in PDF-formaat? Deze bestelt u eenvoudig via www.nen.nl/normshop

Gratis e-mailnieuwsbrieven

Wilt u op de hoogte blijven van de laatste ontwikkelingen op het gebied van normen, normalisatie en regelgeving? Neem dan een gratis abonnement op een van onze e-mailnieuwsbrieven. www.nen.nl/nieuwsbrieven

Gegevens

Bedrijf / Instelling _____

T.a.v. _____ O M O V

E-mail _____

Klantnummer NEN _____

Uw ordernummer _____ BTW nummer _____

Postbus / Adres _____

Postcode _____ Plaats _____

Telefoon _____ Fax _____

Factuuradres (indien dit afwijkt van bovenstaand adres)

Postbus / Adres _____

Postcode _____ Plaats _____

Datum _____ Handtekening _____

Retourneren

Fax: 015 2 690 271

E-mail: klantenservice@nen.nl

Post: NEN Standards Products & Services,

t.a.v. afdeling Klantenservice
Antwoordnummer 10214,
2600 WB Delft

(geen postzegel nodig).

Voorwaarden

- De prijzen zijn geldig tot 31 december 2018, tenzij anders aangegeven.
- Alle prijzen zijn excl. btw, verzend- en handelingskosten en onder voorbehoud bij o.m. ISO- en IEC-normen.
- Bestelt u via de normshop een pdf, dan betaalt u geen handeling en verzendkosten.
- Meer informatie: telefoon 015 2 690 391, dagelijks van 8.30 tot 17.00 uur.
- Wijzigingen en typfouten in teksten en prijsinformatie voorbehouden.
- U kunt onze algemene voorwaarden terugvinden op: www.nen.nl/leveringsvoorwaarden.