BRITISH STANDARD

BS EN 14041:2004

Incorporating Corrigenda Nos. 1 and 2

Resilient, textile and laminate floor coverings — Essential Characteristics

The European Standard EN 14041:2004 has the status of a British Standard

ICS 59.080.60; 97.150

BSI British Standards

National foreword

This British Standard was published by BSI. It is the UK implementation of EN 14041:2004, incorporating Corrigenda May 2005 and October 2006.

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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 cannot confer immunity from legal obligations.

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English version

Resilient, textile and laminate floor coverings - Essential characteristics

Revêtements de sol résilients, textiles et stratifiés - Caractéristiques essentielles

Elastische, textile Bodenbeläge und Laminatböden - Wesentliche Eigenschaften

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

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Foreword

This document (EN 14041:2004) has been prepared by Technical Committee CEN/TC 134 “Resilient, textile and laminate floor coverings”, the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by February 2005, and conflicting national standards shall be withdrawn at the latest by May 2006.

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

1 Scope

This document specifies the health, safety and energy saving requirements for:

- resilient floor coverings manufactured from plastics, linoleum, cork or rubber, excluding loose-laid mats;
- textile floor coverings, excluding loose-laid mats and rugs;
- laminate floor coverings;
- floor panels for loose-laying.

It also specifies procedures for testing for the evaluation of conformity of the products and the requirements for marking and labelling.

The products are intended for use as floor coverings within a building or externally, according to the manufacturer's specifications.

This document does not apply to floor coverings containing asbestos.

This document does not specify requirements unrelated to health, safety and energy saving, which are covered in the separate European Standards for these products, listed in Annex A. To perform correctly, products covered by this standard require correct installation and maintenance. This document does not, however, cover installation or maintenance, but does give advice on minimising slip hazards.

2 Normative references

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

EN 548, *Resilient floor coverings – Specification for plain and decorative linoleum.*

EN 649, *Resilient floor coverings – Homogeneous and heterogeneous polyvinyl chloride floor coverings – Specification.*

EN 651, *Resilient floor coverings – Polyvinyl chloride floor coverings with foam layer – Specification.*

EN 652, *Resilient floor coverings – Polyvinyl chloride floor coverings with cork-based backing – Specification.*

EN 653, *Resilient floor coverings – Expanded (cushioned) polyvinyl chloride floor coverings – Specification.*

EN 654, *Resilient floor coverings – Semi-flexible polyvinyl chloride tiles – Specification.*

EN 687, *Resilient floor coverings – Specification for plain and decorative linoleum on a corkment backing.*

ENV 717-1, *Wood-based panels – Determination of formaldehyde release – Part 1: Formaldehyde emission by the chamber method.*

EN 717-2, *Wood-based panels – Determination of formaldehyde release – Part 2: Formaldehyde release by the gas analysis method.*

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

EN 1815, *Resilient and textile floor coverings – Assessment of static electrical propensity.*

EN 1816, *Resilient floor coverings – Specification for homogeneous and heterogeneous smooth rubber floor coverings with foam backing.*

EN 1817, *Resilient floor coverings – Specification for homogeneous and heterogeneous smooth rubber floor coverings.*

EN 12199, *Resilient floor coverings – Specifications for homogeneous and heterogeneous relief rubber floor coverings.*

EN 12466:1998, *Resilient floor coverings – Vocabulary.*

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

EN 12673, *Water quality – Gas chromatographic determination of some selected chlorophenols in water.*

EN 13238:2001, *Reaction to fire tests for building products – Conditioning procedures and general rules for selection of substrates.*

EN 13329, *Laminate floor coverings – Specifications, requirements and test methods.*

EN 13501-1:2002, *Fire classification of construction products and building elements – Part 1: Classification using test data from reaction to fire tests.*

EN 13553, *Resilient floor coverings – Polyvinyl chloride floor coverings for use in special wet areas – Specification.*

EN 13893, *Resilient, laminate and textile floor coverings – Measurement of dynamic coefficient of friction on dry floor surfaces.*

EN ISO 9001, *Quality management systems – Requirements.*

EN ISO 9239-1:2002, *Reaction to fire tests for floorings – Part 1: Determination of the burning behaviour using a radiant heat source (ISO 9239-1:2002).*

EN ISO 11925-2:2002, *Reaction to fire tests - Ignitability of building products subjected to direct impingement of flame - Part 2: Single-flame source test (ISO 11925-2:2002).*

ISO 1957, *Machine-made textile floor coverings – Selection and cutting of specimens for physical tests.*

ISO 2424:1992, *Textile floor coverings – Vocabulary.*

ISO 6356, *Textile floor coverings – Assessment of static electrical propensity – Walking test.*

ISO 10965, *Textile floor coverings – Determination of electrical resistance.*

ISO 11379, *Textile floor coverings – Laboratory cleaning procedure using spray extraction.*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 12466:1998 and ISO 2424:1992 and the following apply.

3.1
family of products
range of products within defined limits of variability (defined by the manufacturer or a technical specification) of the product parameters and, if relevant, end-use parameters, for which the defined safety property remains unchanged (does not get worse)

4 Requirements

4.1 Reaction to fire

4.1.1 Specimen preparation and conditioning

Preparation of test specimens shall be as defined in the appropriate fire test standard, except in the case of textile floor coverings where a washing and cleaning procedure similar to that used in practice may be required to verify the durability of surface fire retardant treatments (see 4.1.3).

The specimens shall be tested on one of the two standard substrates specified for floorings in EN 13238:2001 according to the intended end use.

The composition of the product, including the presence of any fire retardant additive (if applicable), shall be declared by the manufacturer prior to type testing.

4.1.2 Application rules

If the specimens are tested using an adhesive, the test result is valid for the tested floor covering with that adhesive, or the generic adhesive type, in end use conditions.

If the specimens are tested without using an adhesive, the test result is valid for the tested floor covering with and without using adhesives in end use conditions.

4.1.3 Durability aspects

Where required, textile floor coverings specimens to be tested shall be subjected to the laboratory spray extraction cleaning procedure according to ISO 11379 with the following modifications.

- Clean the test specimens three times, with an interval of 2 h ± 15 min between cycles, each cleaning cycle consisting of two strokes:

  – for the first stroke use the spray extraction machine with simultaneous spray and extraction;

  – for the second stroke operate the machine only as an extraction machine.

- Carry out the first cleaning cycle using the reference cleaning solution at ambient temperature (25 °C ± 10 °C) and the second and third cleaning cycle with water at ambient temperature without any addition of chemicals.

4.1.4 Classification

If a claim for reaction to fire performance is made, the floor covering (except as provided for below) shall be tested and classified according to the requirements of EN 13501-1:2002 and the resulting class and subclass (as appropriate to the class itself) shall be declared.

If it is decided to make no claim for reaction to fire performance, i.e. it is decided to place a product or family of products on the market as Class F_{fl}, no testing is required for this product of family of products.

The products listed in Tables 1, 2 and 3, in the end uses identified in the tables, are classified without further testing (CWFT) in the classes shown and do not require testing in respect of these end uses and classes.

NOTE The provisions of Tables 1, 2 and 3 are subject to final approval by the Standing Committee for Construction. Users of this standard should, therefore, refer to the published EC Decisions, when they become available, to verify the details. Any changes necessary to these standards will be published in a Corrigendum.

Table 1 – Classes of reaction to fire for laminate floor coverings, classified without further testing

Floor covering type[1]	Product detail	Minimum density (kg/m^3)	Minimum overall thickness (mm)	Class[2] Floorings
Laminate floor coverings	Laminate floor coverings manufactured in accordance with EN 13329:2000	800	6,5	E_{fL}
[1] Floor covering loose laid over any wood based substrate of at least Class D-s2,d0 or any substrate of at least Class A2-s1,d0. [2] Class as provided for in Table 2 in the Annex to Decision 2000/147/EC.				

Table 2 – Classes of reaction to fire for textile floor coverings, classified without further testing

Floor covering type[1]	EN product standard	Class[3] Floorings
Non-FR machine-made wall-to-wall pile carpets and pile carpet tiles[2]	EN 1307	E_{fL}
Non-FR needled textile floor coverings without pile[2]	EN 1470	E_{fL}
Non-FR needled textile floor coverings with pile[2]	EN 13297	E_{fL}

1) Floor covering glued or loose laid over a Class A2-s1,d0 substrate.

2) Textile floor coverings having a total mass of max. 4,8 kg/m², a minimum pile thickness of 1,8 mm (ISO 1766) and:

- a surface of 100% wool,
- a surface of 80% wool or more - 20% polyamide or less,
- a surface of 80% wool or more - 20% polyamide/polyester or less,
- a surface of 100% polyamide,
- a surface of 100% polypropylene and if with SBR-foam backing, a total mass of > 0,780 kg/m². All polypropylene carpets with other foam backings are excluded.

3) Class as provided for in Table 2 in the Annex to Decision 2000/147/EC.

Table 3 – Classes of reaction to fire for resilient floor coverings, classified without further testing

Floor covering type[1]	EN product standard	Minimum mass (kg/m^2)	Maximum mass (kg/m^2)	Minimum overall thickness (mm)	Class[2] Floorings
Plain & decorative Linoleum	EN 548	2,3	4,9	2	E_{fL}
Homogeneous and heterogeneous polyvinyl chloride floor coverings	EN 649	2,3	3,9	1,5	E_{fL}
Polyvinyl chloride floor coverings with foam layer	EN 651	1,7	5,4	2	E_{fL}
Polyvinyl chloride floor covering with cork-based backing	EN 652	3,4	3,7	3,2	E_{fL}
Expanded (cushioned) polyvinyl chloride floor coverings	EN 653	1,0	2,8	1,1	E_{fL}
Semi-flexible polyvinyl chloride tiles	EN 654	4,2	5,0	2	E_{fL}
Linoleum on corkment backing	EN 687	2,9	5,3	2,5	E_{fL}
Homogeneous and heterogeneous smooth rubber floor coverings with foam backing	EN 1816	3,4	4,3	4	E_{fL}
Homogeneous and heterogeneous smooth rubber floor coverings	EN 1817	3,0	6,0	1,8	E_{fL}
Homogeneous and heterogeneous relief rubber floor coverings	EN 12199	4,6	6,7	2,5	E_{fL}

[1] Floor covering loose laid over any wood based substrate of at least Class D-s2,d0 or any substrate of at least Class A2-s1,d0.

[2] Class as provided for in Table 2 in the Annex to Decision 2000/147/EC.

〚AC1〛 4.2 Content of pentachlorophenol (PCP)[1]

Resilient, textile and laminate floor coverings shall not contain PCP or a derivative thereof as a component in the production process of the product or of its raw materials. In cases where verification is required, if the content is less than 5 ppm in the parts of the product affected by treatment, this requirement shall be considered to be met. For laminate floor coverings the method CEN/TR 14823[2], for textile floor coverings the method CEN/TS 14494[3] shall be used. For resilient floor coverings verification is not required.

4.3 Formaldehyde emission[4]

When formaldehyde-containing materials have been added to the product as a part of the production process, the product shall be tested and classified into one of two classes: E1 or E2, as specified in Table 4 and Table 5.

NOTE Products of class E1 can be used without causing an indoor air concentration greater than $0,1 \times 10^{-6}$ (0,1 ppm) of formaldehyde.

[1] Attention is drawn to Commission Directive 1999/51/EC that covers restrictions on the marketing and use of certain dangerous substances including PCP and is reflected in national regulations

[2] CEN/TR 14823:2003: Durability of wood and wood-based products; Quantitative determination of pentachlorophenol in wood - Gas chromatographic method.

[3] CEN/TS 14494:2003: Leather — Chemical tests — Determination of pentachlorophenol content.

[4] Products CE marked according to this standard emitting formaldehyde above class E1 might be prohibited in some Member States. 〚AC1〛

The test requirement does not apply to floor coverings to which no formaldehyde-containing materials were added during production or post-production processing. These need not be classified, but may, without any testing, be declared as E1.

Table 4 – Formaldehyde class E1

	Test method	Requirement
Initial type testing [a]	ENV 717-1	Release ≤ 0,124 mg/m^3
Factory production control	ENV 717-1	Release ≤ 0,124 mg/m^3
	EN 717-2	Release ≤ 3,5 mg/m^{2}h
[a] For established products, initial type testing may also be done on the basis of existing data with EN 717-2 testing, either from factory production control or from external inspection.		

Table 5 – Formaldehyde class E2

	Test method	Requirement
Initial type testing	ENV 717-1	Release > 0,124 mg/m^3
	EN 717-2	Release > 3,5 mg/m^{2}h to ≤ 8 mg/m^{2}h
Factory production control	ENV 717-1	Release > 0,124 mg/m^3
	EN 717-2	Release > 3,5 mg/m^{2}h to ≤ 8 mg/m^{2}h

4.4 Water-tightness

Where required, resilient floor coverings shall meet the requirements of EN 13553.

4.5 Slip resistance

4.5.1 Classification

If a claim for slip resistance is made, the floor covering intended to be used in dry and non-contaminated conditions shall have a dynamic coefficient of friction of ≥ 0,30 when tested ex-factory under dry conditions in accordance with EN 13893 and shall be declared as technical class DS.

Although such floors may be subjected to occasional spillage and wet cleaning, the manufacturer does not guarantee the performance under these conditions.

If no claim for slip resistance is made, the floor coverings for which no performance has been determined shall be declared as technical class NPD.

4.5.2 Post-installation care

The floor covering shall be treated, cleaned and maintained in accordance with the manufacturer's instructions.

NOTE Slip resistance characteristics on an installed floor covering can be affected by its installation, the surface treatment that is given to it when installed, dirt accumulation and its cleaning and maintenance. Guidance on the reduction of slip hazards is given in Annex C.

4.6 Electrical behaviour (static electricity)

4.6.1 Applicability

For those floor coverings for which the manufacturer makes a claim for antistatic performance or electrical resistance.

4.6.2 Requirements

4.6.2.1 Antistatic floor coverings

The body voltage, measured in accordance with EN 1815 for resilient and laminate floor coverings or ISO 6356 for textile floor coverings, shall not exceed 2,0 kV when tested at 23 °C ± 1 °C and (25 ± 2) % relative humidity after conditioning the test specimens in the same atmosphere for seven days.

4.6.2.2 Electrical resistance

- Static dissipative floor coverings:
  The vertical resistance, measured in accordance with EN 1081 for resilient and laminate floor coverings or ISO 10965 for textile floor coverings, shall not exceed 10^9 Ω.

- Conductive floor coverings:
  The vertical resistance, measured in accordance with EN 1081 for resilient and laminate floor coverings or ISO 10965 for textile floor coverings, shall not exceed 10^6 Ω.

4.6.3 Durability aspects

For textile antistatic floor coverings, a washing and cleaning procedure similar to that used in practice is required where applicable to verify the durability of surface antistatic treatments.

In such cases the specimens to be tested shall be subjected to the laboratory spray extraction cleaning procedure according to ISO 11379 with the following modifications.

Clean the test specimens three times, with an interval of 2 h ± 15 min between cycles, each cleaning cycle consisting of two strokes:

– for the first stroke use the spray extraction machine with simultaneous spray and extraction;

– for the second stroke operate the machine only as an extraction machine.

Carry out the first cleaning cycle using the reference cleaning solution at ambient temperature 25 °C ± 10 °C and the second and third cleaning cycle with water at ambient temperature without any addition of chemicals.

After this, the test of 4.6.2 shall be repeated and the requirements met.

NOTE Dirt and application of polymers can affect the antistatic and electrical properties of resilient and laminate floor coverings.

4.7 Thermal conductivity

When floor coverings are to be installed over an under-floor heating system the design thermal conductivity values given in EN 12524 shall be assumed for design calculation purposes. Alternatively, the thermal resistance measured in accordance with EN 12667 may be used.

5 Evaluation of conformity

5.1 General

The conformity of floor coverings with the requirements of this standard (including classes) shall be demonstrated by:

– initial type testing;

– factory production control by the manufacturer, including product assessment (see Annex D).

For the purposes of testing, floor coverings may be grouped into families (see 3.1), where it is considered that the results for a given characteristic from any one product within the family are valid for all other floor coverings within that family.

5.2 Type testing

5.2.1 Initial type testing

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 (unless a member of the same family) or at the beginning of a new method of production (where this may affect the stated properties).

Whenever a change occurs in the product, the raw material or supplier of the components, or the production process (subject to the definition of a family), which would change significantly one or more of the characteristics, the type tests shall be repeated for the appropriate characteristic(s).

5.2.2 Sampling, testing and compliance criteria

The sample taken for testing shall be representative of the available material. Compliance criteria are specified in Clause 4.

The results of all type tests shall be recorded and held by the manufacturer for at least 5 years.

5.3 Factory production control (FPC)

The manufacturer shall establish, document and maintain an FPC system to ensure that the products placed on the market conform to the stated performance requirements. The FPC system shall consist of procedures, regular inspections and tests and/or assessments and the use of the results to control raw and other incoming materials or components, equipment, the production process and the product. Elements needed for the methods of FPC are given in Annex D.

6 Marking and labelling

Products which conform to the requirements of this document shall be clearly and indelibly marked by the manufacturer either on their package or on an adhesive label with the following information:

a) the number and the year of this European Standard, i.e. EN 14041:2004;

b) the manufacturer's or supplier's identification;

c) the product name and batch number (possibly in code form).

Where the requirements of ZA.3 give the same information as this clause, the requirements of this clause are considered to have been met.

Annex A
(informative)

Other European Standards for resilient, textile and laminate floor coverings

The following published or draft standards specify the general requirements and the requirements relating to the classification schemes, for resilient, textile and laminate floor coverings.

EN 548, *Resilient floor coverings – Specification for plain and decorative linoleum.*

EN 649, *Resilient floor coverings – Homogeneous and heterogeneous polyvinyl chloride floor coverings – Specification.*

EN 650, *Resilient floor coverings – Polyvinyl chloride floor coverings on jute backing or on polyester felt backing or on polyester felt with polyvinyl chloride backing – Specification.*

EN 651, *Resilient floor coverings – Polyvinyl chloride floor coverings with foam layer – Specification.*

EN 652, *Resilient floor coverings – Polyvinyl chloride floor coverings with cork-based backing – Specification.*

EN 653, *Resilient floor coverings – Expanded (cushioned) polyvinyl chloride floor coverings – Specification.*

EN 654, *Resilient floor coverings – Semi-flexible polyvinyl chloride tiles – Specification.*

EN 655, *Resilient floor coverings – Tiles of agglomerated composition cork with polyvinyl chloride wear layer – Specification.*

EN 686, *Resilient floor coverings – Specification for plain and decorative linoleum on a foam backing.*

EN 687, *Resilient floor coverings – Specification for plain and decorative linoleum on a corkment backing.*

EN 688, *Resilient floor coverings – Specification for cork linoleum.*

EN 1307, *Textile floor coverings – Classification of pile carpets.*

EN 1470, *Textile floor coverings – Classification of needled floor coverings except for needled pile floor coverings.*

EN 1816, *Resilient floor coverings – Specification for homogeneous and heterogeneous smooth rubber floor coverings with foam backing.*

EN 1817, *Resilient floor coverings – Specification for homogeneous and heterogeneous smooth rubber floor coverings.*

EN 12104, *Resilient floor coverings – Cork floor tiles – Specification.*

EN 12199, *Resilient floor coverings – Specifications for homogeneous and heterogeneous relief rubber floor coverings.*

EN 13297, *Textile floor coverings – Classification of needled pile floor coverings.*

EN 13329, *Laminate floor coverings – Specifications, requirements and test methods.*

EN 13413, *Resilient floor coverings – Polyvinyl chloride floor coverings on a filled fibrous backing – Specification.*

EN 13553, *Resilient floor coverings – Polyvinyl chloride floor coverings for use in special wet areas – Specification.*

prEN 13845, *Resilient floor coverings – Polyvinyl chloride floor coverings with enhanced slip resistance – Specification.*

EN 14085, *Resilient floor coverings – Specification for floor panels for loose laying.*

EN 14215, *Textile floor coverings – Classification of machine-made pile rugs and runners.*

prEN 14521, *Resilient floor coverings – Specification for smooth rubber floor coverings with or without foam backing and with decorative layer.*

prEN 14565, *Resilient floor coverings – Floor coverings based upon synthetic thermoplastic polymers – Specification.*

Annex B
(normative)

Analysis of pentachlorophenol in floor coverings

B.1 Scope

Pentachlorophenol (PCP) in floor coverings shall be extracted into potassium carbonate solution and analysed quantitatively according to EN 12673.

B.2 Apparatus and materials

B.2.1 Laboratory equipment

Standard laboratory glassware with vacuum filtration equipment.

B.2.2 Ultrasonic bath

B.2.3 Potassium carbonate, 1,5 % aqueous solution

B.2.4 Other apparatus and materials as specified in EN 12673

B.3 Sampling and specimen preparation

Sampling and specimen preparation shall be carried out in accordance with ISO 1957.

B.4 Sample extraction and analysis

B.4.1 Cut the floor covering sample into small pieces.

B.4.2 Weigh a 5 g specimen from the sample and insert it into a 250 ml Erlenmeyer flask with 50 ml of the potassium carbonate solution (see B.2.3).

B.4.3 Place the flask and contents into an ultrasonic bath for one hour to allow the PCP to be extracted as potassium salt. After extraction, filter the extract through a suction flask and extract the resulting residue a second time with a further 50 ml of potassium carbonate solution.

B.4.4 After extraction, combine the aqueous extracts (WARNING: avoid ingress of carbon dioxide) and analyse for PCP content in accordance with EN 12673.

B.5 Expression of results

Express the result as percent by mass of PCP in the floor covering.

Annex C
(informative)

Guidance on the reduction of slip hazards

C.1 General

The interaction of feet, shod or bare, with flooring materials governs slipping. The slip resistance of a floor in service depends on the nature of its surface, and this may change over the lifetime of the floor. Slip resistance is adversely affected by the presence of contamination; the most common contaminant is water but others including oil, grease, soap, dust, lint and sand are also possible.

It is important to remember that coefficient of friction is only one indicator of slip resistance and the two terms should not be interchanged. Slip resistance is not a constant nor an intrinsic property of any floor or floor covering material. Surface roughness is another property that may be usefully considered.

Resilient, laminate and textile floor coverings and other flooring surfaces in common use usually have acceptable slip resistance provided they are clean, dry, free from oil, fat and other slippery substances and have received appropriate treatment after installation, and continue to receive appropriate maintenance in service.

Many slip incidents do not result in serious injury. A thorough investigation to uncover the root causes of such incidents and comprehensive records of these events will help identify problem areas and allow action to be taken before a serious accident does occur. Records may also allow patterns to be identified, giving further clues to the action required to reduce the hazard.

C.2 Design

The measures that can be taken by designers, in consultation with their clients, to promote safe conditions in service include:

- considering the likely contaminants that will be present in service and specifying the floor surface and measures required for draining it accordingly;
- anticipating the cleaning and maintenance regime necessary and making the necessary provisions for it;
- providing adequate entrance flooring systems at foyers and entrances to intercept water and dirt brought in by traffic. The effective length of the entrance flooring system should allow for a minimum of two footfalls for each foot;
- entrance flooring systems will only remain effective if properly cleaned and maintained and replaced when necessary. Matting should be securely fixed so that it does not present a tripping hazard;
- the use of canopies over entrances;
- positioning entrances to reduce the effects of prevailing weather;
- the use of ventilation systems to help reduce the ingress of wet weather.

Poor lighting, inside or outside, can significantly increase the risk faced by pedestrians. Limited lighting may also skew individuals' perceptions or expectations of the degree of slipperiness of a walking surface. Steps, stairs and ramps also present an increased risk and should be clearly identified and well lit.

Accidents will generally occur when unexpected differences in floor conditions are encountered. It is often the difference between the dry and wet (contaminated) coefficient of friction that is important. Specifiers should remember this and not simply choose a floor covering material with a high dry coefficient of friction value. It is also good practice to avoid significantly different flooring materials (in terms of their slip resistance) in adjacent areas. It is also important to recognise that many flooring materials will change merely on installation, for example by the application of polishes; after all, it is the installed floor that will be walked on.

If contamination is likely to be present, then flooring with enhanced slip resistance should be used. The use of such floorings is particularly important on steps and sloping areas and in areas where falls in gradient are used to drain water from foreseeable wet areas (expert advice should be sought).

C.3 Service

The measures that can be taken by the owner or occupier of the building to promote safe conditions in service include identifying potentially wet areas and using an appropriate surface there, establishing an effective cleaning/maintenance procedure that uses appropriate cleaning materials/dressings and includes entrance flooring systems, confirming that these procedures are conducted at the appropriate frequency and using normal measures of good house keeping.

Various European Directives require the employer to make an assessment of the risks of slipping caused by conditions in his workplace and to take the necessary measures to minimize them.

Areas of class DS floor coverings wet as a result of cleaning should be clearly identified and small areas of local contamination should be cordoned off. Freshly cleaned surfaces should be completely dry before pedestrian traffic is allowed to return. Signs used during cleaning should be removed once the floor has dried; failure to do this will result in their effectiveness being significantly reduced.

The frequency of cleaning and maintenance regimes should be determined by the numbers (normal and peak levels) and type (children, elderly, disabled etc.) of pedestrians who will use the floor.

Good housekeeping practices are the first defence against slip and fall accidents. Good housekeeping is therefore a state to be maintained rather than merely achieved. One way to facilitate this, especially in situations where spills etc. are common, is to leave absorbent materials at conspicuous accessible points throughout the facility. The resources required to clean up spills etc. are far less than those involved if an accident were to occur.

In occupational settings it is often possible to control the footwear to be worn. An informed choice of footwear may offer some protection against the incidence of slipping accidents. Footwear should also be properly cleaned and maintained to remain effective. In situations where no control over footwear is possible the condition of the floor will be even more crucial in reducing the likelihood of slipping accidents. People pulling or pushing loads will generally require a surface with a higher slip resistance to operate safely.

C.4 User responsibility

Water and other liquids are arguably the substances that most often makes floors slippery. Spills of tea, coffee, cleaning solution, rinse water and other liquids are too hazardous to leave until the cleaners arrive. Water or other spilt liquids on the floor are primarily the responsibility of the person who spilt them and that person should remove them immediately and alert others to the hazard while he does so.

Slip resistance can only be maintained by frequent effective cleaning with appropriate detergent and cleaning tools. The flooring product manufacturer may provide details of cleaning methods. When a wet cleaning process is used a thorough final rinse with clean water is particularly important.

C.5 Conclusion

The information given in this annex is aimed at raising the awareness of the problem of slips and falls and resultant injuries. However, in giving advice on how to help reduce some of the major contributors to such accidents, it can only provide guidance rather than an absolute guarantee.

Annex D
(normative)

Factory production control and reaction to fire testing

D.1 General

Factory production control (FPC) means the permanent internal control of production exercised by the manufacturer. FPC shall be based on:

– control of raw material;

– process control;

– calibration plan;

– testing of finished products;

– traceability.

All elements, requirements and provisions adopted by the manufacturer shall be documented in a systematic manner in the form of written policies and procedures. This production control system documentation shall ensure a common understanding of quality assurance and enable the achievement of the required product characteristics and the effective operation of the production control system to be checked.

A manufacturer applying EN ISO 9001 made specific to the product or product family is deemed to satisfy the FPC requirements.

D.2 Control of raw material

The manufacturer shall ensure that raw and constituent materials conform to his specified requirements. In determining the checks required, consideration shall be given to the control exercised by the supplier and the documented evidence of conformity.

D.3 Process control

In order to manufacture products which conform to this European Standard, the manufacturer shall control his process and perform inspection and tests as described in the production control system documentation.

D.4 Calibration plan

Test equipment shall be calibrated and/or checked against equipment or standard materials traceable to relevant internationally or nationally recognized reference standards in accordance with a calibration plan. The minimum frequencies of calibration shall be recorded in the manufacturer's manual.

D.5 Testing of finished products

D.5.1 Direct testing

The manufacturer shall regularly test the finished products. The tests shall be carried out in accordance with the standard test methods specified in this standard or, in the case of indirect testing, in accordance with D.5.2.

The sample shall be drawn periodically from each production unit according to the manufacturer's test plan.

D.5.2 Indirect assessment

Normally the testing is to be performed according to the test method given in this product standard. However, indirect assessment is permitted. Indirect assessment is defined as verifying a specified property X through another property Y, if there is a known relationship between these two properties for the product in question and the evidence of this relationship can be demonstrated.

For each indirect testing procedure applied at a place of production, the sampling plan and the compliance criteria for the indirect property shall be specified, taking into account the relevant relationship between the direct and indirect test methods.

D.6 Inspection and testing status of products

The inspection and testing status of the product or product family shall be identified by means which clearly indicate the conformity or non-conformity of the product or product family with regard to the inspections and tests performed.

All results of inspection, calibration and testing shall be recorded together with:

– a description of the product or product family;

– the date of manufacture;

– the testing method;

– the test result;

– the signature of the person carrying out the inspection.

When products do not conform to the requirements of this standard, the corrective measures to be taken to rectify the situation (e.g. a further test carried out, modification of the manufacturing process, discarding or rectifying of product) shall be made in the manufacturer's log. The manufacturer’s log shall be kept for at least five years.

D.7 Traceability

It is the manufacturer’s, or the manufacturer’s agent’s responsibility to keep full records of individual products or product batches, including their related manufacturing details and characteristics and to keep records of to whom these products or batches were first sold. Individual products or batches of products and the related manufacturing details shall be completely identifiable and retraceable.

D.8 Product parameters influencing reaction to fire performance

The product parameters shown in Table D.1 influence the reaction to fire performance of floor coverings. When testing a family of products for initial type testing, the provisions of Table D.1 shall apply.

Table D.1 – Product parameters influencing reaction to fire performance of textile, resilient and laminate floor coverings

Parameters	Comments
Composition	Each floor covering with different composition, built-up or surface layer shall be tested separately.
Thickness	If a floor covering is produced with a range of different nominal thickness this shall be considered when testing. At least the minimum and maximum thickness shall be tested (one test each) and for the worst case a complete set of tests shall be done. The worst case determines the classification.
Mass per unit area or density	If a floor covering is produced with a range of different nominal mass per unit area or density this shall be considered when testing. At least the minimum and maximum mass per unit area or density shall be tested (one test each) and for the worst case a complete set of tests shall be done. The worst case determines the classification.
Surface structure	If a floor covering is produced with several different surface structures and it is assumed that this will influence the fire performance this shall be considered when testing. Each surface structure shall be tested (one test each) and for the worst case the complete set of tests shall be done. The worst case determines the classification.
Colour and design	Colour and design of a floor covering have no effect on the reaction to fire behaviour unless different colour and design change the composition or other parameters as mentioned above.

The parameters shown in Table D.2 are incorporated in the test methods.

Table D.2 – Parameters considered in fire testing and classification

Parameter	Provisions in test and classification standards
Orientation	EN ISO 11925-2:2002, 5.4.1 EN ISO 9239-1:2002, 7.2.6
Adhesives	EN 13501-1:2002, 6.1
Substrates	EN 13501-1:2002 (and EN 13238:2001, 5.1)
Working/Cleaning	EN 13501-1:2002, 6.1
Size	EN ISO 9239-1:2002, 5.3 EN ISO 11925-2:2002, 5.2

Annex ZA
(informative)

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

ZA.1 Scope and relevant clauses

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

The clauses 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.

This annex ZA has the same scope as clause 1.

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

NOTE 1 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 2 An informative database of European and national provisions on dangerous substances is available at the Construction web site on EUROPA (accessed through http://europa.eu.int/comm/enterprise/construction/internal/dangsub/dangmain.htm).

This annex establishes the conditions for the CE marking of the floor coverings intended for the uses indicated in Table ZA.1 and shows the relevant clauses applicable.

Table ZA.1 – Resilient, textile and laminate floor coverings for interior use

Product: Resilient, textile and laminate floor coverings **Intended use:** Internal and external use as floor coverings			
Essential characteristics	**Requirement clause in this standard**	**Mandated levels and/or classes**	**Notes**
Reaction to fire	4.1	$A1_{fl}$ to F_{fl}	
Content of pentachlorophenol	4.2	-	
Emission of formaldeyhde	4.3	-	Classes of convenience E1 and E2
Water-tightness	4.4	-	
Slipperiness	4.5.1	-	Threshold class DS, if applicable
Electrical behaviour	4.6	-	Threshold value, see 4.6.2.2
Thermal conductivity	4.7	-	
Durability of reaction to fire	4.1.3	-	

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 or Class F_{fl} for reaction to fire) in the information accompanying the CE marking (see ZA.3) may be used.

ZA.2 Procedure for the attestation of conformity of products

[AC1] ZA.2.1 Systems of attestation of conformity

The systems of attestation of conformity for resilient, textile and laminate floor coverings indicated in Table ZA.1, in accordance with the Decision of the Commission 97/808/EC of 03/12/1997 as given in Annex III of the mandate for "Floorings", are shown in Table ZA.2 for the indicated intended uses and relevant classes.

Table ZA.2 – Systems of attestation of conformity

Product	Intended use(s)	Level(s) or class(es)	Attestation of conformity system
Resilient, textile and laminate floor coverings	Internal and external use as flooring coverings	$A1_{fl}$*, $A2_{fl}$ *, B_{fl} * and C_{fl} *	1
		$A1_{fl}$ **, $A2_{fl}$ **, B_{fl} **, C_{fl} **, D_{fl} and E_{fl}	3
		($A1_{fl}$ to E_{fl})*** and F_{fl}	4
* 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). In accordance with EC decision 2001/596EC products with a different content of organic material outside the accepted limits as laid down in the factory production control documentation have to be tested separately according to table D1 in Annex D. ** Products/materials not covered by footnote (*). *** 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). This applies also to products that are covered by a CWFT (classified without further testing) decision.			
System 1: See Directive 89/106/EEC (CPD) Annex III.2.(i), without audit testing of samples. System 3: See Directive 89/106/EEC (CPD) Annex III.2.(ii), Second possibility. System 4: See Directive 89/106/EEC (CPD) Annex III.2.(ii), Third possibility.			

The attestation of conformity of the floor coverings in Table ZA.1 shall be based on the evaluation of conformity procedures indicated in Tables ZA.3 to ZA.5 resulting from application of the clauses of this European Standard indicated therein. [AC1]

Table ZA.3 – Assignment of evaluation of conformity tasks for floor coverings under system 1

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks under the responsibility of the manufacturer	Factory production control (FPC)	Parameters related to all relevant characteristics of Table ZA.1	5.3
	Further testing of samples taken at factory	All relevant characteristics of Table ZA.1	5.3
	Initial type testing by a notified test lab	Emission of formaldehyde	5.2
	Initial type testing by the manufacturer	All relevant characteristics of Table ZA.1 except reaction to fire in the classes below and emission of formaldehyde	5.2
Tasks under the responsibility of the product certification body	Initial type testing	Reaction to fire in classes $A1_{fl}$*, $A2_{fl}$*, B_{fl}* and C_{fl}* and durability of reaction to fire (where applicable) in the same classes	5.2
	Initial inspection of factory and of FPC	Parameters related to all relevant characteristics of Table ZA.1, in particular: reaction to fire in classes $A1_{fl}$*, $A2_{fl}$*, B_{fl}* and C_{fl}*	5.3
	Continuous surveillance, assessment and approval of FPC	Parameters related to all relevant characteristics of Table ZA.1, in particular: reaction to fire in classes $A1_{fl}$*, $A2_{fl}$*, B_{fl}* and C_{fl}*	5.3
* See footnote to Table ZA.2.			

Table ZA.4 – Assignment of evaluation of conformity tasks for floor coverings under system 3

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks under the responsibility of the manufacturer	Factory production control (FPC)	Parameters related to all relevant characteristics of Table ZA.1	5.3
	Initial type testing by the manufacturer	All relevant characteristics of Table ZA.1 except those shown below	5.2
	Initial type testing by a notified test laboratory	Reaction to fire in classes $A1_{fl}$**, $A2_{fl}$**, B_{fl}**, C_{fl}**, D_{fl} and E_{fl}, durability of reaction to fire (where applicable) in the same classes and emission of formaldehyde	5.2
** See footnote to Table ZA.2.			

Table ZA.5 – Assignment of evaluation of conformity tasks for floor coverings under system 4

Tasks		Content of the task	Evaluation of conformity clauses to apply
Tasks under the responsibility of the manufacturer	Factory production control (FPC)	Parameters related to all relevant characteristics of Table ZA.1	5.3
	Sampling and initial type testing	All characteristics of Table ZA.1 relevant for the intended use, i.e. release of dangerous substances, slipperiness, electrical behaviour and thermal conductivity	5.2

ZA.2.2 Certification and declaration of conformity

ZA.2.2.1 *In the case of system 1*

When compliance with this annex is achieved, the certification body shall draw up a certificate of conformity (EC Certificate of conformity) with the information indicated below:

– 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 (if any);

– the number of the certificate;

– conditions of validity of the certificate, where applicable;

– name of, and position held by, the person empowered to sign the certificate.

This EC Certificate of conformity entitles the manufacturer to affix the CE marking, as described in ZA.3.

In addition, for each product covered by an EC Certificate of conformity, the manufacturer shall draw up a declaration of conformity (EC Declaration of conformity) including the following information:

– name and address of the manufacturer, or his authorised representative established in the EEA;

– name and address of the notified body;

– number of the attached 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.

ZA.2.2.2 *In the case of systems 3 and 4*

When compliance with this annex is achieved, the manufacturer shall draw up a declaration of conformity (EC Declaration of conformity) including the following information:

– 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 (if any);

– name and address of the notified body(ies) (test laboratory, system 3 only);

– name of, and position held by, the person empowered to sign the declaration on behalf of the manufacturer or of his authorised representative.

This EC Declaration of conformity entitles the manufacturer to affix the CE marking, as described in ZA.3.

The above mentioned certificate and declaration shall be available in the language or languages accepted in the Member State in which the product is to be used.

ZA.3 CE Marking and labelling – Information to accompany the CE marking

The manufacturer, or his authorized representative established in the EEA, is responsible for affixing the CE marking before the product is placed on the market.

The CE conformity symbol, consisting of the letters “CE” in accordance with Directive 93/68/EEC, shall appear on the packaging, together with the number of the certificate of conformity, where applicable. The CE conformity symbol shall also appear on the accompanying commercial documents together with the following additional information:

a) the identification of the certification body (only for products subject to third party certification – system 1);

b) the number of this European Standard;

c) the description of the product (e.g. polyvinyl chloride floor covering with foam layer);

d) the name or identifying mark of the producer;

e) the last two digits of the year in which the marking was affixed;

f) the number of the EC certificate of conformity (only for products subject to third party certification – system 1);

g) where appropriate, indications to identify the characteristics of the product on the basis of this standard as relevant, i.e.:

– reaction to fire class and subclass (with description of installation conditions, if this affects the class);

– content of pentachlorophenol (if relevant);

– emission of formaldehyde (class E1 or E2, if relevant);

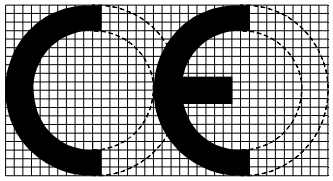
– water tightness (where relevant);

– slipperiness;

– electrical behaviour (where relevant);

– thermal conductivity (where relevant).

The “No performance determined” (NPD) option may be used when and where the characteristic, for a given intended use, is not subject to regulatory requirements in the Member State of destination.



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EN 14041

Polyvinyl chloride floor covering with foam layer, for use in buildings (EN 651)

Reaction to fire Class E_{fl} (see EN 14041, Table 3)

Slipperiness DS

Formaldehyde E1

Figure ZA.1 – Example of CE marking for product classified without further testing in reaction to fire Class E_{fl}

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.

Bibliography

EN 120, *Wood based panels – Determination of formaldehyde content – Extraction method called the perforator method.*

EN 650, *Resilient floor coverings – Polyvinyl chloride floor coverings on jute backing or on polyester felt backing or on polyester felt with polyvinyl chloride backing – Specification.*

EN 655, *Resilient floor coverings – Tiles of agglomerated composition cork with polyvinyl chloride wear layer – Specification.*

EN 686, *Resilient floor coverings – Specification for plain and decorative linoleum on a foam backing.*

EN 688, *Resilient floor coverings – Specification for cork linoleum.*

EN 12104, *Resilient floor coverings – Cork floor tiles – Specification.*

EN 12667, *Thermal performance of building materials and products – Determination of thermal resistance by means of guarded hot plate and heat flow meter methods – Products of high and medium thermal resistance.*

prEN 13845, *Resilient floor coverings – Polyvinyl chloride floor coverings with enhanced slip resistance – Specification.*

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