

Contents

	Page
European foreword	3
Introduction	4
1 Scope.....	5
2 Normative references.....	5
3 Terms and definitions.....	5
4 Principle	6
5 General requirements for the determination of the oxygen content.....	6
6 Reagents	7
7 Apparatus	7
8 Sampling.....	8
9 Measurement procedure.....	8
10 Calculation of the oxygen content.....	9
11 Test report.....	10
Annex A (normative) Performance characteristics.....	11
Bibliography	13

European foreword

This document (EN 17351:2020) has been prepared by Technical Committee CEN/TC 411 “Bio-based products”, 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of an identical text or by endorsement, at the latest by July 2020, and conflicting national standards shall be withdrawn at the latest by July 2020.

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

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Bio-based products from forestry and agriculture have a long history of application, such as paper, board and various chemicals and materials. The last decades have seen the emergence of new bio-based products in the market. Some of the reasons for the increased interest lie in the benefits of bio-based products in relation to the depletion of fossil resources and climate change. Bio-based products may also provide additional product functionalities. These developments have triggered a wave of innovation with the development of knowledge and technologies allowing new transformation processes and product development.

Acknowledging the need for common standards for bio-based products, the European Commission issued Mandate M/492¹⁾, resulting in a series of standards developed by CEN/TC 411, with a focus on bio-based products other than food, feed and biomass for energy applications.

The standards of CEN/TC 411 “Bio-based products” provide a common basis on the following aspects:

- common terminology;
- bio-based content determination;
- life Cycle Assessment (LCA);
- sustainability aspects;
- declaration tools.

It is important to understand what the term bio-based product covers and how it is being used. The term ‘bio-based’ means ‘derived from biomass’. Bio-based products (bottles, insulation materials, wood and wood products, paper, solvents, chemical intermediates, composite materials, etc.) are products which are wholly or partly derived from biomass. It is essential to characterize the amount of biomass contained in the product by, for instance, its bio-based content or bio-based carbon content.

The bio-based content of a product does not provide information on its environmental impact or sustainability, which may be assessed through LCA and sustainability criteria. In addition, transparent and unambiguous communication within bio-based value chains is facilitated by a harmonized framework for certification and declaration.

This document has been developed with the aim to specify the method for the determination of oxygen content in bio-based products using an elemental analyser. This document provides the reference test methods for laboratories, producers, suppliers and purchasers of bio-based products. It may be also useful for authorities and inspection organizations.

Part of the research leading to this document has been performed under the European Union Seventh Framework Programme OpenBio (see <https://www.biobasedeconomy.eu/>).

¹⁾ A mandate is a standardization task embedded in European trade laws. Mandate M/492 is addressed to the European Standardization bodies, CEN, CENELEC and ETSI, for the development of horizontal European Standards for bio-based products.

1 Scope

This document specifies a direct method for the determination of the total oxygen content in bio-based products using an elemental analyser. The scope is limited to products containing elements carbon, hydrogen, oxygen, nitrogen, chloride, bromide and iodide without fluoride, representing at least 95 % of the composition of the product to be analysed.

NOTE 1 Bio-based materials can contain both organic and inorganic components. The oxygen content might originate both from the organic and/or the inorganic components. The inorganic components are not bio-based but will nevertheless contribute to the amount of oxygen determined by the following prescribed methods and therefore influence the results in terms of oxygen content. According to the current state of the art, it is not possible by isotopic measurements to establish a distinction between oxygen originating from biomass and oxygen originating from non-biomass.

NOTE 2 Although this document has been drafted for the purpose of the determinations dealing with bio-based content, it can be also used as a standalone standard for determination of oxygen in organic compounds.

NOTE 3 For the purposes of this document, the unit “% (m/m)” is used to represent the oxygen content of a material.

NOTE 4 The method specified in this document involves a direct measurement method for the determination of oxygen content. This method contains many similarities with the ASTM D5622 [1] standard for gasoline and methanol fuels. The method specified in this document is specifically developed and validated for bio-based products. In addition, this method provides more accurate and unadulterated measured values for oxygen in contrast to indirect measurement methods for the determination of oxygen (e.g. ASTM D 3176 [2]).

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 16575, *Bio-based products - Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16575 and the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- IEC Electropedia: available at <http://www.electropedia.org/>
- ISO Online browsing platform: available at <https://www.iso.org/obp/ui>

3.1 laboratory sample

sub-quantity of a sample suitable for laboratory tests

3.2 sample

quantity of material, representative of a larger quantity for which the property is to be determined

3.3 sample preparation

action taken to obtain representative analysis samples or test portions from the original sample