

Construction products: Assessment of release of dangerous substances - Analysis of inorganic substances in eluates and digests - Analysis by inductively coupled plasma mass spectrometry (ICP-MS)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

<p>See Eesti standard EVS-EN 17200:2023 sisaldab Euroopa standardi EN 17200:2023 ingliskeelset teksti.</p> <p>Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas</p> <p>Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 22.11.2023.</p> <p>Standard on kättesaadav Eesti Standardimis-ja Akrediteerimiskeskusest.</p>	<p>This Estonian standard EVS-EN 17200:2023 consists of the English text of the European standard EN 17200:2023.</p> <p>This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation and Accreditation.</p> <p>Date of Availability of the European standard is 22.11.2023.</p> <p>The standard is available from the Estonian Centre for Standardisation and Accreditation.</p>
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English Version

Construction products: Assessment of release of
dangerous substances - Analysis of inorganic substances in
eluates and digests - Analysis by inductively coupled
plasma mass spectrometry (ICP-MS)

Produits de construction : Évaluation de l'émission de
substances dangereuses - Analyse des substances
inorganiques dans les digestats et les éluats - Analyse
par spectrométrie de masse avec plasma à couplage
inductif (ICP-MS)

Bauprodukte: Bewertung der Freisetzung von
gefährlichen Stoffen - Analyse von anorganischen
Stoffen in Aufschlusslösungen und Eluaten - Analyse
mit induktiv gekoppeltem Plasma -
Massenspektrometrie (ICP-MS)

This European Standard was approved by CEN on 14 August 2023.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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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.....	4
Introduction	5
1 Scope.....	6
2 Normative references.....	6
3 Terms and definitions	7
4 Abbreviations	8
5 Principle	9
6 Interferences	9
6.1 General.....	9
6.2 Spectral interferences	9
6.2.1 Isobaric elemental interferences.....	9
6.2.2 Isobaric molecular and doubly charged ion interferences.....	9
6.3 Non-spectral interferences.....	10
7 Reagents	10
8 Apparatus.....	13
9 Procedure.....	14
9.1 Test sample	14
9.2 Test portion.....	14
9.3 Instrument set up.....	14
9.4 Calibration	15
9.4.1 Calibration function	15
9.4.2 Standard addition calibration.....	15
9.4.3 Determination of correction factors	15
9.4.4 Variable isotope ratio.....	15
9.5 Sample measurement.....	15
10 Calculation	16
10.1 Calculation for digests of construction products.....	16
10.2 Calculation for eluates of construction products	16
11 Expression of results.....	16
12 Performance characteristics.....	16
12.1 General.....	16
12.2 Blank.....	17
12.3 Calibration check	17
12.4 Internal standard response.....	17
12.5 Interference	17
12.6 Recovery	17
12.7 Indicative values for MDL.....	17
13 Test performance.....	17
14 Test report.....	18

Annex A (informative) Validation results for analysis of inorganic substances in eluates and digests from construction products	20
A.1 General	20
A.2 Precision data for analysis of eluates from construction products.....	20
A.3 Precision data for analysis of <i>aqua regia</i> digests from construction products.....	27
Annex B (informative) Indicative values for MDL.....	34
Bibliography	35

European foreword

This document (EN 17200:2023) 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 European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by May 2024, and conflicting national standards shall be withdrawn at the latest by May 2024.

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 supersedes CEN/TS 17200:2018+AC:2018.

In comparison with the previous edition, the following technical modifications have been made:

- the addition of performance data and data from intercomparison validation;
- alignment of terms and definitions within the working groups of CEN/TC 351, i.e. through the revised version of EN 16687.

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

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

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Introduction

Following an extended evaluation of available methods for content and eluate analysis in construction products (CEN/TR 16045) it was concluded that multi element analysis methods have preference over methods developed for single elements or small groups of elements. This implies that for inorganic substances ICP methods are preferred for the analysis of extracts obtained from digestion or eluates obtained from leaching.

This standard has been adopted from the work carried out in the context of CEN/TC 400 (project HORIZONTAL) and is very similar to EN 16171.

The outcome of the analysis of materials that due to considerations of reuse/recycling could fall under an evaluation as construction products would be considered to fall within the uncertainties as specified by the respective methods and as such would not require an additional analysis, thus avoiding double testing.

NOTE 1 A similar method has been validated for the determination of elements in *aqua regia* digests (EN ISO 54321) for the following matrices: municipal sludge, industrial sludge, sludge from electronic industry, ink waste sludge, sewage sludge, biowaste, compost, composted sludge, agricultural soil, sludge amended soil, waste, city waste incineration fly ash ("oxidised" matrix), city waste incineration bottom ash ("silicate" matrix), ink waste sludge (organic matrix), electronic industry sludge ("metallic" matrix), sewage sludge (BCR 146R), city waste incineration ash (BCR 176).

NOTE 2 A similar method has been validated for the determination of elements in hydrochloric (HCl), nitric (HNO₃) and tetrafluoroboric (HBF₄) or hydrofluoric (HF) acid mixture digests (EN 13656) for the following matrices: city waste incineration ash (BCR176/BCR176R), ink waste sludge (organic matrix), electronic industry sludge ("metallic" matrix), sediment, coal fly ash, steel slag, copper slag, city waste incineration fly ash ("oxidised" matrix), city waste incineration bottom ash ("silicate" matrix), sewage sludge (BCR 146R).

This document 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.

The modules that relate to the standards developed in CEN/TC 351 are specified in CEN/TR 16220, which distinguishes between the modules. This document 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 document specifies the method for the determination of major, minor and trace elements in eluates and in *aqua regia* and nitric acid digests of construction products by inductively coupled plasma mass spectrometry (ICP-MS). 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), caesium (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).

NOTE 1 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.

The working range depends on the matrix and the interferences encountered.

NOTE 2 The limit of detection of most elements will be affected by their natural abundance, ionization behaviour, on abundance of isotope(s) free from isobaric interferences and by contamination (e.g. handling and airborne). Handling contaminations are in many cases more important than airborne ones.

The limit of detection (MDL) will be higher in cases where the determination is likely to be interfered (see Clause 6) or in case of memory effects (see e.g. EN ISO 17294-1).

The method in this document is applicable to construction products and validated for the product types listed in Annex A (informative).

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 16637-2, *Construction products: Assessment of release of dangerous substances — Part 2: Horizontal dynamic surface leaching test*

EN 16637-3, *Construction products: Assessment of release of dangerous substances — Part 3: Horizontal up-flow percolation*

EN 16687:2023, *Construction products: Assessment of release of dangerous substances — Terminology*

EN 17196, *Construction products: Assessment of release of dangerous substances — Digestion by aqua regia for subsequent analysis of inorganic substances*

EN ISO 17294-1:2006, *Water quality — Application of inductively coupled plasma mass spectrometry (ICP-MS) — Part 1: General guidelines (ISO 17294-1:2004)*