TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER BERICHT

CEN/TR 16220

August 2011

ICS 91.100.01; 13.020.70

English Version

Construction products - Assessment of release of dangerous substances - Complement to sampling

Produits de construction - Evaluation de l'émission de substances dangereuses - Complément relatif à l'échantillonnage

Bauprodukte - Bewertung der Freisetzung von gefährlichen Substanzen - Ergänzung zur Probenahme

This Technical Report was approved by CEN on 24 April 2011. It has been drawn up by the Technical Committee CEN/TC 351.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

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

Management Centre: Avenue Marnix 17, B-1000 Brussels

Ref. No. CEN/TR 16220:2011: E

Contents

Page

Foreword

This document (CEN/TR 16220:2011) 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 (or CENELEC) by the European Commission and the European Free Trade Association.

0 Introduction

0.1 Objective

This CEN/TR provides a complement to the sampling of construction products. Sampling of construction products for other characteristics than the release or emission of regulated dangerous substances is described in product standards and ETAs[1)]. This CEN/TR is based on mandate M366 of the European Commission[2)]. It provides requirements which are specific for the sampling of construction products for the determination of the release or emission of regulated dangerous substances. The mandate implies that existing sampling standards from product TCs, or sampling instruction in product standards from product TCs, are to be used as much as possible. Consequently this CEN/TR and the sampling parts of the standards prepared by WG 1 and WG 2 of CEN/TC 351 (see below 0.3) should be used as a *complement* to the sampling of construction products as described in existing standards and ETAs. It does not provide full guidance to sampling of construction products.

NOTE 1 As a consequence of the fact that this CEN/TR is a *complement* to existing standards of product TCs, some instructions that would be an integral part of a full sampling standard, are missing in this CEN/TR. An obvious example thereof is the fact that this CEN/TR contains no instructions for actually taking a sample.

Existing sampling standards and instructions[3)] for the sampling of construction products are to be compared with this CEN/TR, in order to determine if the requirements recommendations for sampling as described in this CEN/TR can be met with the existing sampling standards and instructions. If not, product TCs may have to adapt their sampling standards and instructions following appropriate provisions included in the standards to be produced by WG 1 and WG 2. For this purpose this CEN/TR contains a checklist in Annex G.

NOTE 2 Product TCs should be aware of the fact that sampling for the determination of the emission and/or release of dangerous substances, might differ from their current sampling procedures which are used to determine product characteristics.

0.2 Terminology

It is essential that a number of key terms, as mentioned in Clause 2, are well understood when working with this CEN/TR. These key terms are defined in Annex A, which annex also contains Figure A.1 that depicts the relation between these key terms.

0.3 Relation with the deliverables of CEN/TC 351/WG 1 and WG 2

At the time that this CEN/TR is developed, CEN/TC 351 comprises two Working Groups (WGs): CEN/TC 351/WG 1: Release from construction products into soil, ground water and surface water and CEN/TC 351/WG 2: Emissions from construction products into indoor air. Both WGs have to, within their scope, deliver a complete test procedure of which sampling is just a part. The interface between these sampling parts, product standards and this TR have been defined in TC 351 resolution 81[4)]. The test results are to be used for CE-marking (and corresponding AoC) and are produced according to WG 1 and WG 2

---

1) ETA: European Technical Approval issued by the European Organisation for Technical Approvals (EOTA).

2) Mandate M366 "Development of horizontal standardised assessment methods for harmonized approaches relating to dangerous substances under the Construction Products Directive"; European Commission, DG Enterprise, Brussels 16 March 2005.

3) This document refers both to sampling standards as published by product TCs as well as to product standards that contain sampling instructions as part of an overall test procedure.

4) Resolution 81 taken by CEN/TC 351 on 23-24 April 2008 reads: CEN/TC 351 confirms the recommendation 1 of TG 4 taken at its March 2008 meeting as given in document N 149, which is "It is the responsibility of product TCs to specify the detailed procedure for sampling. However, they have to follow the general requirements provided by WG 1 and WG 2 that are to be based on the technical report prepared by TG 4." The decision was taken by unanimity.

standards. Since it is not possible to test all possible conditions, WG 1 and WG 2 establish reference conditions under which the test results are expressed.

0.4 Users of this CEN/TR

This CEN/TR is intended to be used by two principal users:

— CEN/TC 351/WG 1 (Release from construction products into soil, ground water and surface water) and CEN/TC 351/WG 2 (Emissions from construction products into indoor air).

— CEN/TCs and EOTA committees responsible for the development and maintenance of standards for products under the Construction Products Directive (CPD). These CEN product TCs fall under the framework of mandate M366 on the “Emission of dangerous substances from construction products into indoor air, soil, surface water and ground water". This mandate is a “horizontal complement” to the construction product mandates.

Additionally, this CEN/TR might for instance be used as a reference document by individual producers when indirect test procedures are derived e.g. for Factory Production Control (FPC).

0.5 Two sampling domains

Two different sampling domains are relevant to regulated dangerous substances:

— sampling of the construction product to obtain a quantity of the product which is used in a test;

— sampling of the air (emission) or water (release) with which a quantity of the product has been in contact.

This CEN/TR is only of relevance to the first sampling domain, the sampling of the construction product. At the same time, restrains which result from the second sampling domain might impose boundary conditions on the first sampling domain.

NOTE To avoid confusion, this Technical Report often uses the term 'product sampling' for the first sampling domain.

0.6 Uncertainty and statistical testing

The number and type of samples to be taken relates directly to the accepted uncertainty of the test result(s). A number of individual sources of uncertainty can be identified, which can be clustered in three groups: the variability of the product, the variability introduced due to sampling activities and the variability introduced by the laboratory activities.

NOTE 1 In most situations the uncertainty caused by the variability of the product dominates the other sources of uncertainty.

NOTE 2 The variability of the release or emission of dangerous substances often differs from the other characteristics tested by product TCs.

Variability of the product results in uncertainty of the obtained test result(s). By taking account of the variability when sampling, a representative test result can be obtained. Representative within the context of this CEN/TR means the acceptance of a certain level of uncertainty. The level of uncertainty should at least be such that the chance that another sample would result in another assessment of conformity than the original sample is acceptably small.

NOTE 3 This means that the test result obtained from the sample can be used to assess the sampled product, while the uncertainty of that assessment is sufficiently small: the risk of false positive or false negative results is acceptable.

This CEN/TR focuses on obtaining an individual laboratory sample that is representative for a defined quantity of the construction product. Implementation of the guidance of this CEN/TR provides individual samples which are sufficiently representative. Whenever repetitive sampling is necessary, for example to quantify the risk of

exceeding a limit value, a second source of variability in the product is introduced. This is the variability of the relevant product properties over a period of (production) time. This CEN/TR does not provide the necessary guidance to deal with that level of uncertainty, nor does it provide the tools to define the statistical testing that does.

NOTE 4 Considering the fact that the uncertainty of the actual test and measurement often is much smaller than the uncertainty that is due to the heterogeneity of the sampled construction product, it is important to realise that the quantity of the product represented by the test portion / test specimen should be sufficiently large to incorporate that heterogeneity.

In Annex B, more information is provided with respect to the assessment of the uncertainty related to sampling activities as part of the overall test procedure.

0.7 Structure of this CEN/TR

This CEN/TR consists, apart from the scope in Clause 1, of two main parts:

— Clause 2 describes in general the principle requirements for sampling construction products for the determination of the release or emission of dangerous substances. It provides explanatory texts on the key issues that are to be covered in sampling standards and sampling instructions for construction products;

— Clause 3 provides a practical translation between the theoretical principles as described under Clause 2, and the test procedures as developed by CEN/TC 351/WG 1 and WG 2, as well as the product standards as developed and maintained by product TCs.

In addition to these two clauses a number of annexes provide background information and examples:

— Annex A provides definitions for the key terms on sampling as used in this CEN/TR;

— Annex B discusses the assessment of the uncertainty resulting from sampling as part of the overall test procedure;

— Annex C provides help for the estimation of the minimum increment and sample mass when applying probabilistic sampling;

— Annex D provides methods for the calculation of the required number of increments and samples when applying probabilistic sampling;

— Annex E provides some details on sample containers and storage conditions;

— Annex F provides example forms for the sampling plan, the field report and the chain of custody report;

— Annex G provides a checklist for the product TCs to assess their existing sampling standards or sampling paragraph against the essential elements as identified in this CEN/TR.

1 Scope

This Technical Report covers the specific requirements for sampling construction products to determine the release or emission of dangerous substances in their intended use. It is complementary to existing sampling standards and sampling instruction in product standards or test methods for construction products of CEN product TCs and EOTA committees which fall under the CPD.

The scope of this Technical Report covers all activities related to product sampling, starting with the initial planning of sampling until the delivery and formal transfer of the laboratory sample at the laboratory.

This Technical Report:

— does not deal with sub-sampling in the laboratory as a step towards the preparation of the test portion / test specimen[5)];

— does not deal with the second sampling domain in which a sample is to be taken from the air (emission) or water (release) with which the test portion / test specimen has been in contact;

— does not deal with the statistical testing of a construction product against (legislative) limit values, nor does it deal with the definition of repetitive sampling, suitable for fulfilling requirements with respect to a minimum level of uncertainty in a series of test results.

This Technical Report focuses on obtaining a single sample. Repetitive sampling is outside the scope as the boundary conditions for routine testing against a limit are not yet defined (e.g. the necessary reliability). Despite the fact that repetitive sampling is not covered, the conditions provided in this Technical Report apply for an individual sample, as well as for a sample that is part of a series.

2 Key concepts

2.1 Introduction

2.1.1 Key terms

A number of key terms for product sampling are introduced in this clause, including: population, sub-population, scale, increment, composite sample, sample, laboratory sample and test portion / test specimen. The definition of these key terms is independent whether the release or emission of dangerous substances is to be assessed.

NOTE 2.1 gives a general description of some of the key terms and Annex A gives a formal definition together with a figure showing the relationship between some of these terms.

2.1.2 Representativeness

The ultimate goal of product sampling is obtaining a representative portion of the sampled construction product; maintaining the representativeness is essential in all steps where a (partial) sample of the product is involved. Whenever there is variability in the product, measures are to be taken in order to ensure the representativeness of the sample.

NOTE 1 When it comes to maintaining the representativeness of the sampled product, the full test procedure needs to be taken into account.

5) This document regularly refers both to the term 'test portion' and the term 'test specimen' which are equivalent terms. However, as the term 'test portion' is used in the field of release to soil and water, and the term 'test specimen' is used in the field of emissions to indoor air, both are referred to.