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Construction Products — Assessment of release of dangerous substances — Use of harmonised horizontal assessment methods

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National foreword

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Produits de construction - Évaluation de l'émission de substances dangereuses - Utilisation de méthodes d'évaluation horizontales harmonisées

Bauprodukte - Bewertung der Freisetzung von gefährlichen Stoffen - Verwendung harmonisierter horizontaler Bewertungsmethoden

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Foreword

This document (CEN/TR 16496:2013) has been prepared by Technical Committee CEN/TC 351 “Construction products - Assessment of release of dangerous substances”, the secretariat of which is held by NEN.

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

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

This Technical Report gives guidance for the selection and integration of the recommended horizontal product testing protocols on dangerous substances harmonised by CEN/TC 351 into hENs and EADs. Since the work in CEN/TC 351 in cooperation with the European Commission and its Expert Group on Dangerous Substances (EGDS) and the product TCs is a work in progress, some subjects and issues remain open for the time being. However, the results of the work of CEN/TC 351 are now mature enough for practical implementation in product standards and EADs.

This document takes into account relevant information that had become available by March 2013 through the activities in the working groups and task groups of CEN/TC 351 as well as the guidance provided by the European Commission.

This document is intended as easy-to-use guidance especially for product TCs and EOTA Working Groups (or equivalent groups under the Construction Products Regulation). Where reference is made to ‘Product TCs’, EOTA WGs are also meant where appropriate.

1 Introduction

1.1 General

The Construction Products Directive 89/106/EEC (CPD) contained six essential requirements for works that gave rise to a number of 'essential characteristics' for products that had to be covered by European Technical Specifications (ETS) for construction products (harmonised European Standards (CEN) and European Technical Approvals (EOTA)). As derogation from this rule, essential requirement No 3 “Hygiene, health and the environment” (ER3) was dealt with via a convention in the ETS which did not take it directly into account, mainly due to the absence of European harmonised test methods. In order to solve this problem, the European Commission gave CEN, the European Committee for Standardization, a mandate (M/366) in 2005 to develop European harmonised test methods for the assessment of release or emission of dangerous substances from construction products.

From July 2013 the CPD has been replaced by the Construction Products Regulation (Regulation (EU) No 305/2011, CPR). The fundamental principles of the CPR are the same as for the CPD. The CPR now refers to basic requirements for construction works (BRCWs) instead of ERs, but the same six functional requirements as for the CPD are still there, supplemented by a seventh, the “Sustainable use of natural resources”, and BRCW 3 is extended to the construction and demolition phase. However, it is expected that the work in CEN/TC 351 according to mandate M/366 will be carried out under the terms and conditions of the CPD with a focus on release and emission in the use phase of construction works.

Mandate M/366 requires that CEN develops horizontal test methods that, as far as possible, are based on existing test methods. This means that European harmonised test methods will not be developed for each construction product separately. The methods should be preferably applicable to all constructions products as defined in the CPR as far as they are covered by BRCW 3. The intention is to avoid the unnecessary and onerous development of product specific test standards for a multitude of construction products and to minimise the amount of costly testing. The horizontal approach is described in detail in CEN/TR 16098.

Furthermore, according to the guidance of the EC (Decision 192, CEN/TC 351 meeting in Berlin on 2013-02-11/12), CEN/TC 351 is asked to provide horizontal methods reflecting the state of the art. Different test methods or testing options can be considered by CEN/TC 351 when technically justified because of different conditions of use, different end uses or product characteristics, but not because of differences in regulations.

In order to apply the horizontal test methods correctly to individual construction products, some product specific additions remain necessary. For example, aspects such as pre-treatment and preconditioning of test specimens cannot be completely specified horizontally but require product specific additions. The necessary product specific additions to the horizontal test standards must be included in the harmonised product standards for the implementation of BRCW 3.

The European Commission has recently amended ten and is currently amending some further existing construction product mandates issued to CEN to include detailed requirements for BRCW 3. The updated mandates include the requirements for each harmonised product standard. For each hEN or mandated prEN, the relevant release/emission scenarios and the relevant regulated dangerous substances[1)] are listed. The CEN product TCs are obliged to amend their product standards using the mandate amendments as a checklist for including BRCW 3-related requirements.

This Technical Report (TR4 of mandate M/366) gives instructions on which aspects related to the horizontal test methods are important to address when amending product standards. The report is intended as guidance for CEN product TCs for the revision of product standards in regard to dangerous substances. The report focuses on the use of the harmonised test standards. The

1) The term regulated dangerous substances refers to dangerous substances for which performance criteria have been defined in notified regulations in the EEA.

possibilities to avoid testing through the use of e.g. descriptive elements like positive or negative lists in product standards are not covered by this report. With respect to this issue, the product TCs may consult the guidance given by the European Commission including the amended product mandates.

The examples described in Annex A and Annex B show how the guidance given in this Technical Report can be adopted in a product standard. They illustrate a possible way to implement the horizontal test standards of CEN/TC 351 into product standards by product TCs. The examples are inspired by work in progress on existing harmonised product standards. Their intention is to provide generic, non-product specific assistance; they are not the only possible solution confirmed by the powers that be.

1.2 Mandate amendment for BRCW 3 and the product TC's answer

The European Commission describes in the amendments to the various product mandates for dangerous substances the tasks the product TCs are expected to carry out, when preparing an answer to the mandate amendment. Hereunder, as an example, the relevant text from mandate M/103 rev.1 on Thermal Insulation Products is cited[2)] the specifications in the other amendments are comparable.

Description of the mandated work

The attached annex provides an overview on national notified regulatory requirements that have been linked by several experts of the Commission's expert group on dangerous substances to products covered under mandate M/103.

CEN/TC 88 has to assess the list and to take it completely into consideration when describing and justifying its selection of substances and their relevance in its work programme, in particular on the following aspects:

- If these substances may be present in products covered by mandate M/103 and in all existing harmonised product standards or harmonised product standards under development;
- If these substances are likely to emit from the above mentioned products and if these emissions are close to existing limit values in regulations referred to in this document[6)];
- If there is available data, particularly where the above mentioned products have been tested in the past on either content or emission of these substances by national authorities/bodies[7)].

NOTE The work programme of the product TC will be used for further discussion in the EGDS between the Commission, national experts and experts of the product TC and CEN/TC 351.

CEN has to provide in existing harmonised product standards or harmonised product standards under development either

- clear and transparent definitions of products[8)] that will make further requirements for testing for dangerous substances obsolete or/and
- a set of clear and transparent requirements for products which will be laid down in product standards for these specific product families or relevant sub-families.

Execution of the mandate

The standards resulting from this amended mandate will have to be delivered by no later than 12 months after the adoption of technical specifications developed under the mandate M/366.

2) See: http://ec.europa.eu/enterprise/standards_policy/mandates/database/index.cfm?fuseaction=search.detail&id=455#

After formal acceptance of the mandate, CEN will present to the Commission within 2 months a detailed proposal for the Work Programme. Having regard to the scope of this mandate this Work Programme will include

- a selection and clear indication of substances and materials indicated in the annexes of this mandate which are considered as relevant in products covered by mandate M/103, or a justification for excluding substances or materials of the attached annex from standardization work in the relevant product TC;

- a list of all product standards considered to require declaration categories for the potential release or content of regulated dangerous substances to enable fulfilment of regulatory requirements;

- the timetable for the development and the publication of each amended standard; if not all regulated dangerous substances can be dealt with in one phase or generation of the standard, it should be explained how and when to handle the other substances and which steps still need to be taken.

[6)] The possibility of excluding products, components or substances from testing will be dealt with in detail in another document describing a system of defining products “Without Testing” or “Without Further Testing”.

[7)] If products have not been subject to testing for dangerous substances (or specific substances now mentioned in this document have not been assessed in the past), it will be helpful to assess the priority given by regulators or the lack of useful technical instruments for the assessment, but does not necessarily indicate that Member State authorities might not insist on these specific requirements during the development of a standard or *after* it has been finalised. Therefore, each substance should be assessed carefully by the TC and in case of doubt clarification should be requested from the Commission.

[8)] If necessary with regard to materials, constituents, admixtures, etc.

1.3 FAQs on mandate amendments for dangerous substances

These questions on mandate amendments were posed in the CEN/TC 351/TG2 workshop on 8 March 2011 by the representatives of product TCs. The answers have been provided by the Commission Services and updated afterwards to reflect the position in June 2012.

1. *Can a product TC incorporate the forthcoming TS test methods from CEN/TC 351 into its harmonised product standard(s) or should the product TC wait until a fully validated EN test method from CEN/TC 351 is available?*

   The mandate amendments ask for the technical specifications of CEN/TC 351 to be incorporated within one year of their availability (i.e. until end of 2014 at the latest according to the current time table of CEN/TC 351). All product TCs with relevant mandate amendments are expected to incorporate the TS test methods into their hEN, where relevant, after acceptance by the European Commission of the work programme to the mandate amendment. The TS test methods can first be added to the voluntary part of the standard if the product TC wishes to wait for fully validated EN test methods before incorporating clauses on the new test methods into Annex ZA. Conversely, the product TC may incorporate clauses into Annex ZA which directly refer to the TS methods, if it wishes to do so.

   If the fully validated EN test methods of CEN/TC 351 should not become available until the second half of 2016, the TS methods are considered established enough to be called up by Annex ZAs as a mandatory basis for declaring the performance of a product in regard to dangerous substances. This deadline is intended to ensure that a potential delay of the full validation of the CEN/TC 351 test methods does not further delay the implementation of the mandate amendments. As soon as the EN test methods become available, they must be used. For the change from TS to EN test method in a hEN product standard, a corrigendum is adequate and a full revision of the hEN is not necessary.

2. *Which system of attestation of conformity/assessment and verification of constancy of performance will be applied to BRCW 3?*

The AoC/AVCP system(s) will remain the same as in the original product mandate. Member States may ask the Commission to introduce another AoC/AVCP system via a Commission Decision (legal act). So far such requests have not been made.

3. *When will notified bodies become available for the new test methods for dangerous substances?*

A sector group for dangerous substances has been set up in the Group of Notified Bodies. It is expected that member states will be able to nominate notified bodies for the new test methods as soon as they are available as CEN/TS (from end of 2013). According to Annex V of the CPR a reference to a harmonised product standard is not necessary when nominating notified bodies for horizontal characteristics such as dangerous substances.

4. *What should the product TC do, when new national regulations for dangerous substances concerning its products emerge after the TC has received its mandate amendment?*

The product TC may deal with any additional requirement in its draft answer (work programme) to the mandate amendment. Furthermore, a product TC could inform the Commission about new national requirements that come to its attention at a later stage. However, the product TC is not obliged to take any new requirements into account formally before the Commission Services have revised the mandate amendment for dangerous substances accordingly.

5. *Is it foreseen that a TC may create its own classes or levels for the declaration of test results according to the new CEN/TC 351 methods?*

For the performance declaration of emissions into indoor air the Commission Services have already provided a framework for classification, which is expected to be finalised in the course of 2013. A supporting activity is currently being carried out by the DG JRC with the aim of providing harmonised reference values for VOC emissions from construction products (so called Lowest Concentrations of Interest, LCI). As soon as the harmonised LCI become available, they will form the basis for the classification of emission performance within the technical framework provided by the DG ENTR Construction Unit. For release into soil and water, the possibility of creating horizontal declaration formats is currently being scrutinised by the Commission. The classes of convenience for indoor air or other declaration formats of convenience for release into soil and water that reflect the relevant national requirements are a possible future addition to the horizontal tool kit provided by CEN/TC 351, which may become available e.g. as informative annexes in the CEN/TS or EN test methods. If a product TC has identified the need for specific classes or levels, it should contact the European Commission for further guidance and a decision.

6. *The scope of BRCW 3 (under the CPR) is wider than the scope of ER 3 (under the CPD). Has this been taken into consideration in the amendments of the product mandates? If not, how should a product TC address any additional requirements under BRCW 3?*

The amendments of the product mandates are based on the requirements under the CPD and each product TC is expected to start work under the framework of the CPD. The Commission (with the input of the EGDS) will assess in the course of 2013 if there is any need for additional testing under BRCW 3 for each product group. Only if the Commission concludes that additional requirements have to be fulfilled, the relevant product mandates will be amended, which would require additional work within specific product TCs. In this case, the methods developed for assessment of the in use phase by CEN/TC 351 may also be suitable to assess other phases of the life cycle, if considered necessary.

2 Harmonised horizontal test methods for the assessment of the release of regulated dangerous substances and the possibilities and limitations of their use

2.1 Release into soil, groundwater and surface water

2.1.1 Horizontal test methods

CEN/TC 351/WG 1 has drafted two generic horizontal testing standards for release of substances: a dynamic surface leaching test (DSLT) for leaching from monolithic, plate-like or sheet-like construction products (WI 00351009, prCEN/TS 16637-2) and an up-flow percolation test for the release of substances from granular construction products (WI 00351010, expected as prCEN/TS 16637-3).

In early 2013, the technical work on prCEN/TS 16637-2 was completed and this draft standard submitted for TC Approval. It is foreseen to be published as a Technical Specification at the beginning of 2014. It then will be subject to round robin validation. In March 2013, prCEN/TS 16637-3 was still under development.[3)]

In addition, CEN/TC 351/WG 1 is drafting a Technical Specification for CEN Product TCs and EOTA experts for selection of the appropriate release tests for their product(s) (WI 00351008, prCEN/TS 16637-1). PrCEN/TS 16637-1 gives background information on release scenarios and specific influencing factors. The general part of this Technical Specification and its content regarding prCEN/TS 16637-2 have been completed, including robustness validation, and submitted for TC Approval. Once prCEN/TS 16637-3 becomes available, prCEN/TS 16637-1 will be updated with the remaining part and the revision will be submitted for TC Approval.

PrCEN/TS 16637-2 (DSLT) determines the surface dependent leaching behaviour of monolithic or plate-like or sheet-like construction products under dynamic conditions (as a function of time). The test (DSLT) produces eluates, which can subsequently be characterised by physical, chemical and ecotoxicological methods. Organic coatings for metals are not included in the scope of the DSLT, but the validation work may lead to modifications and additional scope for use of the method. Metals and metallic coatings are so far excluded from the scope and this Technical Report (CEN/TR 16496) cannot therefore provide any guidance on this subject.[4)] A special case of the DSLT is a test for “Granular construction products with Low Hydraulic Conductivity" (GLHC). The test for GLHC is specified in an Annex of prCEN/TS 16637-2.

The prCEN/TS 16637-3 (up-flow percolation test) determines the leaching behaviour of non-volatile inorganic and organic substances from granular construction products (with or without size reduction). Granular construction products are subjected to percolation with water as a function of liquid to solid ratio under specified percolation conditions. The resulting eluates can subsequently be characterised by physical, chemical and ecotoxicological methods. Results are presented as a function of the liquid to solid ratio. The test is not suitable for substances that are volatile under ambient conditions.

These test procedures can be used for assessing release from construction products in different release scenarios. To compare test results expressed e.g. as concentrations in eluates with regulatory requirements expressed e.g. as concentrations in soil or groundwater under construction works, a modelling step is necessary. This modelling step may be different in different regulations and is not covered in the CEN/TC 351 test methods. Therefore, the test results are unlikely to be directly comparable to limit values. However, it is expected that the national regulations will evolve to express criteria which accord with the CEN/TC 351 methods.

3) Details on the availability of the standards and reports of CEN/TC 351 can be found in the CEN/TC 351 secretary's report which is updated regularly (latest version N0465. 2013-01-10).

4) Guidance could be offered if the regulatory requirements linked to BRCW 3 make it necessary. So far, no European or notified national provisions that require the determination of the leaching performance of metal products have been identified. CEN/TC 351/WG 1 has not yet harmonised any test methods for metals and metallic coatings, because mandate M/366 covers only test methods required by existing regulations.

In prCEN/TS 16637-2 and prCEN/TS 16637-3 all aspects for determining release from construction products are specified. These cover:

a) general aspects of taking laboratory samples for testing;

b) general aspects of preparing test specimens from the laboratory sample;

c) general aspects of equipment and apparatus;

d) general aspects of the leaching procedure (e.g. type of leachant, temperature, L/A ratio; collection of eluates and total duration of the test);

e) expression of test results and calculation of release;

f) general aspects of taking product laboratory samples for testing;

g) general aspects of making test specimens from the laboratory sample.

The methods for the analysis of eluates are under development in CEN/TC 351 WG 5 (see 2.4).

2.1.2 Implementation of TSs in harmonised technical specifications

It is foreseen that all relevant harmonised Technical Specifications (hEN and EADs) specify the most appropriate of the two test methods according to the rules given in prCEN/TS 16637-1 and then provide product-specific detail such as:

a) taking product laboratory samples for testing;

b) making test specimens from the laboratory sample.

2.2 Emission into indoor air

2.2.1 Horizontal test method

CEN/TC 351/WG 2 has drafted a harmonised horizontal test method for emission into indoor air (CEN/TS 16516). This method has gone through robustness validation and will be published as a Technical Specification in 2013. Based on another validation step (statistical evaluation of already performed round robin intercomparison test), the TS is expected to become a fully validated EN in 2016.

The method specifies all aspects of emission into indoor air testing that are generic. It is not expected that product specific deviations from the generic specifications will be necessary. The following aspects are covered:

a) general aspects of taking product laboratory samples for testing;

b) general aspects of making test specimens from the laboratory sample;

c) European Reference Room for which all test results are calculated, including a selection of four different product loading factors (walls, flooring or ceiling, small surfaces such as doors, very small surfaces such as sealants and sealings; see also 3.3.3);

d) operation of test chamber;

e) taking air samples from test chamber, and analysis;

f) reporting;

g) quality requirements.

2.2.2 Implementation of TS in harmonised technical specifications

It is foreseen that all relevant harmonised Technical Specifications (hEN and EADs) specify this method and then provide product specific details such as:

a) taking product laboratory samples for testing;

b) making test specimens from the laboratory sample;

c) selection of the most appropriate loading scenario.

Deviations from the generic parts of the method are not expected unless its direct application would not be meaningful with respect to the intended conditions of use for a specific product.

2.3 Radiation from construction products

CEN/TC 351/WG 3 “Radiation from construction products” is developing, as its main task, a standardized measurement method for determining the activity concentrations of three relevant naturally occurring radionuclides (gamma spectrometry). A specific convention for expressing results in the form of an activity concentration index (I), as defined in EC guidance Radiation Protection RP 112, is included in the re-cast version of the ”Council Directive laying down basic safety standards for protection against the danger arising from exposure to ionising radiation” (Basic Safety Standards, BSS) [5)] and in Austrian, Czech, Finnish and Polish regulations. This index is a screening tool for identifying materials that might be of concern. For the calculation of the activity concentration index (I) measurements for Radium-226, Thorium-232 and Potassium-40 will be required.

Work on a TS "Construction products — Assessment of release of dangerous substances — Determination of activity concentrations of Radium-226, Thorium-232 and Potassium-40 using gamma spectrometry" was approved as an active work item in the CEN/TC 351 plenary meeting in June 2011. The title clearly describes the objective but the method will also specify sampling, test sample preparation, and the execution of the test. It includes background subtraction, energy and efficiency calibration, analysis of the spectrum, calculation of the activity concentrations with the associated uncertainties, the decision thresholds and detection limits, and reporting of the results. The method described in the standard is applicable to samples from products consisting of single and multiple material increments.[6)]

In the CEN/TC 351 Workshop of 30 October 2009[7)] possible work on radon exhalation was also discussed. Radon exhalation is currently addressed only by the Austrian regulation by an indirect determination. As it’s not addressed by the other identified regulations on radiation under the scope of the CPD, it was decided not to start developing a radon exhalation measurement and dose assessment method at this stage. However, CEN/TC 351/WG 3 has been asked to deliver a state of

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5) The draft of the revised version of Basic Safety Standard Directive (BSS) was published by the European Commission in September 2011 (COM(2011) 593 fin). The draft will be discussed in the Council's Atomic Questions Group in 2013. Considering the complexity of the issues, implementation of the Directive is expected to take place not earlier than 2014-2015.

6) From the CEN/TC 351 document on Terminology, prEN 16687:
3.1.2
increment
individual portion of product collected by a single operation of a sampling device which will not be tested as a single entity, but will be mixed with other increments in a composite sample

7) The CEN/TC 351 Workshop on Radiation from Construction Products was held on 30 October 2009 in Brussels to discuss how to implement the mandated work on radiation from Mandate M/366 and to clarify how the revision of the European Basic Safety Standards Directive for radiation protection (BSS) by EURATOM interfaces with CEN/TC 351 work. Some 25 experts attended including authorities from the member states that regulate in this field, experts on construction products and on the technical aspects of radiation as well as civil servants from DG Enterprise and DG TREN. This resulted in five recommendations that were adopted by CEN/TC 351 Plenary and by the EGDS in 2010 and into the establishment of CEN/TC 351/WG 3 “Radiation from construction products”.

the art report on this issue. As this work item was considered by WG 3 experts not to have top priority and to have many uncertainties associated with it, it has been postponed and no further steps have been decided so far.

In its meeting of February 2013, CEN/TC351 decided to register the new work item "Construction Products – Assessment of Release of Dangerous Substances – Dose assessment and classifications of emitted gamma radiation" (WI 00351020) in its active programme of work, with the scope "This Technical Report discusses existing approaches on gamma dose assessment. It also presents a method for calculating the external gamma dose from construction products that could be a basis for development of a harmonised European approach for estimation of gamma radiation doses caused by construction products."

CEN/TC 351/WG 3 has limited its work to naturally occurring radioactive materials (NORM), which are also referred to in the EC guidance Radiation Protection RP112, in the revision of the European BSS directive for radiation protection and certain Member States' notified regulations.

2.4 Content of regulated dangerous substances and analysis of eluates

Requirements for content are included in many mandate amendments for dangerous substances, and can be covered in product standards either through a test (content determination), when the substances in question are used actively or are known to be possible impurities, or through a product description (use of the substance is excluded).

Additionally, the use of content determination is sometimes possible and useful in factory production control, as described in 4.2.2, as an indirect method for the evaluation of release into soil and water, or of emissions into indoor air. The challenge then is to establish a clear connection between the reference method for the release into soil and water or emissions into indoor air, and the indirect (content) method.

If the mandate amendments for product standards include requirements on content, for the time being reference should be made to the appropriate existing standards for content determination, if available. A list of standards and recommendations on how to incorporate them into a harmonised Technical Specification (hEN and EADs) is available in CEN/TR 16045, *Content of regulated dangerous substances - Selection of analytical methods*.

In the future for construction products harmonised CEN/TC 351 content test methods are expected to become available for substances covered by the mandate amendments for dangerous substances. These include the test methods mentioned in Table 1.

Table 1 — Methods under development in CEN/TC 351/WG 5

<table>
<tr><th>Eluate analysis</th><th>Content analysis</th></tr>
<tr><td>WI 00351016: Analysis of inorganic substances in eluates</td><td>WI 00351017: Digestion by aqua regia for subsequent analysis of the major, minor and trace elements
WI 00351021: Content of inorganic substances - Methods for digestion and analysis</td></tr>
<tr><td colspan="2">WI 00351018: Analysis of major, minor and trace elements in digests and eluates by Inductively Coupled Plasma - Optical Emission Spectrometry (ICP-OES)
WI 00351019: Analysis of major, minor and trace elements in digests and eluates by Inductively Coupled Plasma - Mass Spectrometry (ICP-MS)</td></tr>
<tr><td>Analysis of organic substances in eluates</td><td>Content of organic substances - Methods for extraction and analysis</td></tr>
</table>

Four general 'domains' are distinguished and for each domain a governing (supervising; 'umbrella') standard is being developed to direct and indicate the choice for the proper analysis standard to be used.

WG 5 has prepared a draft standard on digestion of construction products by aqua regia (WI 00351017) and two analysis standards for construction products for the determination of major, minor and trace elements in digests and eluates (ICP-OES, WI 00351018 and ICP-MS, WI 00351019). The latter two standards are intended for eluate analysis as well as for content analysis and are referenced in the appropriate governing standard.

3 Integration of harmonised horizontal test methods into harmonised Technical Specifications (hEN and EADs) – Issues for product TCs and EOTA

3.1 General issues

3.1.1 Definition of product types

Products covered by a hEN can be divided into different product types. The existing product standards often already contain provisions which differentiate product types. It may be useful to re-categorise/re-group existing product types to take aspects related to dangerous substances into account more easily.

Product types, newly created or re-categorised to facilitate standardization under BRCW 3 should allocate products that have the same intended use (identical release/emission scenario) and which show a similar release/emission behaviour (not identical emission ratios) into the same product type. In addition, the broad chemical composition of products in the same product type should be comparable (e.g. organic or inorganic).

New product types should only be created if the products covered by a hEN are affected in different ways, or to differing degrees, by BRCW 3 (e.g. when different release or emission scenarios are relevant) or if not all the products can or need to be tested in the same way.

3.1.2 Criteria for Without Testing/Without Further Testing (WT/WFT)

The product TCs may include criteria for WT/WFT in the hEN on the basis of a revised mandate, if the Commission has not established binding WT/WFT conditions elsewhere.

The exact procedure for the use of the possibilities of reducing testing (WT/WFT - Without Testing/Without Further Testing) against BRCW 3 has not yet been officially communicated by the European Commission. The product TCs should however use the possibility to start collecting existing data on the content and release of dangerous substances of their relevant products. This would speed up the WT/WFT request once the formal procedure has been initiated by the European Commission. This data collection would also support the work of CEN to establish WT/WFT conditions in harmonised standards.

3.1.3 Selection of horizontal Technical Classes compatible with national requirements

The declaration of release or emission performance of the construction product should be easy for the user to understand. In order to simplify the communication of test results, it is helpful to create technical classes that are able to incorporate the requirements of the member states.

So far, technical classes have not been established for dangerous substances with the exception of formaldehyde. It is expected that the European Commission will notify CEN if it is able to provide technical classes corresponding to the new test standards of CEN/TC 351 before these become formally available. Concerned product TCs should check the current status of the work on technical classes before they hand in an updated product standard for CEN enquiry/formal vote. If technical

classes are not available, country codes could be used to show compliance with the requirements of different EU member states.

3.1.4 Product sampling, packaging and transport

CEN product TCs need to specify the details on product sampling, packaging and transport in the product standard. If such clauses have already been included in the product standard there needs to be a check on whether these are also appropriate for the testing regimes instituted under BRCW 3. Instructions on how to deal with the relevant aspects are included in CEN/TR 16220 "Complement to Sampling".

3.1.5 Preparation and conditioning of test specimens and portions

CEN product TCs need to specify in the product standard the details for the preparation and conditioning of test specimens and portions, taken from the laboratory sample[8)] for the release or emission test, for the purposes of the laboratory. Instructions can be found in the CEN/TC 351 test methods (prCEN/TS 16637-2 and prCEN/TS 16637-3 for leaching, CEN/TS 16516 for emissions.)

3.1.6 Assessment of constancy of performance (“Statistical issues”)

CEN product TCs should check whether the procedures currently applied for the assessment of constancy of performance of each product appropriately cover the BRCW 3 characteristics.

TG 7 of CEN/TC 351 is harmonising methods relevant for the assessment of constancy of performance for dangerous substances. The TR of TG 7 (WI 00351013, work in progress) on statistical issues is anticipated to include further guidance to product TCs. The main issue of the TR is to show, how the (statistical) variation between products that are covered by the same Declaration of Performance can adequately be dealt with in the testing. The reference method for assessing whether the product conforms to the information on the release of dangerous substances as provided in the Declaration of Performance is described and justified.

3.2 Issues specific for release into soil, groundwater and surface water

3.2.1 Selection of the appropriate test method (prCEN/TS 16637-1)

In prCEN/TS 16637-1, advice for CEN Product TCs and EOTA experts on how to select the most appropriate available release test for specific products is given. The following steps are considered:

a) Identification of products for which a leaching test is required.

   Obligations for leaching tests for construction products may arise when the standardization mandates to CEN are amended by the European Commission to include regulated dangerous substances. As an answer to such a mandate amendment the respective CEN product TCs are requested to prepare a work programme that is used as a basis of a contract on the mandated work between CEN and the European Commission. In the work programme the product TC specifies for which products and intended uses leaching tests will be integrated into the product standards.

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8 From the CEN/TC 351 document on Terminology, prEN 16687:

3.2.1
laboratory sample:
sample or sub-sample(s) sent to or received by the laboratory

NOTE 1 When the laboratory sample is further prepared by mixing, drying, grinding or by combinations of these operations, the result is the test sample. When no preparation of the laboratory sample is required, the laboratory sample is the test sample. A test portion is removed from the test sample for the performance of the test / analysis or for the preparation of a test specimen.

NOTE 2 The laboratory sample is the final sample from the point of view of sample collection but it is the initial sample from the point of view of the laboratory.

b) Selection of test method based on general product properties.

The appropriate test method can be selected based on “general” product properties (e.g. the shape and size and composition of the product, as it appears during intended use) and a further refinement by “specific” product properties (see Figure 1 in prCEN/TS 16637-1).

3.2.2 Selection of appropriate test conditions (prCEN/TS 16637-2/prCEN/TS 16637-3)

3.2.2.1 Selection of appropriate test conditions for the DSLT (prCEN/TS 16637-2)

In prCEN/TS 16637-2 the test conditions for the dynamic surface leaching test (DSLT) are fixed. Product specific selection of test conditions is not foreseen. For the performance of the DSLT a test portion is required, consisting of at least one monolithic or plate- or sheet-like test piece. The structure, homogeneity and composition of this test portion have to be representative of the material that is to be tested. More advice is given in the prCEN/TS 16637-1 and prCEN/TS 16637-2.”

3.2.2.2 Selection of appropriate test conditions for the column test (prCEN/TS 16637-3)

For the column test, the column type has to be selected. In prCEN/TS 16637-3 advice is given as to whether a small or wide column has to be used. The use of column type is related to the particle size of the granular construction product (details are given in Table 1 of prCEN/TS 16637 -3).

NOTE Currently prCEN/TS 16637-3 is finalised by CEN/TC 351/WG 1 with the intention to give product TCs the means to allocate one single upflow-perculation test for a specific product standard.

Usually construction products should be tested as produced and used. For certain granular products a size reduction is necessary to ensure that the release mechanism in the column is similar to that under intended use conditions of the product. If the particles of the granular product to be tested in the up-flow percolation test prCEN/TS 16637-3 are oversized, the sample (or the oversized amount of the sample) has to be crushed. The conditions and procedure for size reduction of granular products will be accurately described in prCEN/TS 16637-1 and prCEN/TS 16637-3.

3.3 Issues specific for emissions into indoor air

3.3.1 Taking product laboratory samples for testing

Existing sampling procedures may not always adequately address the specific needs of sampling for emission into indoor air testing. This refers to batch-to-batch or within batch variation of volatile ingredients, the influence of manufacturing parameters (such as final drying) on VOC emissions, and the impact of non-air-tight packaging on test results.

The TS of CEN/TC 351/WG 2 (CEN/TS 16516) gives guidance on drafting a sampling plan, either based on statistical sampling, or based on judgmental informed sampling. The latter approach assumes knowledge on which parameters influence the test result. This allows taking, in a targeted manner, representative or worst-case samples depending on the manufacturing parameters. Then, fewer samples are required for achieving a representative test result than with statistical sampling.

The TS gives further guidance on sample packaging to avoid contamination during transport, on sample history and on sample documentation.

It is expected that the harmonised Technical Specification (hEN and EAD) will translate this general guidance into product specific requirements.

3.3.2 Making test specimens from laboratory samples

The TS gives only general guidance on how to make a test specimen from a laboratory sample, mainly based on EN ISO 16000-11[9)] with some additional specifications. This guidance should be taken into consideration when writing the corresponding clauses in a harmonised Technical Specification (hEN and EAD).

3.3.3 Selection of the loading factor

The TS specifies a European reference room and one related emission scenario which are used as conventional references for emission testing and for calculation of vapour concentration in indoor air.

The following conditions are fixed for the reference room and for the test chamber:

a) The exposure scenario includes:

   1) room air temperature is 23 °C;

   2) relative air humidity is 50%;

   3) air exchange is 0,5 per hour.

b) The dimensions of the reference room are:

   1) floor and ceiling both measure 3 m x 4 m resulting in surface of 12 m^2 respectively;

   2) the walls are 2,5 m high;

   3) there is one door of 2 m x 0,8 m (1,6 m^2);

   4) there is one window of 2 m^2;

   5) total wall area (less door and window) equals 31,4 m^2.

c) Total air volume in the reference room is 30 m^3.

d) This results in different loading factors (product surface per room volume) for the test, which may have to be added up depending on the intended use:

   1) 0,4 m^2/m^3 - floor or ceiling;

   2) 1,0 m^2/m^3 - walls;

   3) 0,05 m^2/m^3 - small surfaces e.g. a door;

   4) 0,007 m^2/m^3 - very small surfaces, e.g. sealants.

If the intended conditions of use imply the possibility that a product is used on more than one of the above surfaces, the product TC may choose to distinguish between different product subgroups (e.g. products for walls with loading factor 1,0, products for ceilings with loading factor 0,4, or products for walls and ceilings or walls and floors with loading factor 1,4). In a harmonised Technical Specification (hEN and EAD), the product TC is expected to select the most appropriate loading factor for the intended use under consideration, also taking into account the specifications in the notified national regulations.

9) EN ISO 16000-11, *Indoor air - Part 11: Determination of the emission of volatile organic compounds from building products and furnishing - Sampling, storage of samples and preparation of test specimens (ISO 16000-11)*

In the development of the CEN/TC 351/WG 2 draft standard, it was agreed that if product TCs and EOTA do not agree with those loading factors provided in the draft standard, it is possible for them to suggest CEN/TC 351/WG 2 to accept other loading factors better representing the intended conditions of use of their products as specified in their product standards (hEN), in EADs, or in existing regulations. The same procedure could be applied for possible other reference room(s). The suggestions accepted by CEN/TC 351/WG 2 will be taken onboard when the test standard is updated.

3.3.4 Selection of the analytical method

If the harmonised Technical Specification (hEN and EAD) includes testing for VOCs, SVOCs and/or for TVOC, the appropriate analytical method as specified in CEN/TS 16516 is applicable. It is based on ISO 16000-6[10)] but with further specifications for improving reliability.

If the harmonised Technical Specifications (hEN and EAD) include testing for volatile aldehydes other than formaldehyde, the appropriate analytical method as specified in CEN/TS 16516 is applicable. It is based on ISO 16000-3[11)] but limited to acetaldehyde, butyraldehyde, propionaldehyde, acetone, crotonaldehyde. Other aldehydes should be determined using the same method as VOCs.

If the harmonised Technical Specifications (hEN and EAD) include testing for formaldehyde, the appropriate analytical method as specified in CEN/TS 16516 based on ISO 16000-3 is applicable.

3.3.5 Handling of substances currently not covered by the horizontal harmonised test methods (VVOC, ammonia)

If the harmonised Technical Specifications (hEN and EAD) have been mandated to include testing for other parameters such as VVOC or ammonia, product sampling and test chamber method operation should follow the harmonised CEN/TC 351/WG 2 test method as specified in CEN/TS 16516. A harmonised test method in terms of air sampling from test chamber and air sample analysis is not yet available. Annex D of the ISO 16000-6:2011 test method contains non-binding guidelines regarding VVOC determination. In the case of ammonia, so far only national test methods are available.

3.4 Issues specific to gamma radiation from construction products

3.4.1 General

CEN/TC 351 WG 3 is developing a horizontal testing procedure (TS) for determining the activity concentrations from the radionuclides radium-226, thorium-232 and potassium-40 in construction products using gamma spectrometry.

The draft TS is based on existing national and international regulations and standards and describes:

- sampling and sample preparation;
- sample measurement by gamma spectrometry;
- background subtraction, energy and efficiency calibration, analysis of the spectrum;
- calculation of the activity concentrations with the associated uncertainties.

The draft TS is intended to be horizontal and designed to cover all relevant construction products under the CPR as well as the building materials listed in the Annex XI of the draft BSS Directive, with regard to their emitted gamma radiation. However, there are a limited number of vertical elements

10) ISO 16000-6, *Indoor air - Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS or MS/FID*

11) ISO 16000-3, *Indoor air - Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air - Active sampling method*

such as the drying of the test portion and the preparation of the laboratory sample. The method is applicable to samples from products consisting of single and multiple material increments. Furthermore, necessary product specific guidance is expected to be included directly into the deliverables of CEN/TC 351/WG 3.

3.4.2 Sampling and sample preparation

The draft TS (WI 00351014) gives instructions on how to make a test specimen from the laboratory sample. By default, sample material is crushed as part of the preparation procedure. However, crushing is not required if the test specimen is homogeneous in terms of chemical composition as well as activity concentration and fits into the required testing geometry or if the test specimen is granular or powdery (e.g. cement, fly-ash, powdered gypsum) or flexible (e.g. mineral wool).

3.4.3 Measurement and calibration

Determination of the activity from the gamma-emitting radionuclides present in the test specimen is based on the analysis of the energies and the peak areas obtained from the full energy peaks of the gamma lines. For this purpose, the test method requires accurate energy and efficiency calibrations. Such calibration is performed using a calibration material with a known activity that is similar in chemical composition and density to those materials that are tested. The calibration is based on a preselected set of photopeaks used for the determination of the activity concentration. The selected photopeak is either emitted by the radionuclide itself or by one of its progeny nuclides.

The technique requires measurement on a homogeneous test specimen. In addition, the test specimens shall be placed in a container with a predefined geometry (shape and size), identical with the geometry used during calibration. The container shall be completely filled and closed.

For radium-226 and thorium-232, the activity concentration is determined using a progeny nuclide, while for potassium-40 the concentration is based on the photopeak from the nuclide itself. In those cases where the activity is determined using a progeny nuclide, a secular equilibrium between the progeny nuclide and its originating nuclide is necessary. To reach such equilibrium in the radon-226 decay chain the test specimen has to be stored in the container for a period of at least three weeks. During this time, the container has to be radon tight to ensure there is no degradation in the equilibrium due to a leakage of radon.

3.4.4 Data processing

Procedures for computing the activity concentration of the three radionuclides are described in the draft TS. In addition, computation of the various uncertainties in the measurement is described to calculate all relevant uncertainty parameters.

For the thorium-232 concentration additional procedures are included to accommodate for a possible disequilibrium in the thorium-232 decay chain. Such disequilibrium can be present despite the required waiting time of three weeks. Any disequilibrium can be caused by different dissolution ratios between thorium-232 and the progeny radium-228 and can result in a loss of thorium during processing of the material. Consequently, the decay chain can be in disequilibrium for a prolonged period of time, and approximation of the thorium-232 activity is required.

For this purpose, the activity concentration in the thorium decay chain is measured using two progeny nuclides; these are thorium-228 and radium-228. When the concentration of both nuclides is identical the decay-chain is assumed to be in equilibrium and the thorium-232 concentration is identical with its progeny nuclides. In case the activity concentration from both progeny nuclides is different, disequilibrium is assumed and the thorium-232 concentration is based on the higher of the two progeny nuclides.

NOTE In contrast to some members of the decay chain, thorium-232 itself emits only a small amount of relatively soft gamma radiation. Thus it is not the cause of the dose but represents the whole decay chain.

3.5 Issues specific for content of regulated dangerous substances (only when legally required or deemed practicable)

When adapting existing product standards to include content determination, the main challenges to be considered are the following.

Any test result will depend on the method selected. A harmonised approach requires an unambiguous selection of a test method. Available methods are listed in CEN/TR 16045, *Construction Products — Assessment of release of dangerous substances — Content of regulated dangerous substances — Selection of analytical methods*. CEN/TC 351 will provide horizontal standards for content measurement in the future. Before the mandated horizontal test methods for content determination become available, product TCs should consult CEN/TC 351/WG 5, when selecting test methods from CEN/TR 16045.

If a limit value is specified as content, e.g. with the units mg/kg, ppm or ppb, a test method should be selected that extracts the target substance as completely as possible from the product.

A content determination may be used as an indirect method for the assessment of release or emission. In this case, the challenge to be overcome is that the content determination will not give a test result that can be directly correlated to the reference method. A reasonable approach to establishing a correlation between reference method and indirect method would be by parallel testing of the same samples using both test methods. A first test using the content method has to be performed with the same laboratory sample as the type testing, with the test result serving as the reference. Any significant change of test result when testing later batches of the same product would indicate the need to repeat a test using the reference method.

The advantage of using content methods for indirect testing is that the conformity of products with the test results achieved with the respective reference method of CEN/TC 351 for determination of release into soil and water or emission into indoor air can be achieved with less effort - e.g. on a reduced scale or with a shorter test duration. If the correlation is reliable, content methods are suited for use in Factory Production Control.

4 Implementation of the system of Assessment and Verification of Constancy of Performance (AVCP) prescribed by the European Commission (COM) and the Standing Committee on Construction (SCC) for BRCW 3 in the harmonised product standard (hEN)

4.1 General

The European Commission specifies the systems of assessment and verification of constancy of performance (AVCP system) for each construction product covered by a mandate under the CPR.[12)] So far different AVCP systems have commonly been established for the technical and for the reaction to fire characteristics of the same product. The AVCP system to be applied to dangerous substances will not change through a mandate amendment (see 1.2, FAQ No. 2).

Only if the member states deem it necessary to revise the AVCP system for dangerous substances in specific product mandates would the European Commission decide on a modification to the AVCP systems for BRCW 3 (legal act).

12) See http://ec.europa.eu/enterprise/newapproach/nando/index.cfm?fuseaction=directive.annex&dir_id=3&type_dir=CPD

4.2 Responsibility of manufacturer and notified body (NB)

4.2.1 Type testing

Type testing is the procedure that determines the product type of a construction product in accordance with its hEN or ETA. Type testing determines the performance of the construction product in relation to its essential characteristics. Type testing must be carried out, when manufacturing a new construction product according to a harmonised European Technical Specification or when the product or its manufacturing process has been changed in a manner which might affect the performance characteristics of a product.

The existing hENs already contain a description of type testing under the CPD and specify the performance characteristics that have to be tested in type testing. In order to take dangerous substances into account, this general description of type testing has to be supplemented by the performance characteristics that need to be determined to fulfil the mandated requirements on dangerous substances.

The performance characteristics of a construction product determined in type testing are communicated through the declaration of performance (DoP) and the CE marking. This can be done in different ways: with levels (this means the result of the assessment as a numerical value) or classes. To enable a reliable declaration, information on the variability of the product performance has to be available from type testing.

The harmonised test methods developed by CEN/TC 351 are, according to the instructions of the European Commission, to be used for the determination of performance characteristics of construction products in regard to dangerous substances. Product specific additions or adaptations of the CEN/TC 351 test standards may be formulated, if justified, by the product TC and incorporated into the product standard by the product TC as described in the previous chapters of this Technical Report.

Simplified procedures are foreseen in Article 36 of the CPR to prevent duplication of tests that have no added technical value.

4.2.2 Factory production control (FPC) and indirect methods

NOTE Product TCs may define indirect methods for FPC (e.g. content-analysis; correlated methods; short term tests).

The essential characteristics of a construction product are determined in type testing. FPC is the procedure that ensures the constancy of performance of the manufactured products. Indirect tests can be used to ensure that the product performance remains at the same level as verified for the product batch originally tested in type testing. For this purpose, simplified test methods may be available (e.g. content-analysis; correlated methods; short term tests). The BRCW 3-related tests for FPC have to be integrated into the existing selection of FPC tests already established in the standard for other BRCWs. Modification of the FPC procedure for BRCW 3 is not necessary.

The CEN product TCs need also to specify in the product standard, how often the BRCW 3-related FPC tests have to be carried out and how large the deviations from, or tolerance ranges around, the target value are permitted to be.

Annex A of CEN/TS 16516:2013 contains examples of indirect methods for determination of emissions into indoor air. In prCEN/TS 16637-2 (DSLT) the option of using the first two steps of the method, as a shortened test, is included.

4.3 Use of NPD option for BRCW 3

The “no performance determined” (NPD) option may be used when and where any essential characteristic, for a given intended use, is not subject to a regulatory requirement in the Member State where the construction product is put on the market. In these cases, no test needs be carried out for

the particular characteristic and the indication “NPD” is included, in place of a performance statement, in the CE marking.

5 CE-marking

The CE marking must be affixed to all construction products for which the manufacturer has made a declaration of performance. The CE-marking of construction products contains information in any form about its performance in relation to the essential characteristics as defined in the applicable harmonised Technical Specification. The CE-marking documents the conformity of the construction product with the declared performance. The essential characteristics can be indicated in the CE-marking in different ways: with a level, with an indication of a technical or a regulatory class or with a confirmation of the fulfilment of threshold levels.

With the help of the information in the CE-marking, the user of the construction product must be able to judge whether the product may be used in a certain member state for a certain intended use. The information in the CE-marking must therefore be easily understandable, reliable and preferably in line with regulatory requirements in the Member States. The direct copying of test reports of release tests into CE-marking would not be understandable for the user of the construction product and it would not be possible for him to judge, whether the product would be fit for use in a certain Member State for a certain intended use.

Therefore, it is far more transparent and pragmatic to use horizontal technical classes for the communication of test results in the CE-marking, if such classes have been (or will be) established. The technical classes should be defined so that they incorporate the existing national requirements in the Member States.

In the examples included in the annexes, fictional horizontal classes have been defined on the basis of current regulatory requirements to illustrate the use of such classes in product standards.

NOTE The examples for horizontal classes are intended for illustration only and do not have any mandatory or otherwise established status.

The indication of a certain technical class in the CE-marking thus allows a transparent interpretation: e.g. class X is fit for all intended uses in Member State Y, but not fit for use in indoor spaces in Member State Z. If the European Commission would establish regulatory classes for dangerous substances, these would substitute for the horizontal technical classes envisaged for use in the CE-marking.

Annex A

Example of a possible application of a CEN/TC 351 test method in a hEN for a generic product in an intended use with contact with soil, groundwater or surface water

NOTE 1 As mentioned in 1.1 in the main part of this Technical Report, the European Commission is in the process of issuing mandate amendments for dangerous substances. After receiving a mandate amendment product TCs are first expected to draft their answers and provide a work programme, and ultimately make amendments to their product standards. This example deals with a non-specified mandate amendment containing requirements regarding leaching of dangerous substances on the basis of which a product TC is amending its product standard after it has provided a work programme that has been accepted by the European Commission.

NOTE 2 This annex contains practical examples of clauses in a product standard that have been modified according to the guidance given in this Technical Report. The shadowed text contains place holders and would require an adaptation to be applicable to any specific product.

NOTE 3 The numerals i, ii, etc. indicate notes for explanation of the presented model clauses. These notes are given at the end of this Annex.

1 Scope

This European Standard specifies the characteristics and performance requirements of {NAME OF PRODUCT/SYSTEM put on the market} for which the main intended uses are a combination of the following:

{A: structural elements
a external elements
b internal elements
B: non-structural elements
a external elements
b internal elements
I: exposed to weathering or in possible contact with soil and groundwater
II: not-exposed to weathering, no contact with soil and groundwater
…}[13)]

It specifies the levels of the performances related to {*characteristics*}, measured according to the corresponding test methods {included in this European Standard, or available in separate ENs}.

It provides for the assessment and verification of the constancy of performance (AVCP) of the product determined according to this EN.

The European Standard does not cover the following.{variety of product/type of use /characteristics - if appropriate}.

2 Normative references

(…)

{prCEN/TS 16637-2, *Generic horizontal dynamic surface leaching test (DSLT) for determination of surface dependent release of substances from monolithic or plate-like or sheet-like construction products*}

13) For some product standards it may be more appropriate to specify the intended uses in a different or separate clause or to refer to an annex.

3 Definitions, symbols and abbreviations

{…
3.x
regulated dangerous substances (RDS)
dangerous/hazardous substances, ions and radioactive substances that may present a danger for man or the environment during normal use of construction products when installed in works and for which at least one European Member State has notified a regulation or the European Union has a Community provision…}[14)]

4 Requirements

4.1 Compostion

{NAME OF PRODUCT/SYSTEM put on the market} are produced from {aggregates, cement, lime as well as up to x % from organic admixtures.}

5 Testing, assessment and sampling methods

5.x Release of RDS

5.x.1 Release into soil and ground water

The essential characteristic release into soil and groundwater shall be determined for intended end uses exposed to weathering or in contact with soil or groundwater subject to applicable regulations. For these end uses of {NAME OF PRODUCT/SYSTEM put on the market} the manufacturer shall declare for each regulated dangerous substance its release R_n[15)] {according to Table 5.x.1}[16)].

Add a description for the preparation of the test pieces in accordance with the specified test method.

Annex X1 specifies subsets of {NAME OF PRODUCT/SYSTEM put on the market} which are deemed to satisfy the corresponding release performance without type testing[17)]. When the manufactured {NAME OF PRODUCT/SYSTEM put on the market} complies with one of the defined subsets, the manufacturer may declare the cumulative release of one or more regulated dangerous substance/s in accordance with the corresponding performances as specified in Annex X1.

NOTE 1 The subsets and corresponding release performances have been adopted by the Technical Committee that drafted this standard and approved by the Commission and the Standing Committee referred to in Article 64 of Regulation EU No 305/2011, on the basis of a technical dossier and further expertise.[i] The given release performances correspond to XX % fractiles (p = 0,XX) with a confidence level of YY %")[ii]

For products other than those covered by Annex X1 or where the manufacturer seeks to declare a lower release performance level than tabulated in Table X1, the product shall be tested according to prCEN/TS 16637-2 and the resulting release performance level shall be declared.

When a specified number of {NAME OF PRODUCT/SYSTEM put on the market} is sampled from a consignment in accordance with Annex A and tested in accordance with prCEN/TS 16637-2, the mean

14) Add the relevant definitions given in prEN 16687.

15) Release in required terms and units, and as specified in the test standard. For example, cumulative release Rn in mg/m^2 × days, according to reference test prCEN/TS 16637-2.

16) Add a horizontal declaration format, if available, or define a product specific declaration format, if necessary.

17) When a subset cannot be defined by means of verifiable and testable criteria, it may be necessary to demonstrate that the respective product is tested to demonstrate it belongs to the same statistical population. It may also be less onerous to perform a test on an end product rather than testing multiple criteria for multiple constituents. Furthermore, it may be adequate to specify release performances on the basis of content knowledge and testing.

cumulative release shall not be greater than the declared level. Individual values of R_n as determined in accordance with prCEN/TS 16637-2 shall not be greater than (100 + x) % of the declared level[iii].

NOTE 2 For Factory Production Control, a short test according to EN xxx is available.

6 Assessment of constancy of performance[iv]

Reassess the clauses on type testing and factory production control in view of the amended characteristics and the related test methods.

Amend any clause which serves to demonstrate constancy of performance if the standard includes WT/WFT.

6.x1 Initial demonstration of performance

When a manufacturer claims the cumulative release for one or more regulated dangerous substances in accordance with Annex X1, he shall demonstrate that his product complies with the respective subset of {NAME OF PRODUCT/SYSTEM put on the market}.

7 Classification and designation[v]

The release performance into soil or groundwater shall be declared for the intended uses AaI and BaI.

8 Marking, labelling and packaging

9 Annex A (of this example)

Annex A

Sampling for type testing and for independent testing of consignments

Amend the required size of the sample for the type testing methods newly included in the standard.[vi]

10 Annex X1 (of this example)

Annex X1
(normative)
Subsets of {NAME OF PRODUCT/SYSTEM put on the market} which are deemed to satisfy given performances without {further} testing

Table X1.1 — Definition of subset of {NAME OF PRODUCT/SYSTEM put on the market} by constituents

Constituents[vii]	Subset[viii]			
	S1		S2	
	Conditions[ix]	Content of constituent	Conditions	Content of constituent
Binder X according to EN {number of product standard}	Name of product type	≤ … kg/t	-	≤ … kg/t
Aggregates according to EN {number of product standard}	Excluding …	≤ … kg/t	With up to x % of substance X	≤ … kg/t
Addition X according to EN {number of product standard}	-	≤ … kg/t	-	≤ … kg/t
Admixture Y according to EN {number of product standard}	-	≤ … % by mass in total	Not used	-

Table X1.2 — Release levels of regulated dangerous substances deemed to be satisfied without testing (or following type testing for product characterisation, where indicated)

Regulated dangerous substance	Subset	
	S1	S2
	Cumulative release R_n in mg/m^2	
RDS 1	< 0.x mg/m^2/WT	< 0.y mg/m^2/WT
RDS 2	Below detection limit/WT	< x mg/m^2/WT
RDS 3	< X0 mg/m^2/to be confirmed by type testing[x]	To be determined by type testing[xi]
RDS n	< …	< …

11 Endnotes for explanation of the presented model clauses

These endnotes are not intended to be included in the product standard. They are intended to help to use the model clauses.

[i] Currently it may be expected that the Standing Committee on Construction and/or the European Commission are likely to involve e.g. the EGDS and consider their advice.

[ii] The XX and YY are yet to be discussed and accepted by the Member States.

[iii] This approach has not yet been established for BRCW 3 characteristics. It is suggested here on the basis of experiences with other technical characteristics as the approach seems to be pragmatic (e.g. in use for compressive strength). The product TC is expected to use the results of the robustness validation of the test methods for leaching (see: http://www.nen.nl/Normontwikkeling/Doe-mee/Normcommissies-en-nieuwe-trajecten/Normcommissies-Bouw/CENTC-351/Robustness-

validation-of-draft-methodsmethoden.htm) and/or the results of the upcoming round robin tests to specify x.

[iv] The clauses on the assessment of constancy of performance are usually so generic that they also seem applicable to BRCW 3-related performances. It is possibly a point for discussion with a group of experts if additional advice can be given to the manufacturer and if so, how detailed and yet generic it can be.

[v] Classification and designation are issues that were too premature to be detailed, when writing this report (March 2013). In the course of 2013, guidance is expected to become available. The CPR states clearly that the Declaration of Performance has to contain “the list of essential characteristics, as determined in the harmonised Technical Specification for the declared intended use or uses;” and for the time being each RDS needs to be interpreted as an individual essential characteristic. For designation and CE marking purposes performance categories (technical classes as 'classes of convenience') may become available.

[vi] The clauses on sampling in the standards are usually so detailed that they also cover BRCW 3 issues except for the size of the sample.

[vii] The list of constituents relates to a fictional product example and can be adjusted for any product.

[viii] Many products standards permit the use of a variety of constituents. The type and content of constituents in a product (determined and detailed at production level in a product recipe or product formula) depend in general on the envisaged performance of the product but also on availability of constituents and economics. In the product standards, or in practice, products conforming to the same standard are often subdivided into types (subsets), e.g. cement mortars, lime-cement mortars or lime mortars. In many cases, it may not be necessary or the existing historical data may not allow distinguishing between different subsets, yet it may be possible to identify a performance level which is deemed to apply to all products within a specific product standard. In other cases it may be possible or – due to the greater variation of results – sensible to distinguish between subsets, in particular if only the performance of one or some subsets satisfy the legal requirements in the place of their intended use, whereas the performance of the products as a whole (due to the greater variation) does not.

The example given in Table X1.1 assumes a case where it is sensible or necessary to subdivide a generic product type (e.g. mortar) into subsets (e.g. cement mortar, etc.). The example assumes that the subdivision can be done on the basis of the recipe or formula, i.e. on the basis of the type and content of constituents used to manufacture the product. It is important to understand, that the given example is fictional, i.e. that it may not be necessary to distinguish between products in the same product standard (or not in such a detailed way as indicated) or that there may be other (better, simpler) ways of defining the subsets. Based on the data at hand, it is for the product TCs to decide if a distinction between subsets is sensible and possible and, if so, how detailed the distinction needs to be.

Consequently, the example in Table X1.2 specifies the performance levels for all (or some) RDS for all subsets defined in Table X1.1 which have been adopted following the procedure explained in the note in 5.x.1. Products of a specific subset are deemed to satisfy the specified performance level without testing.

[ix] In addition to a product standard possibly allowing use of a great variety of constituents, the constituents, themselves, may also be available with variety which supersedes the limits of experience, i.e. which is not covered by the existing historical data. Conversely, it may also be the case that sufficient data is available to cover the variety of a certain constituent but that for performance reasons it is sensible to define a subset which only covers a limited range of that constituent. The fictional example given in Table X1.1 indicates e.g. that products of subset S1 may contain a certain quantity of binder X which (in addition to meeting the conditions of its corresponding hEN product standard or EN product standard) e.g. has a limited content of a certain substance (RDS 1, e.g. chromium). For another subset, the conditions as appropriate as WT criteria may be totally different or may even be superfluous.

[x] A release test {according to Table 5.x.1} is necessary to confirm that the release of the respective substance does not exceed X % of the tabulated value.

[xi] Despite the limitations on constituents, the overall variation of the respective RDS is known to be too great to allow for determination of release levels as tabulated values.

Annex B

Example of a possible application of a CEN/TC 351 test method in a hEN for a generic flooring product in an intended use with contact with indoor air[i]

NOTE 1 As mentioned in 1.1 in the main part of this Technical Report, the European Commission is in the process of issuing mandate amendments for dangerous substances. After receiving a mandate amendment product TCs are first expected to draft their answers and provide a work programme, and ultimately make amendments to their product standards. This example deals with a mandate amendment containing requirements regarding emissions and content of dangerous substances on the basis of which a product TC is amending its product standard after it has provided a work programme that has been accepted by the European Commission.

NOTE 2 This example is inspired by EN 14041 “Resilient, textile and laminate floor coverings — Essential characteristics”, and more specifically, a version from the work in progress for the integration of the requirements from the EC mandate amendment to M/119 for dangerous substances. The included modified text proposals could be used for the amendment of any generic product for use in indoor spaces.

The aim of the proposal is to provide initial generic guidance on how to proceed with the amendment of the product standards. It is not authorised by the European Commission or CEN.

NOTE 3 The numerals i, ii, etc. indicate notes for explanation of the presented model clauses. These notes are given at the end of this Annex.

1 Scope

This document specifies the {*characteristics*} health, safety and energy saving requirements for: {list of products with main materials}:

a) resilient floor coverings manufactured from plastics, linoleum, cork or rubber, excluding loose-laid mats;

b) textile floor coverings, excluding loose-laid (barrier) mats and rugs;

c) laminate floor coverings;

d) floor panels for loose-laying containing as component one of the above mentioned resilient or Textile floor coverings.

It also specifies procedures for testing, for the assessment and verification of the constancy of performance (AVCP) determined according to this EN and the requirements for marking and labeling. The products are intended for use as floor coverings within a building according to the manufacturer's specifications.

This document does not apply to {variety of product/type of use/characteristics - if appropriate} floor coverings containing asbestos.

2 Normative references

(…)

{CEN/TS 16516:2013, *Construction products — Assessment of release dangerous substances — Determination of emissions into indoor air*

3 Definitions, symbols and abbreviations[18)]

4 Requirements and test methods

4.x Composition

Substances not used may be excluded in the product definition.

(Substances X and Y) shall not be used, or added, intentionally.

4.y Requirements and test methods concerning the content of dangerous substances

If the substances listed in Table 4.x are not added in the manufacturing process of the floor covering or any of its raw materials and are not known to occur in any stage of the production process or in any raw materials, then the floor covering does not need to be tested in order to meet the requirements in Table 4.x.

In all other cases verification is required according to the test methods in Table 4.x and requirements in Table 4.x have to be met.

Table 4.x — Content of dangerous substances – Test methods for the determination and requirements

Substance	Product type	Test method	Requirement[19)]
Include substance from mandate amendment	Include relevant product type	Include test method from CEN/TR 16045 or consult CEN/TC 351/WG 5	Include limit value

NOTE Relevant product types are defined in Annex X.

4.z Emissions of VOC, SVOC and formaldehyde into indoor air

The release of VOC emissions from floor coverings shall be determined in accordance with CEN/TS 16516.

For the determination of formaldehyde release from (textile and resilient floor coverings) CEN/TS 16516 shall be used.

The requirements and way of reporting of the release of VOC emissions is expected to be communicated by the European Commission and is included as Annex H in CEN/TS 16516:2013.[20)] As long as horizontal prescriptions or guidance are not available, the evaluation of the release of VOC emissions shall be carried out as stated in Annex Y.

For the calculation of the *R* value the actual notified *LCI* values shall be used. If harmonised EU-*LCI* values become available, these values shall be used. If the performance limit at 28 days is met earlier (either after 3, 7 or 10 days into the test) the test may be stopped, as it is deemed that the 28 days criterion will be fulfilled.

18) Add the relevant definitions given in prEN 16687.

19) Product Contact Points established according to CPR may be consulted to check, when and where requirements are in place (http://ec.europa.eu/enterprise/sectors/construction/files/cpr-nat-contact-points_en.pdf).

20) A declaration format is currently expected to be developed on the basis of the informative Annex H of CEN/TS 16516:2013. Only if a horizontal declaration format is not available should a product specific declaration format be developed.

A product loading factor[21)] of 0,4 m^2/m^3 shall be used, as this is representative of typical floor-covering-area to air-volume ratios in the indoor environment.

NOTE For factory production control, the emission test cell can be used according to EN ISO 16000-10.

5 Sampling and preparation of test specimens for indoor air emission tests

5.x1 Sampling

The sample shall be taken and packed as soon as the product is fit for placing on the market. The product may be stored either at the manufacturer's premises or the testing laboratory. The product shall be stored in low-emission packaging and under normal climatic room conditions. After the sample has been packed, the emission test shall start within 8 weeks.

Selection of samples from rolls

Discard the outer layer of the roll to take the sample. The sample shall have an area corresponding to at least 0,5 m in the production direction over the width of the produced roll. After taking the sample, it shall be rolled immediately at right angles to the direction of the production roll, secured with staples or a non-emitting fastening, wrapped in aluminium foil, and placed in an unprinted, airtight polyethylene bag and sealed. Each bag shall contain only one sample. The packed samples shall be sent to the testing laboratory with the shortest possible delay.

Selection of samples of rigid products such as tiles and planks

Select an unopened and undamaged standard package of the product. Alternatively, remove four or more pieces from the centre of a product package leaving the outer pieces. Stack a minimum of four pieces and tightly wrap the stack in two layers of aluminium foil and treat as described, herein for rolls.

5.x2 Sample description

The outer packaging of the sample shall be labeled with the details of the type of product, date or week of manufacture (if known) and/or any identification numbers, e.g. batch numbers (see also CEN/TS 16516).

5.y Preparation of test specimens

For resilient, textile and laminate floor coverings, there is no extra conditioning time as the installed product is immediately accessible to the consumer.

Test specimens from rolls

Unpack the sample and select an appropriate area of the product from the middle, if possible, at least 50 cm from the edge of the short side, and take a test specimen. Cut the specimen from the square, leaving, if possible, at least 5 cm from the edge on each side. The underside of the test specimen shall be placed on an inert stainless-steel plate in order to determine exclusively the emission of the upper surface. Seal the edges with a non-emitting/non-absorbing aluminium foil (to be checked before use) or stainless-steel frame.

Test specimens from rigid products such as tiles and planks

Tiles and planks, etc. are taken from the middle of the package and assembled side by side. If the surface to be tested is composed of several pieces, such as laminated floor coverings or tiles, the joints in the test piece shall be proportionally distributed over the surface of the test specimen, i.e. the proportion of joint length to tile area shall be the same in the test specimen as in the finished floor. No adhesive shall be used in the joints.

21) See the options given in CEN/TS 16516.

EXAMPLE When laminate flooring is to be tested, at least two panels are taken from the middle of the package and the tongue and the groove are assembled together without using an adhesive. The underside of the test specimen is placed on an inert stainless-steel plate in order to determine exclusively the emission of the upper surface. The edges are sealed with a non-emitting and non-absorbing aluminium foil (to be checked before use) or stainless-steel frame.

6 Assessment and verification of constancy of performance

Reassess the clauses on type testing and factory production control in view of the amended characteristics and the related test methods.

Include a clause on demonstrating conformity if the standard includes WT/WFT.

7 Classification and designation

Modify to take into account dangerous substances according to the mandate amendment.

8 Marking, labelling and packaging

Modify to take into account dangerous substances according to the mandate amendment. Include, as standard information, whether the floor covering has been tested with or without coating.

9 Annex ZA

Modify to include the new clauses on dangerous substances.

10 Annex X of this example

Annex X

Product parameters defining a product type in relation to indoor air emissions[ii]

The product parameters stated in **Clause X.1...** may influence the indoor air emission performance of **floor coverings**. Apply the provisions of Clause **X.1....** for type testing.

X.1 Product parameters defining a product type in relation to indoor air emissions for resilient floor coverings

Table X.1 – Product parameters which can influence indoor air emissions for resilient floor coverings

Parameters	Comments
Composition	For products of the same product group according to EN product specification standards. Test the product with the highest percentage of organic material [%= 100% - % (inorganic fillers + inorganic flame retardants)]
Thickness	If the amount of organic compounds is equal, test the product with the maximum nominal overall thickness.
Mass per unit area or density	Not relevant
Surface structure and coatings	If a coated and an uncoated version of a product of the same composition exists, both versions need to be tested. All the different types of coatings shall be tested. The surface structure (embossing) is not relevant.
Colour and design	The colour and design of a floor covering have no influence on emissions. In case inks are used with different solvents each combination shall be tested.

11 Annex Y of this example[iii]

Annex Y

Declaration format for the essential characteristic "emissions into indoor air"

Table Y1 — Technical classes for declaration of VOC emissions determined according to CEN/TS 16516[22)]

Declaration	TVOC [µg/m³]	ISL class (see Table Y2)	CMR substances [µg/m³]	*R*-value (***)	VOC without LCI [µg/m³]	TSVOC [µg/m³]
IAQ 1	≤ 10 000 $^{3\ d}$ ≤ 1 000 $^{28\ d}$	-	≤ 10 (*) $^{3\ d}$ ≤ 1 (*) $^{28\ d}$	≤ 1	≤ 100	≤ 100
IAQ 2	≤ 1 000	1	≤ 1 (**)	-	-	-
IAQ 3	≤ 1 500	2	≤ 1 (**)	-	-	-
IAQ 4	≤ 2 000	3	≤ 1 (**)	-	-	-
IAQ 5	≥ 2 000	4	≤ 1 (**)	-	-	-
IAQ 6	≥ 2 000	4	-	-	-	-

(*) Volatile cancinogenic substances of categories CARC 1A and CARC 1B of Annex VI to Regulation (EC) No 1272/2008 (Table 3.1)

(**) Trichloroethylene, benzene and dibutylphthalate

(***) Calculated using the latest available LCI values from the AgBB

Table Y2 — Limit values for ISL classes applicable for table Y1

Substance [µg/m³]	ISL class			
	1	2	3	4
acetaldehyde	< 200	< 300	< 400	> 400
toluene	< 300	< 450	< 600	> 600
tetrachlorethylene	< 250	< 350	< 500	> 500
xylene	< 200	< 300	< 400	> 400
1,2,4-trimethylbenzene	< 1 000	< 1 500	< 2 000	> 2 000
1,4-dichlorobenzene	< 60	< 90	< 120	> 120
ethylbenzene	< 750	< 1 000	< 1 500	> 1 500
2-butoxyethanol	< 1 000	< 1 500	< 2 000	> 2 000
styrene	< 250	< 350	< 500	> 500

22) See CEN/TS 16516 for the definitions of VOC etc.

Table Y3 — Technical classes for declaration of formaldehyde emissions determined according to CEN/TS 16516

Declaration	Class limit
HCHO F+	< 10 µg/m^3
HCHO F	< 60 µg/m^3
HCHO F1	≤120 µg/m^3
HCHO F2	> 120 µg/m^3

12 Endnotes for explanation of the presented model clauses

These endnotes are not intended to be included in the product standard. They are intended to help to use the model clauses.

[i] The example is fictional and was inspired by the work of CEN/TC 134 under the amended mandate M/119. Please be aware that the corresponding clauses in the EN 14041 have been developed further in the course of its revision and are or may have become different from the model clauses provided in this example.

[ii] Here only the clause for resilient floor coverings has been included as an example.

[iii] It should be noted that the contents of this clause reflect the situation as per March 2013. Further work can and is expected to lead to changes. It should also be noted that, since European harmonised classifications are not yet available, the tables reflect the current notified Member State regulations, which relevant product TCs have been mandated to take into account when amending their hENs. The tables are intended to show how classes could be integrated into hENs.

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[3] CEN/TR 16220:2011, *Construction products — Assessment of release of dangerous substances — Complement to sampling*

[4] CEN/TS 16516:2013, *Construction products — Assessment of release of dangerous substances — Determination of emissions into indoor air*

[5] prCEN/TS 16637-1, *Construction products — Assessment of release of dangerous substances — Guidance standard for CEN Product TC's for selection of leaching tests appropriate for their product(s) — General principles*

[6] prCEN/TS 16637-2, *Construction products — Assessment of release of dangerous substances — Generic horizontal dynamic surface leaching test (DSLT) for determination of surface dependent release of substances from monolithic or plate-like or sheet-like construction products*

[7] EN ISO 16000-10:2006, *Indoor air — Part 10: Determination of the emission of volatile organic compounds from building products and furnishing — Emission test cell method (ISO 16000-10:2006)*

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[9] ISO 16000-3:2011, *Indoor air — Part 3: Determination of formaldehyde and other carbonyl compounds in indoor air and test chamber air — Active sampling method*

[10] ISO 16000-6:2011, *Indoor air — Part 6: Determination of volatile organic compounds in indoor and test chamber air by active sampling on Tenax TA sorbent, thermal desorption and gas chromatography using MS or MS-FID*

[11] COM(2011) 593 fin, *Proposal for a COUNCIL DIRECTIVE laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation,* Draft presented under Article 31 Euratom Treaty for the opinion of the European Economic and Social Committee, Brussels, 29.9.2011

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[12] WI 00351010, *Construction products — Assessment of release of dangerous substances — Generic horizontal up-flow percolation test for determination of the release of substances from granular construction products*

NOTE Also indicated as expected future CEN/TS 16637-3.

[13] prEN 16687, *Construction products — Assessment of release of dangerous substances — Terminology*

[14] WI 00351013, *Construction products — Assessment of release of dangerous substances — Guidance on evaluation of conformity*

[15] WI 00351014, *Construction products — Assessment of release of dangerous substances — Determination of the activity concentrations of 226Ra, 232Th and 40K using gamma-ray spectrometry*

[16] WI 00351016, *Construction products — Assessment of release of dangerous substances – Analysis of inorganic substances in eluates*

[17] WI 00351017, *Construction products — Assessment of release of dangerous substances — Digestion of construction products by aqua regia*

[18] WI 00351018, *Construction products — Assessment of release of dangerous substances — Analysis of inorganic substances in digests and eluates — Part 1: Analysis by Inductively Coupled Plasma — Optical Emission Spectrometry (ICP-OES)*

[19] WI 00351019, *Construction products — Assessment of release of dangerous substances — Analysis of inorganic substances in digests and eluates — Part 2: Analysis by Inductively Coupled Plasma — Mass Spectrometry (ICP-MS)*

[20] WI 00351020, *Construction products — Assessment of release of dangerous substances — Determination of dose assessment and classification for emitted gamma radiation*

[21] WI 00351021, *Construction products — Assessment of release of dangerous substances — Content of inorganic substances — Methods for digestion and and analysis*

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