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English Version

Construction products: Assessment of release of dangerous substances - Part 3: Horizontal up-flow percolation test

Bauprodukte - Bewertung der Freisetzung von gefährlichen Stoffen - Teil 3: Horizontale Perkolationsprüfung im Aufwärtsstrom

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 351.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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

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European foreword

This document (prEN 16637-3:2021) 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.

This document is currently submitted to the CEN Enquiry.

This document will supersede CEN/TS 16637-3:2016.

The main changes compared to the previous edition are as follows:

— Transfer of technical specification into European Standard;

— Addition of validation data from interlaboratory validation on repeatability and reproducibility (see Clause 12 and Annex E);

— Addition of requirements on the number of eluates (see 5.2);

— Alignment of the test conditions with the test conditions which are specified in prEN 17516;

— Updating of normative and informative cross-references.

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

This document was elaborated on the basis of CEN/TS 14405 [1].

This document specifies an up-flow percolation test to determine the leaching behaviour of granular construction products under standardized percolation conditions.

EN 16637, *Construction products: Assessment of release of dangerous substances*, consists of the following parts:

— Part 1: *Guidance for the determination of leaching tests and additional testing steps*,

— Part 2: *Horizontal dynamic surface leaching test*,

— Part 3: *Horizontal up-flow percolation test*.

prEN 16637-1 deals with the determination and use of test methods for leaching of construction products taking specific situations into account. prEN 16637-2 specifies a dynamic surface leaching test for determination of surface dependent release of substances from monolithic or plate-like or sheet-like construction products or granular construction products with low hydraulic conductivity under standardized conditions.

Background information on characterization of leaching behaviour of construction products can be found in Technical Reports provided by CEN/TC 351 (i.e. CEN/TR 16098 [2], CEN/TR 16496 [3]).

Introduction

The European Standards prEN 16637-1, prEN 16637-2 and prEN 16637-3 are developed to assess the release of regulated dangerous substances (RDS) from construction products into soil, surface water and groundwater in the framework of Mandate M/366. The horizontal test methods developed under the Mandate M/366 are intended to be used to show compliance with notified regulations. The tests cover the release of substances from construction products and in particular, those that are regulated in notified regulations in one or more EU Member States.

prEN 16637-1 specifies how the CEN Technical Product Committees and EOTA experts should determine the appropriate leaching test for the determination of the release of RDS from a construction product into soil, surface water and groundwater. prEN 16637-1 gives background information for CEN Technical Product Committees on the following aspects:

a) description of the intended conditions of use of the construction product (e.g. above ground exposed to the precipitation, or shielded from direct infiltration, in surface or groundwater) with respect to the release of RDS into soil, surface water and groundwater;

b) identification of main release mechanisms, and the appropriate leaching test for a given construction product.

prEN 16637-2 specifies a horizontal test to assess surface dependent release from monolithic, plate-like or sheet-like construction products (tank test).

prEN 16637-3 specifies a horizontal test to assess release from granular construction products.

The test methods can be used for both steps in the hierarchy (type testing (TT) and factory production control (FPC)) and form the reference tests for the intended uses and conditions specified in prEN 16637-1. In this hierarchy of testing conditionally “indirect tests” can be used, but are not specified.

The release of substances upon contact with water results in a potential risk to the environment during the intended use of construction products. The intent of these tests is to identify the leaching behaviour of construction products and thereby allow assessments of the release of RDS from such products to soil, surface water and groundwater under intended conditions of use in relation to CE marking and assessment and verification of constancy of performance.

This document does not address impact assessment. However, since the test methods described in the document may be used in the context of impact assessments and regulation based on impact assessments, some guidance on this issue is provided in prEN 16637-1:—, Annex A (informative).

In addition to existing validation results, in 2011 CEN/TC 351 began an extensive research program on robustness validation of the existing tank leaching and percolation tests. This was carried out by a consortium of European experts on 20 construction products to unify differences from the protocols of the different CEN Members and to check the influence of testing conditions on the test result (e.g. temperature, flow rate, renewal scheme). The results ([4]) of the research program confirmed the robustness of the horizontal tests known from former works. Conclusions from the program have been implemented into the Technical Specifications for the test methods. The performance of the leaching tests regarding repeatability and reproducibility was deduced from a second validation step and respective data ([5], [6]) are included in prEN 16637-2 and in this document.

1 Scope

(1) This document specifies an up-flow percolation test (PT) which is applicable to determine the leaching behaviour of inorganic and non-volatile organic substances from granular construction products. The test is not suitable for substances that are volatile under ambient conditions. The construction products are subjected to percolation with water as a function of liquid to solid ratio under specified percolation conditions. The method is a once-through column leaching test.

(2) This up-flow percolation test is performed under specified test conditions for construction products and does not necessarily produce results that mimic specific intended use conditions. This test method produces eluates, which can subsequently be characterized by physical, chemical and ecotoxicological methods according to existing standard methods. The results of eluate analysis are presented as a function of the liquid/solid ratio. The test results enable the distinction between different leaching behaviour.

NOTE 1 Volatile organic substances include the low molecular weight substances in mixtures such as mineral oil.

NOTE 2 It is not always possible to adjust test conditions simultaneously for inorganic and organic substances. Test conditions can also vary between different groups of organic substances. Test conditions for organic substances are generally more stringent than those for inorganic substances. The test conditions are generally described in a way that they fit testing organic substances and are also applicable to inorganic substances depending on the set-up.

NOTE 3 For ecotoxicity testing, eluates representing the release of both inorganic and organic substances are needed. In this document, ecotoxicological testing is meant to include also genotoxicological testing.

NOTE 4 Construction products with a low hydraulic conductivity that can cause detrimental pressure build-up are not supposed to be subjected to this test.

NOTE 5 This procedure is generally not applicable to products that are easily biologically degradable and products reacting with the leachant, leading, for example, to excessive gas emission or excessive heat release, impermeable hydraulically bound products or products that swell in contact with water.

(3) In this document the same test conditions as for prEN 17516 (CEN/TC 444/WG 1) are applied in order to allow full comparability of testing construction products and waste derived construction products to avoid double testing. The prEN 17516 test results are eligible in the context of testing construction products as well.

NOTE 6 If a leaching test according to prEN 17516 has been performed, additional prEN 16637-3 testing does not need to be carried out.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 933-1, *Tests for geometrical properties of aggregates - Part 1: Determination of particle size distribution - Sieving method*

EN 15934, *Sludge, treated biowaste, soil and waste - Calculation of dry matter fraction after determination of dry residue or water content*

prEN 16637-1, *Construction products: Assessment of release of dangerous substances – Part 1: Guidance for the determination of leaching tests and additional testing steps (under development)*

CEN/TS 17195, *Construction products: Assessment of release of dangerous substances - Analysis of inorganic substances in eluates*

EN ISO 3696:1995, *Water for analytical laboratory use - Specification and test methods (ISO 3696:1987)*

EN ISO 5667-3, *Water quality - Sampling - Part 3: Preservation and handling of water samples (ISO 5667-3)*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— IEC Electropedia: available at http://www.electropedia.org/

— ISO Online browsing platform: available at https://www.iso.org/obp

3.1
eluate
solution obtained from a leaching test

[SOURCE: EN 16687:2015 [7], 4.2.7]

3.2
granular product
product composed of solid particles with a particle size smaller than a specified size or grading

Note 1 to entry: Granular products are usually tested by a percolation test.

3.3
laboratory sample
sample or sub-sample(s) sent to or received by the laboratory

Note 1 to entry: When the laboratory sample is further prepared by subdividing, cutting, sawing, coring, drying, grinding, mixing, curing 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 or for analysis.

Note 2 to entry: 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.

[SOURCE: EN 16687:2015 [7], 3.2.1]