

English Version

Construction products: Assessment of release of
dangerous substances - Content of inorganic substances -
Methods for analysis of aqua regia digests

Produits de construction: Evaluation de l'émission de
substances dangereuses - Contenu des substances
inorganiques - Méthodes d'analyse des digestats d'eau
régale

Bauprodukte: Bewertung der Freisetzung von
gefährlichen Stoffen - Gehalt an anorganischen Stoffen
- Verfahren zur Analyse von
Königswasserauflösungen

This Technical Specification (CEN/TS) was approved by CEN on 23 March 2018 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

CEN members are required to announce the existence of this CEN/TS in the same way as for an EN and to make the CEN/TS available promptly at national level in an appropriate form. It is permissible to keep conflicting national standards in force (in parallel to the CEN/TS) until the final decision about the possible conversion of the CEN/TS into an EN is reached.

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



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

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Contents

Page

European foreword.....	3
Introduction	4
1 Scope.....	5
2 Normative references.....	5
3 Terms and definitions	6
4 Abbreviations	8
5 Sample pre-treatment	8
6 Selection of suitable analytical test method.....	8
6.1 Table of test methods	8
6.2 General validation information	8
6.3 Content in mg/kg.....	9
7 Method performance	10
8 Expression of results.....	10
9 Test report.....	10
10 Test report.....	10
11 Test performance.....	11
Annex A (informative) Summary of validation results for other matrices	12
A.1 General.....	12
A.2 Interlaboratory studies.....	12
A.2.1 Results of the interlaboratory study for EN 13346.....	12
A.2.2 Results of the interlaboratory study for EN 13650.....	14
A.2.3 Results of the interlaboratory study for EN 13657.....	15
A.2.4 Background information in the interlaboratory study for EN 16174.....	17
Annex B (informative) Indicative values for MDL	21
Bibliography.....	22

European foreword

This document (CEN/TS 17201:2018) 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 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.

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

Introduction

Following an extended evaluation of available methods for content analysis in construction products (CEN/TR 16045, [1]) it was concluded that eluate analysis methods are very similar to analytical methods used to determine content after digestion of a solid matrix.

This document has a similar structure as CEN/TS 17195 *Construction products: Assessment of release of dangerous substances – Analysis of inorganic substances in eluates*.

This Technical Specification is part of a modular horizontal approach which 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). Beneficial features of this approach are that modules can be replaced by better ones without jeopardizing the standard chain and duplication of work of in different Technical Committees for Products can be avoided as far as possible. Similar standards have been developed for content determination in different types of matrices, see Annex A.

The modules that relate to the standards developed in CEN/TC 351 are specified in CEN/TR 16220 [2], which distinguishes between the modules. This Technical Specification belongs to the analytical step.

The use of modular horizontal standards implies the drawing of test schemes as well. Before executing a test on a certain construction 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.

1 Scope

This Technical Specification specifies analytical methods for the determination of major, minor and trace elements in aqua regia digests of construction products. It refers to the following 67 elements: Aluminium (Al), antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), bismuth (Bi), boron (B), cadmium (Cd), calcium (Ca), cerium (Ce), cesium (Cs), chromium (Cr), cobalt (Co), copper (Cu), dysprosium (Dy), erbium (Er), europium (Eu), gadolinium (Gd), gallium (Ga), germanium (Ge), gold (Au), hafnium (Hf), holmium (Ho), indium (In), iridium (Ir), iron (Fe), lanthanum (La), lead (Pb), lithium (Li), lutetium (Lu), magnesium (Mg), manganese (Mn), mercury (Hg), molybdenum (Mo), neodymium (Nd), nickel (Ni), palladium (Pd), phosphorus (P), platinum (Pt), potassium (K), praseodymium (Pr), rubidium (Rb), rhenium (Re), rhodium (Rh), ruthenium (Ru), samarium (Sm), scandium (Sc), selenium (Se), silicon (Si), silver (Ag), sodium (Na), strontium (Sr), sulphur (S), tellurium (Te), terbium (Tb), thallium (Tl), thorium (Th), thulium (Tm), tin (Sn), titanium (Ti), tungsten (W), uranium (U), vanadium (V), ytterbium (Yb), yttrium (Y), zinc (Zn), and zirconium (Zr).

The methods in this Technical Specification are applicable to construction products.

NOTE Construction products include e.g. mineral-based products (S); bituminous products (B); metals (M); wood-based products (W); plastics and rubbers (P); sealants and adhesives (A); paints and coatings (C), see also CEN/TR 16045 [1].

The selection of analytical methods to be applied is based on the required sensitivity of the method, which is provided for all combinations of substance and analytical procedure.

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 17087:—¹, *Construction products: Assessment of release of dangerous substances — Preparation of test portions from the laboratory sample for analysis of eluates and digests*

CEN/TS 17195, *Construction products: Assessment of release of dangerous substances — Digestion by aqua regia for subsequent analysis of inorganic substances*

CEN/TS 17197, *Construction products: Assessment of release of dangerous substances — Analysis of inorganic substances in digests and eluates — Analysis by Inductively Coupled Plasma — Optical Emission Spectrometry (ICP-OES)*

CEN/TS 17200, *Construction products: Assessment of release of dangerous substances — Analysis of inorganic substances in digests and eluates — Analysis by Inductively Coupled Plasma — Mass Spectrometry (ICP-MS)*

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

EN ISO 11969:1996, *Water quality — Determination of arsenic — Atomic absorption spectrometric method (hydride technique) (ISO 11969:1996)*

¹ Under preparation. Stage at the time of publication: prEN 17087:2017.

EN ISO 12846:2012, *Water quality — Determination of mercury — Method using atomic absorption spectrometry (AAS) with and without enrichment (ISO 12846:2012)*

EN ISO 15586:2003, *Water quality — Determination of trace elements using atomic absorption spectrometry with graphite furnace (ISO 15586:2003)*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025)*

EN ISO 17852:2008, *Water quality — Determination of mercury — Method using atomic fluorescence spectrometry (ISO 17852:2006)*

ISO 17378-1:2014, *Water quality — Determination of arsenic and antimony — Part 1: Method using hydride generation atomic fluorescence spectrometry (HG-AFS)*

ISO 17378-2:2014, *Water quality — Determination of arsenic and antimony — Part 2: Method using hydride generation atomic absorption spectrometry (HG-AAS)*

ISO/TS 13530, *Water quality — Guidance on analytical quality control for chemical and physicochemical water analysis*

ISO/TS 17379-1:2013, *Water quality — Determination of selenium — Part 1: Method using hydride generation atomic fluorescence spectrometry (HG-AFS)*

ISO/TS 17379-2:2013, *Water quality — Determination of selenium — Part 2: Method using hydride generation atomic absorption spectrometry (HG-AAS)*

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 <http://www.iso.org/obp>

3.1

digest

solution resulting from acid digestion of a sample

[SOURCE: EN 16687:2015, 3.2.8]

3.2

digestion

mineralization of the organic matter of a sample and dissolution of its mineral part (as completely as possible) when reacted with a reagent mixture

Note 1 to entry: Usually done with a strong, concentrated acid like aqua regia or nitric acid to dissolve inorganic substances for chemical analysis.

[SOURCE: EN 16687:2015, 3.2.9]

3.3

laboratory sample

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