BS EN 12004-1:2017

BSI Standards Publication

# Adhesives for ceramic tiles

## Part 1: Requirements, assessment and verification of constancy of performance, classification and marking

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## National foreword

This British Standard is the UK implementation of EN 12004-1:2017. It supersedes BS EN 12004:2007+A1:2012 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee B/539, Ceramic tiles and other rigid tiling.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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EUROPEAN STANDARD

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English Version

# Adhesives for ceramic tiles - Part 1: Requirements, assessment and verification of constancy of performance, classification and marking

Colles à carrelage - Partie 1: Exigences, évaluation et vérification de la constance de performance, classification et marquage

Mörtel und Klebstoffe für keramische Fliesen und Platten - Teil 1: Anforderungen, Bewertung und Überprüfung der Leistungsbeständigkeit, Einstufung und Kennzeichnung

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## European foreword

This document (EN 12004-1:2017) 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of an identical text or by endorsement, at the latest by August 2017, and conflicting national standards shall be withdrawn at the latest by November 2018.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 12004:2007+A1:2012.

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 construction works of Regulation No. 305/2011.

For relationship with this Regulation, see informative Annex ZA, which is an integral part of this document.

The significant technical changes between this European Standard and the previous edition are listed herewith:

— Clause 3.6.1 replacement of the term "Fundamental" with "Basic";

— Clause 4, Tables 1, 2 and 3;

— New Clause 5;

— New Clause 6 in accordance with CEN guidance documents;

— New Annex ZA (informative) in accordance with the CPR (Regulation (EU) No. 305/2011) and the Commission Delegated Regulations (EU) No. 157/2014 relative to DoP made available on websites, (EU) No. 574/2014 relative to the Model of DoP and (EU) No. 568/2014 relative to the assessment and verification of constancy of performance.

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.



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# Introduction

It is essential that the characteristics of the construction products defined in this standard consider that the normal stresses due to the works for which they are intended, assembled or installed, can be properly accommodated. Some special characteristics will take into account the type of substrate and that the adhesives should resist the degrading actions of climate, etc.

Many properties of adhesives for tiling are mainly determined by the type of binders used. Different types of tile adhesives are defined according to the chemical nature of their binders.

The different types of adhesives for ceramic tiles have specific characteristics in terms of their application properties and final performance.

The relationship between characteristics and the working conditions (dry or humid conditions, hot climate, fast setting, etc.) is not given in this standard.

The manufacturer should give information about the use of the product and the correct conditions of use.

The specifier should evaluate the state of the job site (mechanical and thermal influences) and choose the appropriate product considering all the possible risks.



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# 1 Scope

This European Standard is applicable to the following three types of adhesives for ceramic tiles, i.e. cementitious ones for internal and external tile installations, dispersion and reaction resin ones for internal tile installations, on walls and floors.

This European Standard gives the terminology concerning the products, working methods, application properties, etc, for ceramic tile adhesives.

This European Standard specifies the performance requirements for the adhesives for ceramic tiles.

It also specifies the appurtenant test methods, assessment and verification of constancy of performance (AVCP), as well as classification, designation and marking of adhesives for ceramic tiles.

This European Standard does not provide criteria or recommendations for the design and installation of ceramic tiles.

Ceramic tile adhesives may also be used for other types of tiles (natural and agglomerated stones, etc.), if they do not adversely affect these materials.

# 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 12004-2:2017, *Adhesives for ceramic tiles — Part 2: Test methods*

EN 12808-1, *Grouts for tiles — Part 1: Determination of chemical resistance of reaction resin mortars*

EN 13238, *Reaction to fire tests for building products — Conditioning procedures and general rules for selection of substrates*

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

EN 14411, *Ceramic tiles — Definition, classification, characteristics, assessment and verification of constancy of performance and marking*

# 3 Terms and definitions

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

## 3.1 General

**3.1.1**
**thin bed method**
method used for installing tiles onto a plane surface with an adhesive

Note 1 to entry: The adhesive is usually applied with a trowel to obtain a layer and then combed with a notched trowel to achieve the right thickness and planarity.

**3.1.2**
**fixing surface**
plane rigid surface upon which the tile is fixed



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**3.1.3**
**wall and floor tiles**
tiles made out of ceramic or natural and agglomerated stones

## 3.2 Products

**3.2.1**
**cementitious adhesive**
mixture of hydraulic binding agents, aggregates, and organic additives, mixed with water or liquid admix just before use

**3.2.2**
**dispersion adhesive**
ready to use mixture of organic binding agent(s) in the form of an aqueous polymer dispersion, organic additives and mineral fillers

**3.2.3**
**reaction resin adhesive**
one or more component mixture of synthetic resin, mineral fillers and organic additives in which hardening occurs by chemical reaction

## 3.3 Tools and working methods

**3.3.1**
**notched trowel**
toothed tool, which makes it possible to apply the adhesive as a series of ribs of a uniform thickness onto the fixing surface and/or the reverse face of the tile

**3.3.2**
**floating method**
adhesive applied only to the fixing surface, usually with a trowel to obtain a uniform layer and then combed with a notched trowel

**3.3.3**
**floating and buttering method**
adhesive applied to the fixing surface and to the reverse of the tiles

## 3.4 Application properties

**3.4.1**
**shelf life**
time of storage under stated conditions during which an adhesive is expected to maintain its working properties

**3.4.2**
**maturing time**
interval between the time when the cementitious adhesive is mixed and the time when it is ready for use

**3.4.3**
**pot-life**
maximum time interval during which the adhesive can be used after mixing



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**3.4.4**
**open time**
maximum interval after application at which tiles can be embedded in the applied adhesive and meet the specified tensile adhesion strength requirement

**3.4.5**
**wetting capability**
ability of a combed adhesive layer to wet the tile

**3.4.6**
**slip**
downward movement of a tile applied to a combed adhesive layer on a vertical or inclined surface

**3.4.7**
**adjustability**
maximum time interval after which the tile's position in the adhesive layer can be adjusted without significant loss of adhesion strength

## 3.5 Final properties

**3.5.1**
**adhesion strength**
maximum strength per unit surface area which can be measured by shear or tensile testing

**3.5.2**
**deformability**
capacity of a hardened adhesive to be deformed by stresses between the tile and the fixing surface without damage to the installed surface

**3.5.3**
**transverse deformation**
deflection recorded at the centre when a beam of hardened adhesive is subjected to three point loading

## 3.6 Characteristics

**3.6.1**
**basic characteristics**
characteristics that an adhesive absolutely has to have

### 3.6.2 Optional characteristics

**3.6.2.1**
**additional characteristic**
characteristic for specific service conditions where enhanced levels of performance are required

**3.6.2.2**
**special characteristic**
characteristic of the adhesive which provide further information about its general performance



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# 4 Product characteristic

## 4.1 Cementitious adhesives (C)

Characteristics of the normal setting cementitious adhesive for ceramic tiles shall comply with the requirements specified in Table 1 a, and characteristics of the fast setting cementitious adhesive for ceramic tiles with those in Table 1 b.

When needed for special service condition(s) of cementitious adhesive for ceramic tiles, its optional characteristics shall comply with the requirements specified in Tables 1 c, 1 d and/or 1 e.

The amount of water and/or liquid admixes required for preparing the cementitious adhesive shall be the same for all tests.



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**Table 1 — Requirements for cementitious adhesives (C)**

| BASIC CHARACTERISTICS | | |
|---|---|---|
| **1 a** | **NORMAL SETTING ADHESIVES (C1)** | |
| **Characteristic** | **Requirement** | **Test Method** |
| Initial tensile adhesion strength | ≥ 0,5 N/mm² | EN 12004–2:2017, 8.3 |
| Tensile adhesion strength after water immersion | ≥ 0,5 N/mm² | |
| Tensile adhesion strength after heat ageing | ≥ 0,5 N/mm² | |
| Tensile adhesion strength after freeze–thaw cycles | ≥ 0,5 N/mm² | |
| Open time: tensile adhesion strength | ≥ 0,5 N/mm² after not less than 20 min | EN 12004–2:2017, 8.1 |
| **1 b** | **FAST SETTING ADHESIVES (C1F)** | |
| **Characteristic** | **Requirement** | **Test Method** |
| Early tensile adhesion strength | ≥ 0,5 N/mm² after not more than 6 h | EN 12004–2:2017, 8.3 |
| Open time: tensile adhesion strength | ≥ 0,5 N/mm² after not less than 10 min | EN 12004–2:2016, 8.1 |
| All other requirements as in Table 1 a | | EN 12004–2:2017, 8.3 |
| **OPTIONAL CHARACTERISTICS** | | |
| **1 c** | **SPECIAL CHARACTERISTICS** | |
| **Characteristic** | **Requirement** | **Test Method** |
| Slip **(T)** | ≤ 0,5 mm | EN 12004–2:2017, 8.2 |
| Extended open time **(E)**: tensile adhesion strength | ≥ 0,5 N/mm² after not less than 30 min | EN 12004–2:2017, 8.1 |
| Deformable adhesive **(S1)**: transverse deformation | ≥ 2,5 mm and < 5 mm | EN 12004–2:2017, 8.6 |
| Highly deformable adhesive **(S2)**: transverse deformation: | ≥ 5 mm | |
| **1 d** | **ADDITIONAL CHARACTERISTICS (C2)** | |
| **Characteristic** | **Requirement** | **Test Method** |
| High initial tensile adhesion strength | ≥ 1 N/mm² | EN 12004–2:2017, 8.3 |
| High tensile adhesion strength after water immersion | ≥ 1 N/mm² | |
| High tensile adhesion strength after heat ageing | ≥ 1 N/mm² | |
| High tensile adhesion strength after freeze–thaw cycles | ≥ 1 N/mm² | |
| **1 e** | **FAST SETTING ADHESIVES (C2F)** | |
| **Characteristic** | **Requirement** | **Test Method** |
| Early tensile adhesion strength | ≥ 0,5 N/mm² after not more than 6 h | EN 12004–2:2017, 8.3 |
| Open time: tensile adhesion strength | ≥ 0,5 N/mm² after not less than 10 min | EN 12004–2:2017, 8.1 |
| All other requirements as in Table 1 d | | EN 12004–2:2017, 8.3 |



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