



**NSAI**  
Standards

Irish Standard  
I.S. EN ISO 16968:2015

## Solid biofuels - Determination of minor elements (ISO 16968:2015)

## I.S. EN ISO 16968:2015

*Incorporating amendments/corrigenda/National Annexes issued since publication:*

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NSAI  
1 Swift Square,  
Northwood, Santry  
Dublin 9

T +353 1 807 3800  
F +353 1 807 3838  
E standards@nsai.ie  
W NSAI.ie

Sales:  
T +353 1 857 6730  
F +353 1 857 6729  
W standards.ie

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## Solid biofuels - Determination of minor elements (ISO 16968:2015)

Biocombustibles solides - Détermination des éléments mineurs (ISO 16968:2015)

Biogene Festbrennstoffe - Bestimmung von Spurenelementen (ISO 16968:2015)

This European Standard was approved by CEN on 14 February 2015.

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**CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels**

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## **Foreword**

This document (EN ISO 16968:2015) has been prepared by Technical Committee ISO/TC 238 “Solid biofuels” in collaboration with Technical Committee CEN/TC 335 “Solid biofuels” the secretariat of which is held by SIS.

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of an identical text or by endorsement, at the latest by November 2015, and conflicting national standards shall be withdrawn at the latest by November 2015.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 15297:2011.

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

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### **Endorsement notice**

The text of ISO 16968:2015 has been approved by CEN as EN ISO 16968:2015 without any modification.

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STANDARD**

**ISO  
16968**

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2015-05-15

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**Solid biofuels — Determination of  
minor elements**

*Biocombustibles solides — Détermination des éléments mineurs*



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ISO 16968:2015(E)

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**ISO 16968:2015(E)**



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ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org



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## ISO 16968:2015(E)

### Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see [www.iso.org/directives](http://www.iso.org/directives)).

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Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: [Foreword — Supplementary information](#).

ISO 16968 was prepared by the European Committee for Standardization (CEN) in collaboration with Technical Committee ISO/TC 238, *Solid biofuels*, in accordance with the Agreement on technical cooperation between ISO and CEN (Vienna Agreement).

## **Introduction**

The minor elements present in solid biofuels can, in some cases, be of environmental concern, e.g. it has been shown that certain energy crops will concentrate cadmium and, in polluted areas, other toxic elements may be found at elevated concentrations in the biofuels. This can be a problem if, for example, the ash from the combustion is to be put back in the forest as a fertilizer. Trace elements in biofuels are often present at very low concentrations requiring great care to avoid contamination in the sample preparation and decomposition steps. The typical concentrations of minor elements in solid biofuels can be found in ISO 17225-1. In this International Standard, wet chemical methods are described. Alternative methods such as X-ray fluorescence (XRF) or direct mercury analysers may be used when validated with suitable materials (biomass reference materials).



# Solid biofuels — Determination of minor elements

## 1 Scope

This International Standard is intended for the determination of the minor elements Arsenic, Cadmium, Cobalt, Chromium, Copper, Mercury, Manganese, Molybdenum, Nickel, Lead, Antimony, Vanadium, and Zinc in all solid biofuels. Further, it describes methods for sample decomposition and suggests suitable instrumental methods for the determination of the elements of interest in the digests. The determination of other elements such as Selenium, Tin, and Thallium is also possible with the method described in this International Standard.

## 2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 11885, *Water quality — Determination of selected elements by inductively coupled plasma optical emission spectrometry (ICP-OES)*

ISO 16559, *Solid biofuels — Terminology, definitions and descriptions*

ISO 16993, *Solid biofuels — Conversion of analytical results from one basis to another*

ISO 17294-2, *Water quality — Application of inductively coupled plasma mass spectrometry (ICP-MS) — Part 2: Determination of 62 elements*

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

ISO 18134-3<sup>1)</sup>, *Solid biofuels — Determination of moisture content — Oven dry method — Part 3: Moisture in general analysis simple*

EN 14780, *Solid Biofuels — Sample preparation*

EN 12338, *Water quality — Determination of mercury — Enrichment methods by amalgamation*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 16559 and the following apply.

### 3.1 reference material

#### RM

one or more material or substance of which property values are sufficiently homogeneous and well established to be used for the calibration of an apparatus, assessment of a measurement method, or assignment of values to materials

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