

English Version

**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)**

Produits de construction: Évaluation des émissions de
substances dangereuses - Analyse des substances
inorganiques dans les digestats et les éluats - Analyse
par spectrométrie de masse avec plasma à couplage
inductif

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

This Technical Specification (CEN/TS) was approved by CEN on 2 April 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.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
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Contents

Page

European foreword.....	4
Introduction	5
1 Scope	6
2 Normative references	6
3 Terms and definitions	7
4 Symbols and abbreviations	9
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	10
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	16
9.4.4 Variable isotope ratio	16
9.5 Sample measurement	16
10 Calculation	16
10.1 Calculation for digests of construction products.....	16
10.2 Calculation for eluates of construction products	17
11 Expression of results.....	17
12 Performance characteristics.....	17
12.1 General.....	17
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 Precision.....	17
13 Test report.....	18

Annex A (informative) Method detection limit (MDL) and precision data for soil, sludge and biowaste	20
Annex B (informative) Validation results for construction products.....	28
B.1 Introduction.....	28
B.2 Performance data	28
Bibliography	29

European foreword

This document (CEN/TS 17200:2018) 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.

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A similar document has been developed for drinking water, surface water and waste water and different types of waste respectively, see Annex A.

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Introduction

Following an extended evaluation of available methods for content and eluate analysis in construction products (CEN/TR 16045; [1]) 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, *Sludge, treated biowaste and soil - Determination of elements using inductively coupled plasma mass spectrometry (ICP-MS)* [2].

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.

The modules that relate to the standards developed in CEN/TC 351 are specified in CEN/TR 16220, *Construction products: Assessment of release of dangerous substances – Complement to sampling* [3] 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 the method for the determination of major, minor and trace elements in aqua regia and nitric acid digests and in eluates 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), 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).

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 [1].

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 will be higher in cases where the determination is likely to be interfered (see Clause 4) or in case of memory effects (see e.g. EN ISO 17294-1:2006, 8.2).

The method in this Technical Specification is applicable to construction products and validated for the product types listed in Annex B.

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.

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

CEN/TS 16637-3, *Construction products — Assessment of release of dangerous substances — Part 3: Horizontal up-flow percolation test*

CEN/TS 17196, *Construction products: Assessment of release of dangerous substances — Digestion by aqua regia for subsequent analysis of the major, minor and trace elements*

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

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

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