

Solid biofuels - Conversion of analytical results from one basis to another (ISO 16993:2016)

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

See Eesti standard EVS-EN ISO 16993:2016 sisaldab Euroopa standardi EN ISO 16993:2016 ingliskeelset teksti.	This Estonian standard EVS-EN ISO 16993:2016 consists of the English text of the European standard EN ISO 16993:2016.
Standard on jõustunud sellekohase teate avaldamisega EVS Teatajas	This standard has been endorsed with a notification published in the official bulletin of the Estonian Centre for Standardisation.
Euroopa standardimisorganisatsioonid on teinud Euroopa standardi rahvuslikele liikmetele kättesaadavaks 27.07.2016.	Date of Availability of the European standard is 27.07.2016.
Standard on kättesaadav Eesti Standardikeskusest.	The standard is available from the Estonian Centre for Standardisation.

Tagasisidet standardi sisu kohta on võimalik edastada, kasutades EVS-i veebilehel asuvat tagasiside vormi või saates e-kirja meiliaadressile standardiosakond@evs.ee.

ICS 27.190, 75.160.10

Standardite reprodutseerimise ja levitamise õigus kuulub Eesti Standardikeskusele

Andmete paljundamine, taastekitamine, kopeerimine, salvestamine elektroonsesse süsteemi või edastamine ükskõik millises vormis või millisel teel ilma Eesti Standardikeskuse kirjaliku loata on keelatud.

Kui Teil on küsimusi standardite autorikaitse kohta, võtke palun ühendust Eesti Standardikeskusega:

Aru 10, 10317 Tallinn, Eesti; koduleht www.evs.ee; telefon 605 5050; e-post info@evs.ee

The right to reproduce and distribute standards belongs to the Estonian Centre for Standardisation

No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying, without a written permission from the Estonian Centre for Standardisation.

If you have any questions about copyright, please contact Estonian Centre for Standardisation:

Aru 10, 10317 Tallinn, Estonia; homepage www.evs.ee; phone +372 605 5050; e-mail info@evs.ee

English Version

**Solid biofuels - Conversion of analytical results from one
basis to another (ISO 16993:2016)**

Biocombustibles solides - Conversion de résultats
analytiques d'une base en une autre base (ISO
16993:2016)

Biogene Festbrennstoffe - Umwandlung von
Analysenergebnissen einer Bezugsbasis in Ergebnisse
mit anderer Bezugsbasis (ISO 16993:2016)

This European Standard was approved by CEN on 25 June 2016.

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. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

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.

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, 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: Avenue Marnix 17, B-1000 Brussels

European foreword

This document (EN ISO 16993:2016) 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 January 2017, and conflicting national standards shall be withdrawn at the latest by January 2017.

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 ISO 16993:2015.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: 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, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Endorsement notice

The text of ISO 16993:2016 has been approved by CEN as EN ISO 16993:2016 without any modification.

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Symbols and abbreviated terms	1
4 Principle	2
5 Calculations for analyses of solid biofuels	2
5.1 General.....	2
5.2 Extra calculations for hydrogen, oxygen, and net calorific value.....	2
5.2.1 Hydrogen.....	2
5.2.2 Oxygen.....	2
5.2.3 Net calorific value.....	3
5.3 General formulae for the conversion from one basis to another basis.....	3
Annex A (informative) Tools for integrity check	4
Annex B (informative) Tables with units and conversion factors	7
Annex C (informative) Guideline for the use of validation parameters	8
Bibliography	10

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

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](#).

The committee responsible for this document is ISO/TC 238, *Solid biofuels*.

This second edition cancels and replaces the first edition (ISO 16993:2015), of which it constitutes a minor revision.

Introduction

In the International Standards covering the analysis of solid biofuels, it is generally specified that the determination is intended to be carried out on the air-dried or in air-equilibrated general analysis test sample prepared according to ISO 14780. However, in making use of these analyses, it is necessary to express the results on dry basis and sometimes, also on some other basis. The bases in common use for solid biofuels are “air-dried” (sometimes stated as “as determined”), “as received” (sometimes stated “as sampled” or “as delivered”), “dry”, and “dry, ash free”.

Solid biofuels — Conversion of analytical results from one basis to another

1 Scope

This International Standard gives formulae which allow analytical data relating to solid biofuels to be expressed on the different bases in common use. Consideration is given to corrections that can be applied to certain determined values for solid biofuels prior to their calculation to other bases.

In [Annex A](#), tools for integrity checks of analytical results are given. In [Annex B](#), conversion factors for calculation into other units are given. [Annex C](#) is a guideline for the use of validation parameters as can be found in ISO/TC 238 analytical standards.

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 16948:2015, *Solid biofuels — Determination of total content of carbon, hydrogen and nitrogen*

ISO 16994, *Solid biofuels — Determination of total content of sulphur and chlorine*

ISO 18122, *Solid biofuels — Determination of ash content*

ISO 18125¹⁾, *Solid biofuels — Determination of calorific value*

ISO 18134-1, *Solid biofuels — Determination of moisture content — Oven dry method — Part 1: Total moisture — Reference method*

ISO 18134-2, *Solid biofuels — Determination of moisture content — Oven dry method — Part 2: Total moisture — Simplified method*

ISO 18134-3, *Solid biofuels — Determination of moisture content — Oven dry method — Part 3: Moisture in general analysis sample*

3 Symbols and abbreviated terms

The symbols employed in the subsequent clauses are as follows, with the suffixes “ad” (air-dried), “ar” (as received), “d” (dry), and “daf” (dry, ash free), where appropriate.

<i>A</i>	ash (percentage by mass) according to ISO 18122
<i>C</i>	total carbon content (percentage by mass) according to ISO 16948
<i>Cl</i>	total chlorine content (percentage by mass) according to ISO 16994
<i>q_{p,net}</i>	net calorific value at constant pressure (J/g) according to ISO 18125
<i>H</i>	total hydrogen content (percentage by mass) according to ISO 16948

1) To be published.