



BSI Standards Publication

Resilient, textile, laminate and modular multilayer floor coverings - Essential characteristics

National foreword

This British Standard is the UK implementation of EN 14041:2018. It supersedes BS EN 14041:2004, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/60, Resilient and Laminate Floor Coverings.

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

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English Version

Resilient, textile, laminate and modular multilayer floor coverings - Essential characteristics

Revêtements de sol résilients, textiles, stratifiés et multicouches modulaires - Caractéristiques essentielles

Elastische, textile und Laminat-Bodenbeläge - Wesentliche Merkmale

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Contents

Page

European foreword	4
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	9
4 Essential characteristics.....	9
5 Assessment and verification of constancy of performance (AVCP)	21
6 Marking and labelling	31
Annex A (informative) Product standards for resilient, textile, laminate and modular multilayer floor coverings	32
Annex B (normative) Determination of content of pentachlorophenol (PCP) in resilient and textile floor coverings	34
B.1 Principle of test.....	34
B.2 Apparatus and materials.....	34
B.3 Sampling and specimen preparation.....	34
B.4 Sample extraction and analysis	34
B.5 Expression of results	34
Annex C (informative) Guidance on the reduction of slip hazards	35
C.1 Scope.....	35
C.2 General.....	35
C.3 Design.....	35
C.4 Service.....	36
C.5 User responsibility	37
Annex D (normative) Product parameters for defining product families.....	38
D.1 Product parameters related to reaction to fire performance.....	38
D.2 Product parameters related content of dangerous substances	39
D.3 Product parameters related to emission of dangerous substances into indoor air	41
D.4 Product parameters related to slip resistance performance.....	43
D.5 Product parameters related to electrical behaviour performance	43
Annex E (normative) Determination of content of Polycyclic Aromatic Hydrocarbons (PAH)	45
E.1 Principle of test.....	45
E.2 Terms and definitions	45
E.3 Abbreviations	45
E.4 Equipment	45

E.5	Chemicals and solutions.....	46
E.6	Procedure	47
E.7	GC-MS Analysis.....	48
E.8	Calculations.....	49
E.9	Test Report.....	49
Annex F (normative)	Determination of content of phthalates	50
F.1	Principle of test	50
F.2	Terms and definitions.....	50
F.3	Equipment and Supplies	51
F.4	Measurement of Phthalate Concentration.....	52
Annex G (normative)	Information to be provided in the Supplier declaration on raw materials or constituent products.....	57
G.1	Information to be provided with the supplier declaration on dangerous substances in raw materials or constituent products.....	57
G.2	Supplier declaration on the content of dangerous substances in raw materials or constituent products	58
Annex H (normative)	Content of Azocolourants – Restricted Aromatic Amines	60
Annex I (normative)	List of pictograms used for an alternative way of expressing the performance of certain characteristics	61
Annex ZA (informative)	Relationship of this European Standard with Regulation (EU) No.305/2011	64
Bibliography		69

European foreword

This document (EN 14041:2018) has been prepared by Technical Committee CEN/TC 134 “Resilient, textile and laminate floor coverings”, the secretariat of which is held by NBN.

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 July 2018, and conflicting national standards shall be withdrawn at the latest by October 2019.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN not be held responsible for identifying any or all such patent rights.

This document supersedes EN 14041:2004.

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 for construction works of Regulation (EU) No. 305/2011.

For relationship with Regulation (EU) No. 305/2011, see informative Annex ZA, which is an integral part of this document.

The major changes between this version of the standard and the superseded version can be summarized as the following:

General

The product group “modular multilayer floor coverings” has been introduced in the title, scope and has been added throughout the remaining text where applicable. (including Annex ZA).

4. Essential Characteristics

4.2 Content of dangerous substances

Following the mandate M/119 rev on Dangerous Substances and the answer prepared by CEN/TC 134 and approved by the EC, the former clause “4.2 Content of pentachlorophenol (PCP)” has been integrated into a more detailed “Clause on content of dangerous substances.

4.6 Slip resistance

The content of this clause has been updated and, according to the answer to the mandate, it is now applicable to all types of floor coverings covered by this standard.

4.7 Thermal resistance (Thermal conductivity)

The content of this clause has been updated and, according to the answer to the mandate, the option to either declare thermal resistance or thermal conductivity has been added.

5. Assessment and verification of constancy of performance (AVCP)

This clause replaces the former clause “Evaluation of conformity”; an official template for this clause is provided by CEN, which has to be implemented. Clause 5 follows this template.

Annex D (normative) Product parameters for defining product families

The former Annex D has become Clause 5. The current Annex D is an updated version of the previous Clause D.8. Separate sections per product group for the different essential characteristics have been introduced. The following clauses have been added:

D.2 Product parameters related content of dangerous substances

D.3 Product parameters related to emission of dangerous substances into indoor air

D.4 Product parameters related to slip resistance performance

D.5 Product parameters related to electrical behaviour performance

Annex E (normative) Determination of Polycyclic Aromatic Hydrocarbons (PAH)

This Annex has been added as there was no standardized test method available for determining Polycyclic Aromatic Hydrocarbons (PAH) at the moment of submitting this standard to CEN formal vote.

Annex F (normative) Determination of phthalates

This Annex has been added as there was no standardized test method available for determining phthalates at the moment of submitting this standard to CEN formal vote.

Annex G (informative) Example for a Supplier declaration on raw materials or constituent products

This Annex has been added as guidance for preparing a supplier declaration.

Annex H (normative) Azocolourants – Restricted Aromatic Amines

This Annex has been added to provide more details on the restricted aromatic amines and azo-dyes.

Annex I (normative) List of pictograms used for an alternative way of expressing the performance of certain characteristics

This Annex has been added to present the list of characteristics which also may be declared in form of (a) pictogram(s).

Annex ZA (informative) Relationship of this European Standard with Regulation (EU) No.305/2011 (Construction Products Regulation)

The revised template for the Annex ZA for construction product standards has been implemented.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope

This European Standard specifies the essential characteristics for the following types of floor coverings:

- resilient floor coverings, excluding loose-laid mats;
- textile floor coverings, excluding loose-laid (barrier) mats, runners and rugs;
- laminate floor coverings;
- modular multilayer floor coverings.

These types of floor coverings may or may not be formulated to enhance the performance of one or more essential characteristics.

These types of floor coverings are intended for internal use as floor coverings within a building according to the manufacturer's specifications.

For these types of floor coverings this European standard specifies the assessment methods for determination of performances of the essential characteristics, the ways of expressing their performance, the systems for assessment and verification of constancy of performance (AVCP) their marking.

This standard does not specify requirements of floor coverings, which are not related to the essential characteristics as defined in Regulation (EU) No 305/2011.

This standard does not cover installation or maintenance of the floor coverings.

2 Normative references

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

EN 312:2010, *Particleboards — Specifications*

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

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

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

EN 1122, *Plastics - Determination of cadmium — Wet decomposition method*

EN 1307, *Textile floor coverings — Classification*

EN 1815, *Resilient and laminate 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, *Resilient floor coverings — Vocabulary*

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*

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*

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

EN 13238:2010, *Reaction to fire tests for building products — Conditioning procedures and general rules for selection of substrates*

EN 13501-1:2007+A1:2009, *Fire classification of construction products and building elements — Part 1: Classification using data from reaction to fire tests*

EN 13553:2017, *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 13329, *Laminate floor coverings — Elements with a surface layer based on aminoplastic thermosetting resins — Specifications, requirements and test methods*

CEN/TR 14823, *Durability of wood and wood-based products — Quantitative determination of pentachlorophenol in wood — Gas chromatographic method*

CEN/TS 15447, *Mounting and fixing in reaction to fire tests under the Construction Products Directive*

CEN/TS 15968, *Determination of extractable perfluorooctanesulphonate (PFOS) in coated and impregnated solid articles, liquids and fire fighting foams — Method for sampling, extraction and analysis by LC-qMS or LC-tandem/MS*

EN 16516, *Construction products: Assessment of release of dangerous substances — Determination of emissions into indoor air*

EN 62321-1, *Determination of certain substances in electrotechnical products — Part 1: Introduction and overview (IEC 62321-1)*

EN ISO 139, *Textiles — Standard atmospheres for conditioning and testing (ISO 139)*

EN ISO 9239-1:2010, *Reaction to fire tests for floorings — Part 1: Determination of the burning behaviour using a radiant heat source (ISO 9239-1:2010)*

EN ISO 10456, *Building materials and products — Hygrothermal properties — Tabulated design values and procedures for determining declared and design thermal values (ISO 10456)*

EN ISO 10581, *Resilient floor coverings — Homogeneous poly(vinyl chloride) floor covering — Specifications (ISO 10581)*

EN ISO 10582, *Resilient floor coverings — Heterogeneous poly(vinyl chloride) floor coverings — Specification (ISO 10582)*

EN ISO 10595, *Resilient floor coverings — Semi-flexible/vinyl composition (VCT) poly(vinyl chloride) floor tiles — Specification (ISO 10595)*

EN ISO 11925-2:2010, *Reaction to fire tests — Ignitability of products subjected to direct impingement of flame — Part 2: Single-flame source test (ISO 11925-2:2010)*

EN ISO 14362-1, *Textiles — Methods for determination of certain aromatic amines derived from azo colorants — Part 1: Detection of the use of certain azo colorants accessible with and without extracting the fibres (ISO 14362-1)*

CEN ISO/TS 16179, *Footwear — Critical substances potentially present in footwear and footwear components — Determination of organotin compounds in footwear materials (ISO/TS 16179)*

CEN ISO/TS 16186, *Footwear — Critical substances potentially present in footwear and footwear components — Test method to quantitatively determine dimethyl fumarate (DMFU) in footwear materials (ISO/TS 16186)*

EN ISO 18219, *Leather — Determination of chlorinated hydrocarbons in leather — Chromatographic method for short-chain chlorinated paraffins (SCCP) (ISO 18219)*

EN ISO 24011, *Resilient floor coverings — Specification for plain and decorative linoleum (ISO 24011)*

EN ISO 26986, *Resilient floor coverings — Expanded (cushioned) poly(vinyl chloride) floor covering — Specification (ISO 26986)*

ISO 390:1993, *Products in fibre-reinforced cement — Sampling and inspection*

ISO 1766, *Textile floor coverings — Determination of thickness of pile above the substrate*

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

ISO 2424, *Textile floor coverings — Vocabulary*

ISO 6356:2012, *Textile and laminate floor coverings — Assessment of static electrical propensity — Walking test*

ISO 8302, *Thermal insulation — Determination of steady-state thermal resistance and related properties — Guarded hot plate apparatus*

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, ISO 2424 and the following apply.

3.1

family of products

range of products within defined limits of variability defined by the manufacturer or by a technical specification of the product parameters and, if relevant, end-use parameters for which essential characteristics remain unchanged

4 Essential characteristics

4.1 Reaction to fire

4.1.1 General

The reaction-to-fire performance of a given type of floor coverings, as specified in the respective EN product standard (see the list in Annex A), shall be classified according to the requirements of EN 13501-1, based on one of the following options:

- a) either without the need for testing (CWT), according to 4.1.2; or
- b) based on results of the test method(s), relevant to specific reaction to fire class, as specified in 4.1.3.1.

4.1.2 Classification without the need for testing (CWT)

The reaction to fire performance of a given type of floor coverings is automatically classified E_{FL} , when meeting the requirements for that type of floor coverings, as specified in the following tables: in Table 1 for the laminate floor coverings, in Table 2 for the textile floor coverings and in Table 3 for the resilient floor coverings.

Alternatively, graphic symbol may be used for expressing the performance of this characteristic. In this case, the pictogram for the class E_{FL} , specified in Annex I, shall be used.

Table 1 — Classes of reaction to fire performance¹ of laminate floor coverings

Floor covering type ^a	Product detail	Min. density kg/m ³	Min. overall thickness mm	Class ^b Floorings
Laminate floor coverings	Laminate floor coverings manufactured in accordance with EN 13329 ¹	800	6,5	E_{FL}

^a Floor covering loose laid over any wood based substrate $\geq D-s2$, $d0$, or any substrate of class $A2-s1$, $d0$.

^b Class as provided for in Table 2 to the Annex to Commission Delegated Regulation (EU) 2016/364.

¹ See Table 2 of Commission Decision 2005/610/EC, of 9 August 2005

Table 2 — Classes of reaction to fire performance of textile floor coverings²

Floor covering type ^a	Product standard	Class Floorings ^b
Textile floor coverings and carpet tiles ^c	EN 1307 ¹	E _{FL}
^a Floor covering glued or loose laid over a class A2-s1, d0 substrate. ^b Class as provided for in Table 2 to Commission Delegated Regulation (EU) 2016/364. ^c Textile floor coverings having a total mass of max 4 800 g/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 SBR³-foam backing, a total mass of > 780 g/m². All polypropylene carpets with other foam backings are excluded.		

Table 3 — Classes of reaction to fire performance of resilient floor coverings⁴

Floor covering type ^a	EN Product standard	Min. mass (g/m ²)	Max. mass (g/m ²)	Min. overall thickness (mm)	Class ^b Floorings
Plain and decorative linoleum	EN ISO 24011 ⁵	2 300	4 900	2	E _{FL}
Homogeneous polyvinyl chloride floor coverings	EN ISO 10581 ⁶	2 300	3 900	1,5	E _{FL}
Heterogeneous polyvinyl chloride floor coverings	EN ISO 10582 ⁷	2 300	3 900	1,5	E _{FL}
Polyvinyl chloride floor coverings with foam layer	EN 651	1 700	5 400	2	E _{FL}
Polyvinyl chloride floor covering with cork-based backing	EN 652	3 400	3 700	3,2	E _{FL}
Expanded (cushioned) polyvinyl chloride floor coverings	EN ISO 26986 ⁷	1 000	2 800	1,1	E _{FL}
Semi-flexible polyvinyl chloride tiles	EN ISO 10595 ⁸	4 200	5 000	2	E _{FL}
Linoleum on corkment backing	EN 687	2 900	5 300	2,5	E _{FL}

² See Table 4 of Commission Decision 2005/610/EC, of 9 August 2005³ Styrene Butadiene Rubber⁴ See Table 3 of Commission Decision 2005/610/EC, of 9 August 2005⁵ Original reference EN 548 is superseded by EN ISO 24011⁶ Original reference EN 649 is superseded by EN ISO 10581 (homogeneous polyvinyl chloride floor coverings) and EN ISO 10582 (heterogeneous polyvinyl chloride floor coverings)⁷ Original reference EN 653 is superseded by EN ISO 26986⁸ Original reference EN 654 is superseded by EN ISO 10595

Floor covering type ^a	EN Product standard	Min. mass (g/m ²)	Max. mass (g/m ²)	Min. overall thickness (mm)	Class ^b Floorings
Homogeneous and heterogeneous smooth rubber floor coverings with foam backing	EN 1816	3 400	4 300	4	E _{FL}
Homogeneous and heterogeneous smooth rubber floor coverings	EN 1817	3 000	6 000	1,8	E _{FL}
Homogeneous and heterogeneous relief rubber floor coverings	EN 12199	4 600	6 700	2,5	E _{FL}
^a Floor covering loose laid over any wood based substrate ≥ D-s2, d0, or any substrate of class A2-s1, d0. ^b Class as provided for in Table 2 to Commission Delegated Regulation (EU) 2016/364.					

4.1.3 Classification according to the test results

4.1.3.1 General

The reaction to fire performance of a given type of floor coverings shall be determined on a base of results of the test(s), performed in accordance with the relevant method(s), which is(are) specified, for the claimed reaction to fire in the standard(s), referred in EN 13501-1:2007+A1:2009, with exception of class F_{FL}, which shall be tested according to EN ISO 11925-2:2010 ⁹.

Before performing of some of these test(s), the test specimen used shall be prepared and conditioned according to 4.1.3.2 and a family of certain type of floor coverings defined, used for selection of test, according to 4.1.3.3.

Based on the test results obtained, the reaction to fire performance of a given type of floor coverings shall be classified, using the classification system according to EN 13501-1, and expressed as the class achieved. Additionally, for all classes with exception of E_{FL} and F_{FL}, the type of substrate used (4.1.3.2.2) and the method of affixation of the floor covering to the substrate (4.1.3.2.3) shall be expressed.

a) Alternatively to (4.1.3.2.2), the type of substrate may be expressed as:

- NCS, for the non-combustible type of substrate defined in 4.1.3.2.2 a);
- CS, for the combustible type of substrate defined in 4.1.3.2.2 b).

b) Alternatively to (4.1.3.2.3), the method of affixation may be expressed as

- G, for the glued method of affixation defined in 4.1.3.2.3 a);
- L, for the loose-laid method of affixation as defined in 4.1.3.2.3 b).

Alternatively, graphic symbol may be used for expressing the performance of this characteristic for a given type of substrate and given method of affixation. In this case, the pictogram for the achieved reaction to fire class, specified in Annex I, shall be used.

⁹ Commission Delegated Regulation (EU) 2016/364 on the classification of the reaction to fire performance of construction products

4.1.3.2 Specimen preparation and conditioning

4.1.3.2.1 General

The test specimens shall be prepared in accordance with the relevant test method(s), specified for claimed class in the standard(s), referred in EN 13501-1, considering also CEN/TS 15447.

The following information on the floor covering to be tested shall be provided for specimen preparation, conditioning and testing:

- density or mass per area;
- construction;
- generic composition, including the presence of any flame retardant;
- thickness.

4.1.3.2.2 Type of substrate

At least one of the two standard substrates, specified for floorings in EN 13238:2010, shall be selected according to the intended end use of the floor coverings:

- a) Non-combustible substrate, comprised of a fibre cement board (in accordance with ISO 390:1993) with thickness (8 ± 2) mm, with density $(1\ 800 \pm 200)$ kg/m³ and with class A2_{FL}-s1 (tested according to EN ISO 9239-1:2010 as flooring but without a substrate);

or

- b) Combustible substrate, comprised of a not fire retardant treated particleboard (in accordance with EN 312:2010) with thickness (20 ± 2) mm, with density (680 ± 50) kg/m³ and with class C_{FL}-s1 (tested according to EN ISO 9239-1:2010 as flooring but without a substrate).

4.1.3.2.3 Method of affixation

The method of affixation (e.g. adhesive) of the floor covering to the substrate shall be representative of end use application:

- a) glued, using a generic type¹⁰ of adhesive;

or

- b) loose laid (i.e. no adhesive is used).

4.1.3.2.4 Other

In the case of textile floor coverings, when a flame retardant has been directly applied to the exposed use surface of a floor covering by spray, foam or other technology, the specimen shall be subjected to a laboratory cleaning procedure prior to testing. The spray-extraction cleaning procedure according to ISO 11379 shall be used with the following modifications:

- a) the specimens shall be cleaned three times, with an interval of (120 ± 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;

¹⁰ See EN 13501-1:2007+A1:2009, Clause 15.

- for the second stroke: operate the machine only as an extraction machine;
- b) the first cleaning cycle shall be carried out using the reference cleaning solution at ambient temperature (25 ± 10) °C and the second and third cleaning cycles with water at ambient temperature without any addition of chemicals.

4.1.3.3 Application rules

When defining a family of a particular type of floor coverings with regard to their reaction to fire performance, the floor coverings parameters, influencing such performance, as given in D.1, shall be taken into account.

If the specimen is mounted to a substrate using an adhesive, the test result is valid also for other adhesives of the same generic type, in end use conditions, according to EN 13501-1.

If the specimen is tested in combination with a substrate without using an adhesive, the test result is valid for the tested floor covering with and without using adhesives in end use conditions.

If the specimen is tested on not fire retardant treated particleboard substrate the test result for the tested floor covering is also valid for end-use conditions on fibre cement board.

4.2 Content of dangerous substances

4.2.1 General

Resilient, textile, laminate and modular multilayer floor coverings shall be evaluated with respect to their content of dangerous substances. This shall be done:

- without testing, based on a manufacturer declaration and supplier declarations (assessment without testing, 4.2.2.2);

or

- based on calculation (assessment by calculation, 4.2.2.3.2);

or

- based on testing (assessment by testing, 4.2.2.3.3).

When assessing the content of dangerous substances of a floor covering, the parameters influencing such performance, as given in D.2, shall be taken into account.

When declaring the performance based on manufacturer declaration and supplier declarations, the provisions stated in Annex G shall be used.

The term “dangerous substances” refers to either individual substances or to mixtures containing dangerous substances¹¹.

4.2.2 Content of specific dangerous substances

4.2.2.1 General

A list of specific dangerous substances, which are known to occur in resilient, textile, laminate, and modular multilayer floor coverings, or the raw materials and constituent products used for manufacturing thereof, is provided in Table 4.

¹¹ Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures (CLP).

NOTE Most of these substances are also classified as carcinogenic and mutagenic (CM) substances of category 1A and 1B ¹¹.

4.2.2.2 Assessment without calculation or testing

If any of the substances or groups of them listed in Table 4 are known to not be present in the product, as assessed by manufacturer declaration and based on supplier declarations for raw materials or constituent products used for the manufacturing of the floor covering product, then the performance shall be expressed as 'compliant, not actively added'.

Alternatively, graphic symbol may be used for expressing the performance of this characteristic. In this case, the respective pictogram specified in Annex I, shall be used.

4.2.2.3 Assessment based on calculation or testing

4.2.2.3.1 General

If one or more substances or groups of them, listed in Table 4, are either actively added during the production process of the floor covering or they are present in the raw materials or constituent products, or it is known they may occur in any stage of the production process, their content of such substance in the floor covering shall be determined either

- by calculation, according to 4.2.2.3.2;

or

- by testing, according to 4.2.2.3.3.

4.2.2.3.2 Assessment based on calculation

The content of each of the dangerous substances or group of them, listed in Table 4, shall be determined individually and for the final floor covering product, using a standard calculation method.

a) If any dangerous substances or group of them, listed in Table 4, is added during the manufacturing of a floor covering product, then the content of such dangerous substances or group of them in the floor covering product shall be calculated based on:

- the amount of product added to the manufacturing process (x_m);

and

- the amount of product consumed during the manufacturing process (x_c).

The net amount of this dangerous substance or group of, listed in Table 4, retained in the product after manufacturing, x_n , with

$$x_n = x_m - x_c,$$

shall be calculated in mg/kg.

b) If any dangerous substances or group of them, listed in Table 4, is present in any of the raw materials or constituent products of a floor covering product, then the content of such dangerous substances or group of them in the floor covering product shall be calculated based on:

- the content of the raw material, x_r , or constituent product, x_{cp} , in the floor covering product;

- the content of the dangerous substance or group of them, listed in Table 4, in the raw material, $x_{S,r}$, or constituent product, $x_{S,cp}$.
- c) The net amount of dangerous substance or group of, listed in Table 4, in the product after manufacturing, x_n , shall be calculated for the sum of all raw materials and constituent products used for the manufacturing of the floor covering product, according to

$$x_n = \Sigma (x_{S,r} \cdot x_r) + \Sigma (x_{S,cp} \cdot x_{cp}),$$

and shall be reported in mg/kg.

Depending on the reported content of each of such substances or group of them, the performance of this characteristic shall be expressed:

- 1) as a uniform indication 'compliant, actively added', when the content of none of such substances or of group of them, exceeds the respective threshold value(s), listed in Table 4,

Alternatively, graphic symbol may be used for expressing the performance of this characteristic. The respective pictogram specified in Annex I, shall be used.

or

- 2) with the name of each individual substance and its content value (in mg/kg), when the content of such substance or of group of them, exceeds the respective threshold value(s), listed in Table 4.

4.2.2.3.3 Assessment based on testing

- a) The content of each of the substances, listed in Table 4 and presented in the floor coverings in the forms explained above, as indicated in 4.2.2.3.1, shall be determined individually by testing according to respective test method, specified in Table 4, and the resulting content reported.
- b) Depending on the reported content of each of such substances, the performance of this characteristic shall be expressed:

- 1) as a uniform indication 'compliant, actively added', when the content of none of such substances or of group of them, exceeds the respective threshold value(s), listed in Table 4,

Alternatively, graphic symbol may be used for expressing the performance of this characteristic. The respective pictogram specified in Annex I, shall be used.

or

- 2) with the name of each individual substance and its content value (in mg/kg), when the content of such substance or of group of them, exceeds the respective threshold value(s), listed in Table 4.

Table 4 — Content of dangerous substances: Test methods and requirements

Substance	CAS number	Floor covering type ^e	Test method	Threshold values
Pentachlorophenol (PCP)	87-86-5	R, T	See Annex B	≤ 5 mg/kg
		L, M	CEN/TR 14823	≤ 5 mg/kg
Phthalates:	-	R, T, L, M	See Annex F	Sum of listed phthalates ≤ 1 000 mg/kg
Benzyl butyl phthalate (BBP)	85-68-7			
Bis(2-ethylhexyl)phthalate (DEHP)	117-81-7			
Dibutylphthalate (DBP)	84-74-2			
Short chain chlorinated paraffins (C10-13, SCCP)	85535-84-8	R, T, L, M	EN ISO 18219 ^a	≤ 1 000 mg/kg ^b
Medium chain chlorinated paraffins (C14-17, MCCP)	85535-85-9	R, T, L, M	EN ISO 18219 ^a	≤ 1 000 mg/kg ^b
Pentabromodiphenylether	32534-81-9	R, T, L, M	EN 62321-1	≤ 1 000 mg/kg
Octabromodiphenylether	32536-52-0	R, T, L, M	EN 62321-1	≤ 1 000 mg/kg
Decabromodiphenylether	1163-19-5	R, T, L, M	EN 62321-1	≤ 1 000 mg/kg
Cadmium	7440-43-9	R, T, L, M	EN 1122 Total digestion of sample by hydrofluoric acid, followed by atomic absorption spectroscopy (AAS) or inductively coupled plasma (ICP)	≤ 100 mg/kg
Lead	7439-92-1	R, T, L, M	EN 1122 Total digestion of sample by hydrofluoric acid, followed by atomic absorption spectroscopy (AAS) or inductively coupled plasma (ICP).	≤ 1 000 mg/kg
PAH (polycyclic aromatic hydrocarbons)	-	R, T, L, M	See Annex E	individual PAH ≤ 1mg/kg
Benzo[a]pyrene	50-32-8			
Benzo[e]pyrene	192-97-2			
Benzo[a]anthracene	56-55-3			
Dibenzo[a,h]anthracene	53-70-3			
Benzo[b]fluoranthene	205-99-2			

Substance	CAS number	Floor covering type ^e	Test method	Threshold values
Benzo[k]fluoranthene	205-82-3			
Benzo[j]fluoranthene	207-08-9			
Chrysene	218-01-9			
Organostannic (organotin) compounds	-	R, T, L, M	CEN ISO/TS 16179	Sum of all organotin compounds listed ≤ 1 000 mg/kg
Tri-substituted organostannic compounds	-			
Dibutyltin (DBT)	1002-53-5			
Diocetyl tin (DOT)	15231-44-4			
Azo-colorants which can form the carcinogenic amines listed in Annex H	-	T, M ^c R, L, M ^d	EN ISO 14362-1 Not relevant	≤ 30 mg/kg
Perfluoro-octanoic acid (PFOA), salts and esters of PFOA	335-67-1	R, T, L, M	CEN/TS 15968	≤ 1 000 mg/kg
Dimethylfumarate	624-49-7	T, L, M R	CEN ISO/TS 16186 Not relevant	≤ 1 000 mg/kg

^a Contents of SCCP and MCCP can only be determined together, as separation with the existing test method is not possible.
^b In addition, also the sum of contents of SCCP and MCCP shall be ≤ 1000 mg/kg.
^c Relevant for modular multilayer floor covering with a textile use surface only.
^d Not applicable for modular multilayer floor covering with a non-textile use surface
^e R = resilient,
T = textile,
L = laminate,
M = modular multilayer

4.3 Emission of dangerous substances into indoor air

4.3.1 General

Resilient, textile, laminate and modular multilayer floor coverings shall be evaluated concerning their emission of the following dangerous substances:

- volatile organic compounds (VOC), with exception of formaldehyde, as specified in 4.3.2; and
- formaldehyde (HCHO), as specified in 4.3.3.

When assessing the emission of these dangerous substances, the parameters influencing such performance, as given in D.3, shall be taken into account.

4.3.2 Emissions of volatile organic compounds (VOC) with exception of formaldehyde

Emission of volatile organic compounds (VOC) from a floor covering product shall be determined in accordance with EN 16516:2017. The performance of this characteristic shall be expressed with value, in mg/m^3 , and name of the respective characteristic.

4.3.3 Emissions of formaldehyde (HCHO)

4.3.3.1 Assessment without testing

If formaldehyde is neither used in the manufacturing process of the floor covering nor existing in any of its raw materials and is known not to occur in any stage of the production process, then performance of this characteristic shall be based on a manufacturer declaration and supplier declarations and expressed, without testing, as the emission of formaldehyde class E1, as specified in Table 5.

Alternatively, graphic symbol may be used for expressing the performance of this characteristic. In this case, the respective pictogram specified in Annex I, shall be used.

4.3.3.2 Assessment based on testing

If formaldehyde is used in the manufacturing process of the floor covering or exists in any of its raw materials or is known that it may occur in any stage of the production process, the emission of formaldehyde in the floor covering shall be determined by testing in accordance with either:

- a) EN 717-1;
- b) EN 16516.

Depending on the test results the performance of this characteristic shall be expressed as formaldehyde emissions class E1 or E2, considering the respective threshold requirements, specified in Table 5.

Alternatively, graphic symbol may be used for expressing the performance of this characteristic. In this case, the respective pictogram specified in Annex I, shall be used.

Table 5 — Classes for formaldehyde emissions (E-classes)

Class	Requirements EN 717-1	Requirements EN 16516
E1	Equilibrium concentration in the air of the test chamber $\leq 0,12 \text{ mg}/\text{m}^3$	$\leq 0,12 \text{ mg}/\text{m}^3$
E2	Equilibrium concentration in the air of the test chamber $> 0,12 \text{ mg}/\text{m}^3$	$> 0,12 \text{ mg}/\text{m}^3$

4.4 Water-tightness

The water-tightness performance of the resilient floor coverings shall be determined by test according to EN 13553:2017, Annex A.

If at the bottom surface of the test specimen after the test is finished, there is no sign of penetrating water, the resilient floor coverings may be considered water-tight and the related performance expressed as “compliant”.

Alternatively, graphic symbol may be used for expressing the performance of this characteristic. In this case, the respective pictogram specified in Annex I, shall be used.

NOTE Applicable to resilient floor coverings only.

4.5 Slip resistance

The slip resistance performance of a floor covering, shall be determined by test as dynamic coefficient of friction, μ , in accordance with EN 13893 under dry and non-contaminated conditions.

NOTE The slip resistance performance of 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. For this reason, it is only possible to determine the slip resistance performance of a floor covering before its installation (ex-factory) and under dry and non-contaminated conditions. Guidance on the reduction of slip hazards is given in Annex C.

When determining the slip resistance performance of the textile floor coverings, the floor covering parameters, influencing such performance, as given in D.4, shall be taken into account.

The coefficient of friction, μ , shall be declared, depending on the obtained result, as:

a) $\mu < 0,30$;

or

b) $\mu \geq 0,30$.

Alternatively, graphic symbol may be used for expressing the performance of this characteristic. In this case, the respective pictogram specified in Annex I, shall be used.

4.6 Electrical behaviour

4.6.1 General

Electrical behaviour of the floor coverings, determined as antistatic, static dissipative or conductive performances, shall be individually determined by test results and in accordance with the test methods, as specified in the standards, listed in Table 6, column (3), under test conditions, specified in Table 6, column (4). The individual results shall be evaluated according to the relevant assessment requirements, listed in Table 6, column (5), and the respective performance shall be expressed as one of the indications, given also in Table 6, column (6).

Alternatively, graphic symbol may be used for expressing the performance of this characteristic. In the case of the referenced expression, specified in Table 6, the respective pictogram specified in Annex I, shall be used.

When determining the performances related to the electrical behaviour of the textile floor coverings, the parameters influencing such performance, as given in D.5, shall be taken into account.

Table 6 — Requirements for floor covering for antistatic, dissipative or conductive performance

Electrical behaviour	Floor coverings types ^a	Specification with test methods	Test conditions	Assessment requirements	Ways of expression of the performance
(1)	(2)	(3)	(4)	(5)	(6)
Antistatic	R	EN 1815	Directly on metal base plate and at 25 % RH	$BV^b \leq 2,0 \text{ kV}$	“Body Voltage $\leq 2,0 \text{ kV}$ ” or “Antistatic” or graphic symbol (Annex I)
	L, M	EN 1815 or ISO 6356:2012, Method A	PE foil/foam on metal base plate at 25 % RH		
	T	ISO 6356:2012 Method A	Rubber mat on metal base plate and at 25 % RH		
Static dissipative	R, L, M	EN 1081	$\leq 50 \text{ % RH}$	$VRC^c \leq 1,0 \times 10^9 \Omega$	“Vertical resistance $\leq 1,0 \times 10^9 \Omega$ ” or “Static dissipative” or graphic symbol (Annex I)
	T	ISO 10965	25 % RH		
Conductive	R, L, M	EN 1081	$\leq 50 \text{ % RH}$	$VRC^c \leq 1,0 \times 10^6 \Omega$	“Vertical resistance $\leq 1,0 \times 10^6 \Omega$ ” or “Conductive” or graphic symbol (Annex I)
	T	ISO 10965	25 % RH		

^a Floor coverings types: R – resilient; L – laminate; T – textile; M – modular multilayer.

^b BV = Body voltage (in kV), for antistatic performance.

^c VR = Vertical resistance (in Ω), for static dissipative and conductive performances.

4.6.2 Specimen preparation and conditioning

The test specimen of the floor coverings shall be prepared and conditioned in accordance with the respective test method(s), as specified in the standards, listed in Table 6, column (3).

In the case of textile floor coverings, when an antistatic or static dissipative additive has been directly applied to the exposed use surface of a floor covering by spray, foam or other technology, the test specimen shall be subjected to a laboratory cleaning procedure prior to testing. The spray-extraction cleaning procedure according to ISO 11379 shall be used with the following modifications:

- the specimens shall be cleaned three times, with an interval of (120 ± 15) min between cycles, each cleaning cycle consisting of two strokes: