



SLOVENSKI STANDARD
oSIST prEN 17331:2022
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Gradbeni proizvodi - Ocenjevanje sproščanja nevarnih snovi - Vsebnost organskih snovi - Metode ekstrakcije in analize

Construction products: Assessment of release of dangerous substances - Content of organic substances - Methods for extraction and analysis

Bauprodukte: Bewertung der Freisetzung von gefährlichen Stoffen - Gehalt an organischen Stoffen - Extraktions- und Analyseverfahren

Produits de construction - Évaluation de l'émission de substances dangereuses - Teneur en matières organiques - Méthodes d'extraction et d'analyse

Ta slovenski standard je istoveten z: prEN 17331

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ICS:

13.020.99	Drugi standardi v zvezi z varstvom okolja	Other standards related to environmental protection
91.100.01	Gradbeni materiali na splošno	Construction materials in general

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EUROPEAN STANDARD
NORME EUROPÉENNE
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English Version

Construction products: Assessment of release of dangerous substances - Content of organic substances - Methods for extraction and analysis

Produits de construction - Évaluation de l'émission de
substances dangereuses - Teneur en matières
organiques - Méthodes d'extraction et d'analyse

Bauprodukte: Bewertung der Freisetzung von
gefährlichen Stoffen - Gehalt an organischen Stoffen -
Extraktions- und Analyseverfahren

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

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European foreword

This document (prEN 17331:2022) 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 17331:2019.

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

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prEN 17331:2022 (E)**Introduction**

This document deals with the determination of the content of organic substances in construction products.

Following an extended evaluation of available methods for content and eluate analysis in construction products (CEN/TR 16045) it was concluded that existing methods for determining content of various organic substances in soil, sludge and waste are applicable to construction products. The present document therefore contains reference to such other standards for the substances of interest.

This document is part of a modular horizontal approach and belongs to the analytical step. An overview of all modules which belong to a chain of measurement, and the manner how modules are selected is given in CEN/TR 16220.

In the growing amount of product and sector-oriented test methods it was recognized that many steps in test procedures are or could be used in test procedures for many products, materials and sectors. It was supposed that, by careful determination of these steps and selection of specific questions within these steps, elements of the test procedure could be described in a way that can be used for all materials and products or for all materials and products with certain specifications.

In this context a horizontal modular approach was adopted in CEN/TC 351. "Horizontal" means that the methods can be used for a wide range of materials and products with certain properties. "Modular" means that a test standard developed in this approach concerns a specific step in assessing a property and not the whole "chain of measurement" (from sampling to analyses). A beneficial feature of this approach is that "modules" can be replaced by better ones without jeopardizing the standard "chain".

The use of modular horizontal standards implies the drawing of test schemes as well. Before executing a test on a certain material or product to determine certain characteristics, it is necessary to draw up a protocol in which the adequate modules are selected and together form the basis for the entire test procedure.

Further guidance on the applicability of specific test methods can be found in CEN/TR 16496.

NOTE In Annex B, several methods are mentioned which are, to the current knowledge of CEN/TC 351/WG 5 members, national standards or in the process of standardization (at European or national level). Please inform the CEN/TC 351 secretariat if you know of other such standardization activities.

1 Scope

This document specifies existing methods for the determination of the content of specific organic substances in construction products.

The following parameters are covered: BTEX, biocides, dioxins, furans and dioxin-like PCBs, mineral oil, nonylphenols, PAH, PCB, PCP, PBDE, and short-chain chlorinated paraffins.

NOTE 1 Methods still under development or available at national level only are listed in Annex B for PFOS, PFOA, HBCD and EOX. The methods can be included in the normative text as soon as full EN standards are available.

NOTE 2 Methods that have not been validated for construction products, because no suitable material was available at the time of the robustness validation, only are listed in Annex B. This applies to organotin compounds, phenols and phthalates.

The methods listed in this document come from different fields and are expected to be suitable for organic substances in organic extracts from all types of constructions products.

The methods in this document are validated for the product types listed in Annex A.

NOTE 3 Construction products include, e.g. mineral-based products, bituminous products, wood-based products, polymer-based products and metals. This document includes analytical methods for all matrices except metals.

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.

prEN 17844, *Construction products: Assessment of release of dangerous substances — Determination of the content of polycyclic aromatic hydrocarbons (PAH) and of benzene, toluene, ethylbenzene and xylenes (BTEX) — Gas chromatographic method with mass spectrometric detection*

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prEN 17845, *Construction products: Assessment of release of dangerous substances — Determination of biocide residues using LC-MS/MS*

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

EN 14039, *Characterization of waste — Determination of hydrocarbon content in the range of C10 to C40 by gas chromatography*

CEN/TS 16182, *Sludge treated biowaste and soil — Determination of nonylphenols (NP) and nonylphenol-mono- and diethoxylates using gas chromatography with mass selective detection (GC-MS)*

EN 16190, *Soil, treated biowaste and sludge — Determination of dioxins and furans and dioxin-like polychlorinated biphenyls by gas chromatography with high resolution mass selective detection (HR GC-MS)*

EN 16687:2015, *Construction products — Assessment of release of dangerous substances — Terminology*

EN 17087, *Construction products: Assessment of release of dangerous substances — Preparation of test portions from the laboratory sample for testing of release and analysis of content*

EN 17322, *Environmental solid matrices — Determination of polychlorinated biphenyls (PCB) by gas chromatography - mass selective detection (GC-MS) or electron-capture detection (GC-ECD)*

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EN ISO 22032, *Water quality — Determination of selected polybrominated diphenyl ethers in sediment and sewage sludge — Method using extraction and gas chromatography/mass spectrometry (ISO 22032)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16687:2015 and the following apply.

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

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1**blank value**

test result obtained by carrying out the test procedure in the absence of a test portion

Note 1 to entry: The blank value is expressed in the same units as for presenting the test results as usual for that test.

[SOURCE: EN 16687:2015, 4.1.10]

3.2**extract**

solution resulting from extraction of a sample with a solvent

[SOURCE: CEN/TR 16045:2010, 2.2.4]

3.3**extraction**

dissolution of substances in a solvent for subsequent chemical analysis

Note 1 to entry: Extraction is usually done with an organic solvent to extract organic substances for chemical analysis or for special analysis of inorganic substances.

[SOURCE: CEN/TR 16045:2010, 2.2.5]

3.4**laboratory sample**

sample or subsample(s) sent to or received by the laboratory

[SOURCE: EN 16687:2015, 3.2.1]

3.5**method detection limit****MDL**

smallest analyte concentration that can be detected with a specified analytical method including sample preparation with a defined statistical probability

[SOURCE: EN ISO 17294-1:2006, 3.12, modified – “including sample preparation” added, symbol replaced by abbreviation]

3.6**product matrix**

main composition of the product dictating the manner of sample preparation and the type of digestion or extraction for later chemical analysis

Note 1 to entry: For construction products for example the following product matrices can be distinguished:

- bituminous products;
- metals;
- plastics/rubbers;
- silica-based products;
- wood-based products.

[SOURCE: CEN/TR 16045:2010, 2.2.6; edited]

3.7**sample**

portion of material selected from a larger quantity of material

[SOURCE: EN 16687:2015, 3.1.5]

3.8**test portion****analytical portion**

amount of the test sample taken for testing/analysis purposes, usually of known weight or volume

[SOURCE: EN 16687:2015, 3.2.3]

3.9**test sample**

sample, prepared from the laboratory sample, from which test portions are removed for testing or analysis

[SOURCE: EN 16687:2015, 3.2.2]

4 Abbreviations

For the purposes of this document, the following abbreviations apply.

AAS	Atomic absorption spectrometry
AED	Atomic emission detector
BTEX	Alkylated benzenes: sum of benzene, toluene, ethylbenzene and xylenes
ECD	Electron capture detection
ECNI	Electron capture negative ionization
EI	Electron ionization
EOTA	European Organisation for Technical Assessment
EOX	Extractable organically bound halogens
FID	Flame ionization detector
FPD	Flame photometric detector

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GC	Gas chromatography
HBCD	Hexabromocyclododecane
HPLC	High performance liquid chromatography NOTE High pressure liquid chromatography is an (outdated) synonym.
HRGC	High-resolution gas chromatography
LLE	Liquid-liquid extraction, also known as solvent extraction and partitioning
MS	Mass spectrometry; Mass selective detection
NCI	Negative chemical ionization
NP	Nonylphenol(s)
PAH	Polycyclic aromatic hydrocarbon(s)
PBDE	Polybrominated diphenyl ether(s)
PCB	Polychlorinated biphenyl(s)
PCP	Pentachlorophenol
PFOA	Perfluorooctanoic acid
PFOS	Perfluorooctanesulfonate
PLE	Pressurized liquid extraction
SCCP	Short-chain chlorinated paraffins
SLE	Solid-liquid extraction
TR	Technical Report (ISO, CEN or EOTA)
TS	Technical Specification (ISO, CEN or EOTA)

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5 Sample preparation

To obtain test samples for extraction (and analysis) guidance on sample preparation as specified in EN 17087 shall be applied. The sample shall be analysed for the total content of substances of interest.

Precautions should be taken before and during transport of the laboratory sample as well as during the time in which the samples are preserved in the laboratory before being analysed, to avoid alteration of the sample (see CEN/TR 16220).

Extracts are susceptible to change due to physical or chemical reactions which can take place between the time of extraction and the analysis.

It is therefore essential to take the necessary precautions to minimize these reactions and in the case of many parameters to analyse the extract with a minimum of delay. The maximum delay is given in the respective analytical standards.

6 Blank determination

The blank contribution of the applied procedure for extraction and analysis shall be determined as described in the analytical standards and considered in the calculation of the results when appropriate.

7 Interferences

A large number of compounds can interfere with the determination of the parameters concerned. These potential interferences are listed in the individual standards in question.

Several types of interference effects can contribute to inaccuracies in the determination of the various parameters, especially at low concentrations. These potential interference effects are listed in the individual standards and shall be considered separately for each analytical technique.

Chemical interferences are characterized by:

- molecular compound formation;
- ionization effects;
- solute vaporization;
- precipitation;
- effects of decomposition of organic matter.

Addition of buffer and/or preservation methods can reduce these effects.

8 Selection of the suitable test method

Select the appropriate standardized test method listed in Table 1 according to the type of construction product, the concentration range of the parameter of interest and the expected interferences.

For analytical quality control purposes, EN ISO/IEC 17025 should be considered.

It is pointed out that the standardized test methods listed in Table 1 have primarily been developed for the analysis of different types of solid samples. They have been validated in an interlaboratory trial for a limited number of construction products (see Annex A).

If the methods referred to in Table 1 are found to be inappropriate by reason of, for example, detection limits, repeatability or interferences, other methods validated for analysis of solid matrices can be used. In some cases, e.g. polymeric materials, the extraction yield can be too low and the extraction step shall be optimized. The suitability of the alternative method for construction products as well as the optimized extractions shall be checked in the laboratory performing the analysis. The reason for the deviations shall be stated in the test report.

Table 1 — Parameters and test methods

Parameter/ Substance group ^a	Method (number)	Method (short title)	Suitable for Matrix type	Sample preparation	Method type	Method detection limit mg/kg dry matter
Alkylated benzenes (BTEX): Sum of benzene, toluene, ethylbenzene, xylenes	prEN 17844	BTEX in construction products	Bitumen and related products	Cryogenic size reduction	GC-MS	0,1
Biocides	prEN 17845	biocide residues in construction products		methanol extraction and clean-up using diatomaceous earth	LC-MS/MS	