BRITISH STANDARD

BS EN
13813:2002

Screed material and floor screeds — Screed material — Properties and requirements

The European Standard EN 13813:2002 has the status of a British Standard

ICS 91.100.10

National foreword

This British Standard is the official English language version of EN 13813:2002.

EN 13813:2002 is a candidate "harmonized" European Standard and fully takes into account the requirements of the European Commission mandate M/119, *Floorings*, given under the EU Construction Products Directive (89/106/EEC) and is intended to lead to CE marking. The date of applicability of EN 13813:2002 as a "harmonized" European Standard, i.e. the date after which this standard may be used for CE marking purposes, is subject to an announcement in the *Official Journal of the European Communities*.

The Commission in consultation with Member States 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 twelve months, for the implementation of CE marking. At the end of this co-existence period, the national standard(s) will be withdrawn. In the UK, there is no corresponding national standard.

The UK participation in the preparation of EN 13813:2002 was entrusted by Technical Committee B/544, Plastering, rendering, dry lining, screeds and in situ floorings, to Subcommittee B/544/6, Screeds and in situ floorings, 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.

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.

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

Compliance with a British Standard does not of itself confer immunity from legal obligations.

This British Standard, having been prepared under the direction of the Building and Civil Engineering Sector Policy and Strategy Committee, was published under the authority of the Standards Policy and Strategy Committee on 11 November 2002

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EUROPEAN STANDARD

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EN 13813

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English version

Screed material and floor screeds - Screed material - Properties and requirements

Matériaux de chapes et chapes - Matériaux de chapes - Propriétés et exigences

Estrichmörtel, Estrichmassen und Estriche - Estrichmörtel und Estrichmassen - Eigenschaften und Anforderungen

This European Standard was approved by CEN on 14 September 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.

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 Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
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Contents

Foreword

This document EN 13813:2002 has been prepared by Technical Committee CEN/TC 303 "Floor screeds and in-situ floorings in buildings", the secretariat of which is held by DIN.

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 April 2003, and conflicting national standards shall be withdrawn at the latest by July 2004.

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.

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, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

The properties required of a screed are related to its use.

They are considered in two groups: those relating to the fresh, unhardened screed material and those relating to the hardened screed material.

The properties achieved depend essentially on the type or types of binder used and their respective proportions. The type of aggregates, admixtures and/or additions used can achieve special properties.

1 Scope

This European Standard specifies requirements for screed material for use in floor construction internally.

To support the aim of achieving a performance related standard, as far as practicable this standard refers only to the properties of the product and not to its method of manufacture, except when this is unavoidable in the description of the characteristics of the product.

It defines for fresh screed material the performance related to setting time, consistency, pH value and for the hardened screed material, compressive strength, flexural strength, wear resistance, surface hardness, resistance to indentation, resistance to rolling wheel, shrinkage and swelling, modulus of elasticity, bond strength, impact resistance, reaction to fire, acoustic performance, thermal resistance and chemical resistance.

It provides for the evaluation of conformity of the product to this European Standard.

The marking requirements for products covered by this European Standard are included.

This standard covers screed materials as defined in EN 13318.

Structural screeds, i.e. those that contribute to the load bearing capacity of the structure, are excluded from this standard.

NOTE This standard can be used in conjunction with codes of application and national specifications for site made screed material produced and laid by the same contractor.

2 Normative references

This European Standard incorporates by dated or undated reference, 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 1062-3, *Paints and varnishes - Coating materials and coating systems for exterior masonry and concrete - Part 3: Determination and classification of liquid-water transmission rate (permeability).*

EN 1081, *Resilient floor coverings – Determination of the electrical resistance.*

prEN 1504-2, *Products and systems for the protection and repair of concrete structures – Definitions, requirements, quality control and evaluation of conformity – Part 2: Surface protection systems*.

EN 12086, *Thermal insulating products for building applications - Determination of water vapour transmission properties.*

prEN 12354-6, *Building acoustics - Estimation of acoustic performance of buildings from the performance of elements - Part 6: Sound absorption in enclosed spaces.*

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

EN 12664, *Thermal performance of building materials and products - Determination of thermal resistance by means of guarded hot plate and heat flow meter methods - Dry and moist products of medium and low thermal resistance.*

prEN 12697-20, *Bituminous mixtures - Test methods for hot mix asphalt - Part 20: Indentation using cube or marshall specimens.*

prEN 12697-21, *Bituminous mixtures - Test methods for hot mix asphalt - Part 21: Indentation using plate specimens.*

EN 12706, *Adhesives - Test methods for hydraulic setting floor smoothing and/or levelling compounds - Determination of flow characteristics.*

EN 13318, *Screed materials and floor screeds – Definitions.*

prEN 13454-2, *Binders, composite binders and factory made mixtures for floor screeds based on calcium sulfate - Part 2: Test methods.*

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

prEN 13529, *Products and systems for the protection and repair of concrete structures - Test method - Resistance to high chemical attack.*

prEN 13872, *Methods of test for hydraulic setting floor smoothing and/or levelling compounds - Determination of dimensional change.*

prEN 13892-1, *Methods of test for screed materials - Part 1: Sampling, making and curing specimens for test.*

prEN 13892-2, *Methods of test for screed materials - Part 2: Determination of flexural and compressive strength.*

prEN 13892-3, *Methods of test for screed materials - Part 3: Determination of wear resistance-Böhme.*

prEN 13892-4, *Method of test for screed materials – Part 4: Determination of wear resistance-BCA.*

prEN 13892-5, *Methods of test for screed materials - Part 5: Determination of wear resistance to rolling wheel - Methods for screed material for wearing layer.*

prEN 13892-6, *Methods of test for screed materials - Part 6: Determination of surface hardness.*

prEN 13892-7, *Methods of test for screed materials - Part 7: Determination of resistance to rolling wheel - Methods for screed material with floor coverings.*

prEN 13892-8, *Methods of test for screed materials - Part 8: Determination of bond strength.*

EN ISO 140-6, *Acoustics - Measurement of sound insulation in buildings and of building elements - Part 6: Laboratory measurements of impact sound insulation of floors (ISO 140-6:1998).*

EN ISO 178, *Plastics - Determination of flexural properties (ISO 178:1993).*

EN ISO 354, *Acoustics - Measurement of sound absorption in a reverberation room (ISO 354:1985).*

EN ISO 354/A1, *Acoustics - Measurement of sound absorption in a reverberation room - Amendment 1: Test specimen mountings for sound absorption tests (ISO 354:1985/AMD1:1997).*

EN ISO 6272, *Paints and varnishes - Falling-weight test (ISO 6272:1993).*

3 Terms and definitions, symbols and abbreviations

3.1 Terms and definitions

For the purpose of this European Standard, the terms and definitions described in EN 13318 apply.

3.2 Symbols and abbreviations

The following abbreviations are used in this European Standard for screeds in relation to the binder used:

CT cementitious screeds

CA calcium sulfate screeds

MA magnesite screeds

AS mastic asphalt screeds

SR synthetic resin screeds

The following abbreviations are used in this standard for designation of the properties:

C	for compressive strength
F	for flexural strength
A	for wear resistance "Böhme"
RWA	for wear resistance to rolling wheel
AR	for wear resistance "BCA"
SH	for surface hardness
IC	for resistance to indentation on cubes
IP	for resistance to indentation on plates
RWFC	for resistance to rolling wheel with floor covering
E	for modulus of elasticity
B	for bond strength
IR	for impact resistance

4 Materials

Binders, aggregates, admixtures, additives and water with established suitability for screed material shall be used.

5 Classification and requirements

5.1 General

The requirements and properties specified in this standard shall be defined in terms of the test methods and procedures referred to in this standard. For these tests the screed material shall be sampled and the test specimens made and cured in accordance with prEN 13892-1.

Where flooring systems are used to protect or reinstate the integrity of a concrete structure, the requirements according to prEN 1504-2 shall also be fulfilled in addition to the requirements of this standard.

The conformity criteria given in the following subclauses relate to initial type tests and production control. The production control system shall be detailed in the Quality Manual.

NOTE The screed properties under site conditions cannot always be directly comparable with the screed material properties obtained under laboratory conditions, due for instance to variations of mixing, compaction or curing.

5.2 Properties and classification

The properties to be tested are listed in Table 1.

Table 1 — Screed materials and tests which apply to each type

Screed materials based on	compressive strength	flexural strength	wear resistance "Böhme"	wear resistance "BCA"	wear resistance to rolling wheel	surface hardness	resistance to indentation	resistance to rolling wheel with floor covering	setting time	shrinkage and swelling	consistency	pH value	modulus of elasticity	Impact resistance	bond strength
Cement	N	N	N[a] (one of three)			O		O	O	O	O	O	O	O[a]	O
Calcium sulfate	N	N	O	O	O	O		O	O	O	O	N	O		O
Magnesite	N	N	O	O	O	N[a]		O		O	O	O	O		O
Mastic asphalt			O	O	O		N	O							
Synthetic resin	O	O		N[a] (one of two)		O		O		O	O		O	N[a]	N

Key

N Normative

O Optional, where relevant

not relevant

[a] only for screed material intended for wearing surfaces

For each type of binder, the age where the performances shall be achieved is defined in prEN 13892-1. Where the manufacturer can demonstrate that the required classes of properties can be achieved at an earlier age, this age may be included in the designation provided all declared class values are achieved at this age.

5.2.1 Compressive strength

The compressive strength, for cementitious screed, calcium sulfate screed and magnesite screed materials, shall be declared by the manufacturer, and may be declared for synthetic resin screed materials. The compressive strength shall be determined in accordance with prEN 13892-2.

The compressive strength shall be designated by a "C" (for Compression) followed by the compressive strength class in N/mm^2, in accordance with Table 2.

Table 2 — Compressive strength classes for screed materials

Class	C5	C7	C12	C16	C20	C25	C30	C35	C40	C50	C60	C70	C80
Compressive strength in N/mm^2	5	7	12	16	20	25	30	35	40	50	60	70	80

5.2.2 Flexural strength

The flexural strength, for cementitious screed, calcium sulfate screed and magnesite screed materials, shall be declared by the manufacturer. The flexural strength shall be determined in accordance with prEN 13892-2.

The manufacturer may declare the flexural strength for synthetic resin screed materials. The flexural strength of synthetic resin screed shall be determined in accordance with EN ISO 178 for screed materials intended to be applied at a thickness of 5 mm or less, or with prEN 13892-2 for other screed materials.

The flexural strength is designated with "F" (for Flexural) followed by the flexural strength in N/mm^2, in accordance with Table 3.

Table 3 — Flexural strength classes for screed materials

Class	F1	F2	F3	F4	F5	F6	F7	F10	F15	F20	F30	F40	F50
Flexural strength in N/mm^2	1	2	3	4	5	6	7	10	15	20	30	40	50

5.2.3 Wear resistance

The wear resistance for cementitious screed materials and for synthetic resin screed materials, to be used as wearing surfaces, shall be determined in accordance with prEN 13892-3 (wear resistance Böhme) or with prEN 13892-4 (wear resistance BCA) or with prEN 13892-5 (wear resistance to rolling wheel) and shall be declared by the manufacturer. To declare the wear resistance for cementitious screed materials, the manufacturer may choose between the three test methods and for synthetic resin screed materials between the wear resistance BCA and the wear resistance to rolling wheel.

A manufacturer of a screed material other than cementitious or synthetic resin screed material to be used as a wearing surface may choose to determine and declare the appropriate wear class utilising these methods.

Another test method may be used, if a correlation with prEN 13892-3, with prEN 13892-4 or with prEN 13892-5 is proved with the screed material.

The wear resistance Böhme is designated by "A" (for Abrasion) followed by the abrasion quantity in cm^3/50 cm^2, in accordance with Table 4.

Table 4 — Wear resistance Böhme classes for cementitious and other scread meterials

Class	**A22**	**A15**	**A12**	**A9**	**A6**	**A3**	**A1,5**
Abrasion quantity in cm^3/50 cm^2	22	15	12	9	6	3	1,5

The wear resistance BCA is designated by an "AR" (for Abrasion Resistance) followed by the maximum wear depth in 100 m, in accordance with Table 5.

Table 5 — Wear resistance BCA classes for cementitious and other screed materials

Class	AR6	AR4	AR2	AR1	AR0,5
Maximum wear depth in m	600	400	200	100	50

The wear resistance to rolling wheel is designated by "RWA" (for Rolling Wheel Abrasion) followed by the abrasion quantity in cm^3, in accordance with Table 6.

Table 6 — Wear resistance to rolling wheel classes for cementitious and other screed materials

Class	RWA300	RWA100	RWA20	RWA 10	RWA1
Abrasion quantity in cm^3	300	100	20	10	1

5.2.4 Surface hardness

The surface hardness for magnesite screed materials, to be used as wearing surfaces, shall be declared by the manufacturer and as an option may be declared for other screed materials with fine aggregates (< 4 mm). The surface hardness shall be determined in accordance with prEN 13892-6.

The surface hardness is designated with "SH" (for Surface Hardness) followed by the surface hardness in N/mm^2, in accordance with Table 7.

Table 7 — Surface hardness for magnesite and other screed materials

Class	SH30	SH40	SH50	SH70	SH100	SH150	SH200
Surface hardness in N/mm^2	30	40	50	70	100	150	200

5.2.5 Resistance to indentation

The manufacturer shall declare the resistance to indentation of mastic asphalt screed materials. The resistance to indentation shall be determined on cubes in accordance with prEN 12697-20 or on plates in accordance with prEN 12697-21.

The resistance to indentation of mastic asphalt screed materials shall be designated by "I" (for Indentation), "C" or "P" (for Cube or Plate) to indicate the test method applied, followed by the maximum indentation value in 0,1 mm, in accordance with Tables 8a and 8b.

For tests of mastic asphalt screed materials on plates with a cross sectional area of the indentation pin of 31,7 mm^2, with indentation also measured in 0,1 mm, classes are designated by IP and Roman numerals I to IV, in accordance with Table 8c.

The designation "H" signifies material for use in heated screeds.

Table 8a — Hardness classes on cubes Load applied 525 N Indentation in units of 0,1 mm

Hardness classes Test conditions	ICH10	IC10	IC15	IC40	IC100
(22 1) °C; 100 mm^2; 5 h	10	10	15	—	—
(40 1) °C; 100 mm^2; 2 h	20	40	60	—	—
(40 1) °C; 500 mm^2; 0,5 h	—	—	—	15-40	40-100

Table 8b — Hardness classes on plates Load applied 525 N Indentation in units of 0,1 mm

Hardness classes Test conditions	IP10	IP12	IP30	IP70
(40 1) °C; 100 mm^2; 31min	10	12	10 - 30	70

Table 8c — Hardness classes on plates Load applied 317 N Indentation in units of 0,1 mm

Hardness classes Test conditions	IP I	IP II	IP III	IP IV
45 °C; 31,7 mm^2; 1 min	11	—	—	—
35 °C; 31,7 mm^2; 1 min	—	9	8	30

5.2.6 Resistance to rolling wheel for screed material intended to be covered with floor covering

The resistance to rolling wheel, for all screed materials for screeds intended to be covered with floor covering, may be declared by the manufacturer. The resistance to rolling wheel shall be determined in accordance with prEN 13892-7.

The resistance to rolling wheel is designated by "RWFC" (for Rolling Wheel Floor Covering) followed by the rolling wheel load in N, in accordance with Table 9.

Table 9 — Resistance to rolling wheel classes for all screed materials

Class	RWFC150	RWFC250	RWFC350	RWFC450	RWFC550
Load in N	150	250	350	450	550

5.2.7 Setting time

A manufacturer of cementitious or calcium sulfate screed material may declare the setting time of the screed material determined in accordance with prEN 13454-2.

5.2.8 Shrinkage and swelling

A manufacturer of a screed material, other than mastic asphalt, may declare the shrinkage value and swelling value of the screed material, in mm/m, determined in accordance with prEN 13454-2 or in accordance with prEN 13872 where the product is intended to be applied at a thickness less than 10 mm.

5.2.9 Consistency

A manufacturer of a screed material, other than mastic asphalt, may declare the consistency, in mm, determined in accordance with prEN 13454-2; where the consistency value is greater than 300 mm, it may be determined in accordance with EN 12706.

5.2.10 pH-value

For calcium sulfate screed material the pH value shall be greater than or equal to 7 when determined in accordance with prEN 13454-2, for cementitious and magnesite screed material a manufacturer may declare the pH value in accordance with prEN 13454-2.

5.2.11 Modulus of elasticity in flexure

The modulus of elasticity in flexure of a screed material other than mastic asphalt may be declared by the manufacturer and designated by "E" (for Elasticity) followed by the modulus of elasticity in kN/mm^2, in accordance with Table 10. The modulus of elasticity shall be determined in accordance with EN ISO 178.

Table 10 — Modulus of elasticity in flexure classes for cementitious, calcium sulfate, magnesite and synthetic resin screed material

Class	E1	E2	E5	E10	E15	E20	higher in multiples of 5
Modulus of elasticity in flexure in kN/mm^2	1	2	5	10	15	20	25 – 30 – etc

5.2.12 Bond strength

The bond strength for synthetic resin screed materials shall be declared by the manufacturer, and as an option may be declared for cementitious, calcium sulfate and magnesite screed materials. The bond strength shall be determined in accordance with prEN 13892-8.

The bond strength shall be designated by "B" (for Bond) followed by the bond strength in N/mm^2, in accordance with Table 11.

Table 11 — Bond strength classes for cementitious, calcium sulfate, magnesite and synthetic resin screed material

Class	B0,2	B0,5	B1,0	B1,5	B2,0
Bond strength in N/mm^2	0,2	0,5	1,0	1,5	2,0

5.2.13 Impact resistance

The impact resistance for synthetic resin screed materials, intended for wearing surfaces, shall be declared by the manufacturer, and as an option may be declared for cementitious screed materials. The impact resistance for the screed material, applied to a concrete surface, shall be determined in accordance with EN ISO 6272.

The impact resistance shall be designated by "IR" (for Impact Resistance) followed by the impact resistance in Nm.

5.3 Special characteristics

5.3.1 General

The following characteristics shall be declared when regulatory requirements demand them, or when the manufacturer chooses to state a performance even if not covered by regulations.

5.3.2 Electrical resistance

The electrical resistance shall be determined in accordance with EN 1081 and is indicated by "ER" (for Electrical Resistance) followed with the electrical resistance in Ohm, for instance ER105.

5.3.3 Chemical resistance

The chemical resistance shall be determined in accordance with prEN 13529 and is indicated by "CR" (for Chemical Resistance) followed by a list of those chemical groups to which resistance has been demonstrated, with the class of resistance (class 1 or 2), for example CR1 to 8 (class 2), 12 (class 1), 14 (class 2).

5.3.4 Reaction to fire

The reaction to fire of screed material[1)] shall be determined in accordance with EN 13501-1.

5.3.5 Release of corrosive substances or corrosiveness of screed materials

Release of corrosive substances or corrosiveness of screed material shall be indicated by a declaration of the screed material type.

5.3.6 Water vapour permeability

Where the intended use of the screed material is for moisture diffusion control, the permeability to water vapour of the screed material shall be determined in accordance with EN 12086.

5.3.7 Thermal resistance

Where the intended use of the screed material is to contribute to thermal resistance in building construction works (floor screeds), either the design values of thermal resistance for screed material given in EN 12524 may be used or the product shall be tested in accordance with EN 12664.

5.3.8 Water permeability

Where the intended use of the screed material is for resistance against water penetration, the water permeability of the screed material shall be determined in accordance with the test method described in EN 1062-3.

5.3.9 Impact sound insulation

Impact sound insulation is a property of an assembled system and not of the product itself.

When relevant, the impact sound insulation of a system including screed material shall be determined in accordance with EN ISO 140-6.

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[1] For material in class A1 (without testing) reference shall be made to Commission Decision 96/603/EC, as amended.

5.3.10 Sound absorption

Where screed materials are intended to be used for acoustic conditioning, acoustic absorption shall be measured on the product according to prEN 12354-6, made up and installed in accordance with the manufacturer's instructions, according to EN ISO 354 and EN ISO 354/A1.

5.3.11 Other characteristics

Where the manufacturer declares that the screed materials have particular characteristics, which are not covered in this standard, he shall indicate the method, which shall be valid in the place of use, used to assess them.

6 Evaluation of conformity

6.1 General requirements

Evaluation of conformity shall be carried out by declaring conformity of the product with the requirements of this standard on the basis of:

- initial type testing (see 6.2);
- production control (see 6.3);

6.2 Initial type tests

Initial type testing shall be performed to show conformity with this standard. Tests previously performed in accordance with the provisions of this standard (same product, same characteristic(s), test method, sampling procedure, system of attestation of conformity, etc.) may be taken into account. In addition, initial type testing shall be performed at the beginning of the production of a new product type and before the commencement of manufacture and offering for sale, appropriate initial type tests shall be carried out to confirm that the properties predicted from the development meet the requirements of this standard and the values to be declared for the product.

The tests to be conducted shall be those listed in Table 1 as normative and any other optional test for which the manufacturer wishes to declare a value or class.

Initial type tests shall also be carried out on existing production whenever a change is made in the specification of the basic materials or manufacturing procedure.

6.3 Factory Production Control (FPC)

6.3.1 General

A factory production control (FPC) scheme shall be established and documented in a Quality Manual. The production control system shall consist of procedures for the internal control of production to ensure that products placed on the market conform with this standard and the designated classification.

A FPC system conforming with the requirements of EN ISO 9001, and made specific to the requirements of this standard, is considered to satisfy the above requirements.

The internal control shall consist of the following:

a. regular inspections, checks and tests and the utilisation of the results to control equipment, raw or incoming materials and the production process;

b. regular inspections, checks and tests on the finished product.

Records shall be maintained of the dates of tests and inspections, identification of the products tested, and the results of the tests or inspections as indicated in the Quality Manual.

A sampling plan shall be prepared listing the required frequency of testing. This shall take due account of:

- the nature of the product;
- the particular test procedure;
- the significance of the test result;
- the overall record of previous test results.

6.3.2 Process Control

The items to be addressed in the Quality Manual relating to the system of control are:

6.3.2.1 Incoming materials

The manufacturer shall define the acceptance criteria of incoming materials and the procedures that are operated to ensure these are met.

NOTE Requirements prescribed in relevant ENs, Technical Approvals or National standards valid in the place of use of the product should be used whenever possible.

6.3.2.2 Production process

The relevant features of the production process shall be defined listing the frequency of testing and inspections to be undertaken, together with the values of criteria required, both on equipment and on work in progress. The action to be taken when control values or criteria are not achieved shall be given. Weighing and measuring equipment shall be regularly calibrated, according to a prescribed plan. The calibration test results shall be recorded.

6.3.3 Screed material

6.3.3.1 Tests on the screed material

The production control system shall incorporate a sampling plan and the testing rate for the screed material. The results of sampling and testing shall be recorded.

The frequency of sampling and testing shall be determined from the principles set out in clause 9, to ensure that the production conforms with the compliance criteria in this standard and the designated class for the screed material.

6.3.3.2 Alternative tests

Alternative tests to those given in this standard are permitted to be used provided that acceptable equivalent levels of conformity as given by the tests in this standard has been proven. The test procedure and the limits of acceptability shall be identified in the Quality Manual.

6.3.3.3 Test equipment

Test equipment having a bearing on test results shall be regularly calibrated according to a prescribed plan.

6.3.4 Traceability

Systems of traceability and control of incoming materials and the use of materials shall be given in the Quality Manual. The stock control system of products having a stated shelf life shall be given in the Quality Manual. This shall include the method of treating non-conforming products.

6.3.5 Labelling

Only materials which are in compliance with the appropriate requirements of this standard shall be labelled as complying with EN 13813, in accordance with clause 8.

6.3.6 Records

Records shall be maintained of:

a. the calibration or verification of all test equipment;

b. raw materials evaluation and testing;

c. the manufacturing process (batch weights, batch identification numbers) and other relevant information;

d. test results traceable to the product.

All records shall be authorised by designated personnel.

7 Designation

Screed material to be used for the installation of floor screeds shall be designated by at least the type (3.2) and the class in respect of each of the normative requirements and if desired other characteristics.

Examples:

Cementitious screed material not used for wearing surfaces in strength classes C20 and F4 of this European Standard is designated by:

EN 13813 CT-C20-F4

or Magnesite screed material in strength classes C50 and F10 and surface hardness SH150 of this European Standard is designated by:

EN 13813 MA-C50-F10-SH150

or Calcium sulfate screed material in strength classes C20 and F4 of this European Standard is designated by

EN 13813 CA-C20-F4

or Mastic asphalt material according to resistance to indentation class IC10 of this European Standard is designated by

EN 13813 AS-IC10

or Synthetic screed material according to bond strength class B2,0, wear resistance class AR1 and impact resistance IR4 of this European Standard is designated by

EN 13813 SR-B2,0-AR1-IR4

If materials such as hard aggregates, polymers or fibres are used to achieve special properties, these materials may be mentioned in the designation.

Examples:

Cementitious screed material modified by polymer according to compressive strength class C40, flexural strength class F10 and bonding strength class B1,5 according to this European Standard may be designated by

EN 13813 Polymer-modified CT-C40-F10-B1,5

or:
Cementitious screed material with hard aggregates according to compressive strength class C60, flexural strength class F10 and wear resistance “Böhme” class A1,5 according to this European Standard may be designated by

EN 13813 Hard aggregates CT-C60-F10-A1,5

8 Marking, labelling and packaging

The following items shall be indicated on packaging or on the delivery ticket, or supplied in another written document, if applicable:

1. designation, (see clause 7);
2. product name;
3. quantity (mass or volume);
4. date of manufacture and shelf life (or use-by-date);
5. batch references or production number;
6. maximum aggregates diameter or intended thickness range;
7. instructions for mixing and application;
8. health and safety requirements;
9. name and address of manufacturer or supplier.

9 Conformity criteria and assessment procedure

9.1 General requirements

Conformity of screed material to this European Standard shall be evaluated on the basis of either:

i) a system based on continuous statistical analysis

or

ii) a system based on assessing individual results.

9.2 Conformity criteria for physical, mechanical and chemical properties and evaluation procedure

9.2.1 General

Conformity of screed material with the requirements for physical, mechanical and chemical properties specified in this European Standard is assumed if the conformity criteria in 9.2.2 or 9.2.3 are met. Conformity shall be evaluated on the basis of samples representative of the production and on the basis of test results obtained from all samples taken during the control period.

9.2.2 Statistical conformity criteria

9.2.2.1 General

Conformity on the basis of continuous sampling shall be formulated in terms of a statistical criterion based on:

- the required mechanical, physical and chemical properties defined as characteristic values as specified in clause 5 of this European Standard;
- the probability P_k on which the definition of the characteristic value is based (in this standard 10 %);
- the allowable probability of acceptance CR of screed material not conforming to the requirements (in this standard 5 %);

- an absolute Limit value. The absolute Limit value shall be an adverse variance of 10 % from the characteristic value. No results are permitted outside this tolerance.

NOTE Conformity evaluation by a procedure based on a finite number of test results can only produce an approximate value for the proportion of results outside the characteristic value in a population. The larger the sample size (number of results) the better the approximation. The selected probability of acceptance CR controls the degree of approximation by the sampling plan.

Conformity to the requirements of this European Standard shall be verified either by variables or attributes, on an individual test basis.

9.2.2.2 Assessment by variables

The conformity shall be evaluated on the totality of test results obtained on all samples taken during the control period. For this calculation the test results are assumed to be normally distributed.

Conformity is verified when the following equations are satisfied

$\bar{x} - k_A \, s \geq C$ for minimum value, or

$\bar{x} + k_A \, s \leq C$ for maximum value

where $\bar{x}$ is the arithmetic mean of the totality of the test results in the control period;

s is the standard deviation of the totality of the test results in the control period;

k_A is the acceptability constant;

C is the characteristic value.

The acceptability constant k_A depends on the probability P_K on which the definition of the characteristic value is based and on the number of test results n. The values of k_A listed in Table 12 are valid for 5 % probability of acceptance CR of screed material not conforming to the requirements.

Table 12 — Acceptability constant k_A

Number of test results n	k_A[a] (for P_k = 10 %)
10 to 14	2,35
15 to 19	2,07
20 to 24	1,93
25 to 29	1,84
30 to 34	1,78
35 to 39	1,73
40 to 49	1,70
50 to 59	1,65
60 to 69	1,61
70 to 79	1,58
80 to 99	1,56
100 to 199	1,53
200 to 299	1,45
> 300	1,42

[a] The value of k_A valid for each individual value of n may be used instead.

Values given in this table are valid for CR = 5 %

9.2.2.3 Assessment by attributes

The number of test results C_D outside the characteristic value shall be counted and compared with an acceptable number C_A, calculated from the number of test results n and the percentile P_k as specified in table 12. Conformity is verified when the following equation is satisfied:

$$C_D \quad C_A$$

The values of C_A depends upon the percentile on which the characteristic value is based, on the allowable probability of acceptance CR and on a number n of the test results. Values of C_A are listed in table 13.

Table 13 — Values of C_A

Number of test results n (p_K =10 %)	C_A
20 to 39[a]	0
40 to 54	1
55 to 69	2
70 to 84	3
85 to 99	4
100 to 109	5

[a] If the number of test results n < 20 a statistical criterion is not possible.

9.2.3 Assessment based on individual results

Where individual results are used to assess conformity with the requirements of this standard all test results shall equal or show a favourable variance on the declared class value for the individual test.

Annex ZA
(informative)

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

ZA.1 Scope and relevant characteristics

This European Standard has been prepared under mandate M/132 “Floorings” given to CEN by the European Commission and the European Free Trade Association.

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

Compliance with these clauses confers a presumption of fitness of the construction product covered by this European Standard for its intended use(s) under the mandate; reference shall be made to the information accompanying the CE marking.

> **WARNING**: Other requirements and other EU Directives, not affecting the fitness for intended use(s), may apply to the construction products falling within the scope of this European Standard.

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

The scope of this annex is the same as clause 1 of this standard and is defined in Table ZA.1.1 to ZA.1.5.

This annex establishes the conditions for the CE marking of the screed material intended for the uses indicated in Tables ZA.1.1 to ZA 1.5 and shows the relevant clauses applicable:

Table ZA.1.1 — Relevant clauses for cementitious screed material

Essential characteristics	Requirements clauses in this standard:	Levels or classes:	Remarks
Reaction to fire (for exposed situations)	5.3.4	$A1_{fl}$ to F_{fl}	
Release of corrosive substances			by declaration of material type
Water permeability	5.3.8		
Water vapour permeability	5.3.6		
Mechanical resistance Compressive strength Flexural strength Wear resistance (for wearing surfaces)	 5.2.1 5.2.2 5.2.3		threshold classes[a] C5 F1 A22 or RWA300 or AR6
Sound insulation Sound absorption	5.3.9 5.3.10		
Thermal resistance	5.3.7		
Chemical resistance	5.3.3		

[a] For the intended use, the specifier has to prescribe the class to get the desired durability

Table ZA.1.2 — Relevant clauses for calcium sulfate screed material

Essential characteristics	**Requirements clauses in this standard:**	**Levels or classes:**	**Remarks**
Reaction to fire (for exposed situations)	5.3.4	$A1_{fl}$ to F_{fl}	
Release of corrosive substances pH value	5.2.10		by declaration of material type and threshold class[a] 7
Water vapour permeability	5.3.6		
Mechanical resistance Compressive strength Flexural strength	 5.2.1 5.2.2		threshold classes[a] C5 F1
Sound insulation Sound absorption	5.3.9 5.3.10		
Thermal resistance	5.3.7		
Chemical resistance	5.3.3		
[a] For the intended use, the specifier has to prescribe the class to get the desired durability.			

Table ZA.1.3 — Relevant clauses for magnesite screed material

Essential characteristics	Requirements clauses in this standard:	Levels or classes:	Remarks
Reaction to fire (for exposed situations)	5.3.4	$A1_{fl}$ to F_{fl}	
Release of corrosive substances			by declaration of material type
Water vapour permeability	5.3.6		
Mechanical resistance Compressive strength Flexural strength Surface hardness (for wearing surfaces)	 5.2.1 5.2.2 5.2.4		threshold classes[a] C5 F1 SH30
Sound insulation Sound absorption	5.3.9 5.3.10		
Thermal resistance	5.3.7		
Chemical resistance	5.3.3		

[a] For the intended use, the specifier has to prescribe the class to get the desired durability.

Table ZA.1.4 — Relevant clauses for mastic asphalt screed material for normal uses

Essential characteristics	Requirements clauses in this standard:	Levels or classes:	Remarks
Reaction to fire (for exposed situations)	5.3.4	$A1_{fl}$ to F_{fl}	
Release of corrosive substances			by declaration of material type
Water permeability	5.3.8		
Mechanical resistance Resistance to indentation	5.2.5		threshold classes[a] IC100 or IP70 or IP IV
Sound insulation Sound absorption	5.3.9 5.3.10		
Thermal resistance	5.3.7		
Chemical resistance	5.3.3		

[a] For the intended use, the specifier has to prescribe the class to get the desired durability.

Table ZA.1.5 — Relevant clauses for synthetic resin screed material

Essential characteristics	Requirements clauses in this standard:	Levels or classes:	Remarks
Reaction to fire (for exposed situations)	5.3.4	$A1_{fl}$ to F_{fl}	
Release of corrosive substances			by declaration of material type
Water permeability	5.3.8		
Mechanical resistance Wear resistance (for wearing surfaces) Bond strength Impact resistance (for wearing surfaces)	 5.2.3 5.2.12 5.2.13		threshold classes[a] RWA10 or AR1 B1,5 IR4
Sound insulation Sound absorption	5.3.9 5.3.10		
Thermal resistance	5.3.7		
Chemical resistance	5.3.3		

[a] For the intended use, the specifier has to prescribe the class to get the desired durability.

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

ZA.2 Procedures for the attestation of conformity of floor screed material

ZA.2.1 System(s) of attestation of conformity

The system(s) of attestation of conformity of the floor screed materials indicated in Tables ZA.1.1 to ZA.1.5, in accordance with the Decision of the Commission 97/808/EC (as amended) as given in Annex III of the mandate for “M/132 “Floorings”, is shown in Table ZA.2 for the indicated intended uses and relevant levels or classes.

Table ZA.2 — Attestation of Conformity Systems for screed materials for internal use

Products	Intended uses	Class (if appropriate)	Attestation of conformity system
Floor screed materials	For internal uses subject to reaction to fire regulations	$A1_{fl}$ [a], $A2_{fl}$ [a], B_{fl} [a] and C_{fl} [a]	1
		$A1_{fl}$ [b], $A2_{fl}$ [b], B_{fl} [b], C_{fl} [b], D_{fl} and E_{fl}	3
		($A1_{fl}$ to E_{fl}) [c] and F	4
	For internal uses subject to regulations on dangerous substances		3
	All other uses	Matching threshold classes of Table ZA.1.1 to ZA.1.5	4

[a] Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material)

[b] Products/materials not covered by footnote [a]

[c] Products/materials that do not require to be tested for reaction to fire (e.g. products/materials of Class A1 according to Commission Decision 96/603/EC, as amended)

The attestation of conformity of the products in Tables ZA.1.1 to ZA.1.5 shall be based on the evaluation of conformity procedures indicated in Tables ZA.3.1 to ZA.3.3 resulting from the application of the clauses of this European Standard indicated therein.

Where more than one table covering the assignment of tasks for the product applies (i.e. because its intended use makes different characteristics relevant), Table ZA.3.1 has to be read in conjunction with subsequent tables in order to determine which characteristics assigned to the manufacturer in Table ZA.3.1 are type tested by a notified test laboratory (system 3) and which by the manufacturer (system 4).

Table ZA.3.1 — Assignment of evaluation of conformity tasks for floor screed materials under system 1

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks for the manufacturer	Factory production control (F.P.C)	Parameters related to all relevant characteristics of Table ZA.1	6.3
	Further testing of samples taken at factory	All relevant characteristics of Table ZA.1	6.3
	Initial type testing	All relevant characteristics of Table ZA.1 except reaction to fire	6.2
Tasks for the notified body	Initial type testing	Reaction to fire ($A1_{fl}$- $A2_{fl}$- B_{fl}- C_{fl})[a]	6.2
	Initial inspection of factory and of F.P.C	Parameters related to all relevant characteristics of Table ZA.1, in particular: reaction to fire	6.3
	Continuous surveillance, assessment and approval of F.P.C.	Parameters related to all relevant characteristics of Table ZA.1, in particular: reaction to fire	6.3

[a] Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material)

Table ZA.3.2 — Assignment of evaluation of conformity tasks for floor screed material under system 3

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks for the manufacturer	Factory production control (F.P.C)	Parameters related to all relevant characteristics of Table ZA.1	6.3
	Initial type testing	All relevant characteristics of Table ZA.1 except reaction to fire and dangerous substances	6.2
Tasks for the notified body	Initial type testing	Reaction to fire $A1_{fl}$ [b], $A2_{fl}$ [b], B_{fl} [b], C_{fl} [b], D_{fl} and E_{fl} Release of dangerous substances	6.2

[a] Products/materials for which a clearly identifiable stage in the production process results in an improvement of the reaction to fire classification (e.g. an addition of fire retardants or a limiting of organic material)

[b] Products/materials not covered by footnote [a]

Table ZA.3.3 - Assignment of evaluation of conformity tasks for floor screed material under system 4

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks for the manufacturer	Factory production control (F.P.C)	Parameters related to all relevant characteristics of Table ZA.1	6.3
	Initial type testing	All relevant characteristics of Table ZA.1	6.2

ZA.2.2 EC Certificate and Declaration of conformity

(In case of products with system 1): When compliance with the conditions of this annex is achieved, the certification body shall draw up a certificate of conformity (EC Certificate of conformity), which entitles the manufacturer to affix the CE marking. The certificate shall include:

- name, address and identification number of the certification body;
- name and address of the manufacturer, or his authorised representative established in the EEA, and place of production;
- description of the product (type, identification, use, ...);
- provisions to which the product conforms (i.e. annex ZA of this EN);
- particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions, etc.);
- the number of the certificate;
- conditions and period of validity of the certificate, where applicable;
- name of, and position held by, the person empowered to sign the certificate.

In addition, the manufacturer shall draw up a declaration of conformity (EC Declaration of conformity) including the following:

- name and address of the manufacturer, or his authorised representative established in the EEA;
- name and address of the certification body;
- description of the product (type, identification, use, ...), and a copy of the information accompanying the CE marking;
- provisions to which the product conforms (i.e. annex ZA of this EN);
- particular conditions applicable to the use of the product (e.g. provisions for use under certain conditions, etc.);
- number of the accompanying EC Certificate of conformity;
- name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or of his authorised representative.

(In case of products under system 3): When compliance with the conditions of this annex is achieved, the manufacturer or his agent established in the EEA shall prepare and retain a declaration of conformity (EC Declaration of conformity), which entitles the manufacturer to affix the CE marking. This declaration shall include:

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

(In case of products under system 4): When compliance with this annex is achieved, the manufacturer or his agent established in the EEA shall prepare and retain a declaration of conformity (EC Declaration of conformity), which entitles the manufacturer to affix the CE marking. This declaration shall include:

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

NOTE Duplication of information between the declaration and certificate should be avoided. To avoid duplication of information, cross-reference between documents can be made when one contains more information than the other.

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

ZA.3 CE conformity marking

The manufacturer or his authorised representative established within the EEA is responsible for the affixing of the CE marking. The CE marking symbol to affix shall be in accordance with Directive 93/68/EC and shall be shown on the accompanying label, the packaging or on the accompanying commercial documents e.g. a delivery note. The following information on the product and its essential characteristics shall accompany the CE marking symbol:

- identification number of the certification body (only for products under systems 1);
- name or identifying mark and registered address of the producer;
- the last two digits of the year in which the marking is affixed;
- number of the EC Certificate of conformity (if relevant);
- reference to this European Standard EN 13813;

- description of the product in accordance with clause 7 and 8 of this standard;
- information on the relevant essential characteristics in Table ZA1.1 – ZA1.5;
- values and, where relevant, level or class to declare for each essential characteristic as indicated in Table ZA1.1 – ZA1.5;
- characteristics against which the “No performance determined” (NPD) option is relevant.

The “No performance determined” (NPD) option may not be used where the characteristic is subject to a threshold level. Otherwise, the NPD option may be used when and where the characteristic, for a given intended use, is not subject to regulatory requirements.

Figure ZA.1 gives an example of the information to be given on the label, packaging and/or accompanying commercial documents.

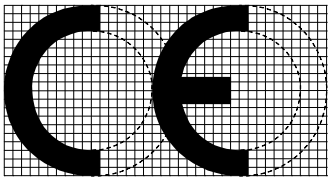	*CE conformity marking, consisting of the "CE"-symbol given in directive 93/68/EEC.*
AnyCo Ltd, PO Box 21, B-1050 **00**	*Name or identifying mark and registered address of the producer* *Last two digits of the year in which the marking was affixed*
EN 13813 CT-C50-F6-A6 Cementitious screed material for use internally in buildings Reaction to fire: $A1_{fl}$ Release of corrosive substances: CT Water permeability: NPD Water vapour permeability: NPD Compressive strength: C50 Flexural strength: F6 Wear resistance: A6 Sound insulation: NPD Sound absorption: NPD Thermal resistance: NPD Chemical resistance: NPD	*No. of European Standard* *Description of product* *and* *information on regulated characteristics*

Figure ZA.1 - Example CE marking information

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

NOTE European legislation without national derogations need not be mentioned.

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