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# Solid biofuels - Determination of calorific value

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## Solid biofuels - Determination of calorific value

Biocombustibles solides - Détermination du pouvoir calorifique

Feste Biobrennstoffe - Bestimmung des Heizwertes

This European Standard was approved by CEN on 10 October 2009.

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## Contents

	Page
<b>Foreword</b> .....	<b>4</b>
1 <b>Scope</b> .....	5
2 <b>Normative references</b> .....	5
3 <b>Terms and definitions</b> .....	5
4 <b>Principle</b> .....	6
5 <b>Reagents</b> .....	7
6 <b>Apparatus</b> .....	8
7 <b>Preparation of test sample</b> .....	11
8 <b>Calorimetric procedure</b> .....	12
9 <b>Calibration</b> .....	18
10 <b>Gross calorific value</b> .....	23
11 <b>Precision</b> .....	27
12 <b>Calculation of net calorific value at constant pressure</b> .....	27
13 <b>Test report</b> .....	28
<b>Annex A (normative) Adiabatic bomb calorimeters</b> .....	<b>30</b>
A.1 <b>Principle</b> .....	30
A.2 <b>Sources of error for the real calorimeter</b> .....	30
A.3 <b>Adiabatic conditions</b> .....	30
A.4 <b>Initial steady state and length of the main period</b> .....	31
A.5 <b>Correction for drift at the final temperature</b> .....	32
A.6 <b>Strategy for checking on bias</b> .....	32
<b>Annex B (normative) Isoperibol and static-jacket bomb calorimeters</b> .....	<b>34</b>
B.1 <b>Principle</b> .....	34
B.2 <b>Sources of error for the real calorimeter</b> .....	35
B.3 <b>Choice of jacket temperature</b> .....	36
B.4 <b>Rating periods</b> .....	36
B.5 <b>Calculation of the corrected temperature rise <math>\theta</math></b> .....	37
<b>Annex C (normative) Automated bomb calorimeters</b> .....	<b>40</b>
C.1 <b>The instrument</b> .....	40
C.2 <b>Calibration</b> .....	40
C.3 <b>Precision requirements for calibrations</b> .....	41
C.4 <b>Comparability of calibration and fuel experiments</b> .....	41
C.5 <b>Documentation and print-out</b> .....	42
C.6 <b>Precision requirements for fuel experiments</b> .....	42
<b>Annex D (informative) Checklists for the design and procedures of combustion experiments</b> .....	<b>43</b>
D.1 <b>Introduction</b> .....	43
D.2 <b>Choice of general parameters</b> .....	43
D.3 <b>Adiabatic calorimeters</b> .....	44
D.4 <b>Isoperibol calorimeters</b> .....	46
D.5 <b>Automated bomb calorimeters</b> .....	47
<b>Annex E (informative) Examples to illustrate the main calculations used in this document when an automated bomb calorimeter is used for determinations</b> .....	<b>48</b>

E.1	Gross calorific value at constant volume .....	48
E.2	Gross calorific value at constant pressure.....	49
E.3	Net calorific value .....	50
E.4	Use of typical or default values to calculate calorific values .....	51
Annex F (informative)	List of symbols used in this document .....	52
Annex G (informative)	Key-word index.....	55
Annex H (informative)	Default values of most used biofuels for the calculations of calorific values .....	59
Annex I (informative)	Flow chart for a routine calorific value determination .....	60
Bibliography.....		61

## **Foreword**

This document (EN 14918:2009) has been prepared by 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 June 2010, and conflicting national standards shall be withdrawn at the latest by June 2010.

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 CEN/TS 14918:2005.

**WARNING – Strict adherence to all of the provisions prescribed in this document should ensure against explosive rupture of the bomb, or a blow-out, provided that the bomb is of proper design and construction and in good mechanical condition.**

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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

## 1 Scope

This European Standard specifies a method for the determination of the gross calorific value of a solid biofuel at constant volume and at the reference temperature 25 °C in a bomb calorimeter calibrated by combustion of certified benzoic acid.

The result obtained is the gross calorific value of the analysis sample at constant volume with all the water of the combustion products as liquid water. In practice, biofuels are burned at constant (atmospheric) pressure and the water is either not condensed (removed as vapour with the flue gases) or condensed. Under both conditions, the operative heat of combustion to be used is the net calorific value of the fuel at constant pressure. The net calorific value at constant volume may also be used; formulae are given for calculating both values.

General principles and procedures for the calibrations and the biofuel experiments are presented in the main text, whereas those pertaining to the use of a particular type of calorimetric instrument are described in Annexes A to C. Annex D contains checklists for performing calibration and fuel experiments using specified types of calorimeters. Annex E gives examples to illustrate some of the calculations.

## 2 Normative references

The following referenced documents are indispensable for the application 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 14774-3, *Solid biofuels — Determination of moisture content — Oven dry method — Part 3: Moisture in general analysis sample*

prEN 14778-1, *Solid biofuels — Methods for sampling*

prEN 14780, *Solid biofuels — Methods for sample preparation*

prEN 15296, *Solid biofuels — Calculation of analyses to different bases*

EN ISO 10304-1, *Water quality — Determination of dissolved anions by liquid chromatography of ions — Part 1: Determination of bromide, chloride, fluoride, nitrate, nitrite, phosphate and sulfate (ISO 10304-1:2007)*

ISO 651, *Solid-stem calorimeter thermometers*

ISO 652, *Enclosed-scale calorimeter thermometers*

ISO 1770, *Solid-stem general purpose thermometers*

ISO 1771, *Enclosed-scale general purpose thermometers*

## 3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

### 3.1

#### **gross calorific value at constant volume**

absolute value of the specific energy of combustion, in joules, for unit mass of a solid biofuel burned in oxygen in a calorimetric bomb under the conditions specified



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