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Topila biološkega izvora - Zahteve in preskusne metode

Bio-based solvents - Requirements and test methods

Biobasierte Lösemittel - Anforderungen und Prüfverfahren

Solvants biosourcés - Exigences et méthodes d'essais

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English Version

Bio-based solvents - Requirements and test methods

Solvants biosourcés - Exigences et méthodes d'essais

Biobasierte Lösemittel - Anforderungen und Prüfverfahren

This Technical Specification (CEN/TS) was approved by CEN on 25 November 2014 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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Foreword

This document (CEN/TS 16766:2015) has been prepared by Technical Committee CEN/TC 411 “Bio-based products”, the secretariat of which is held by NEN.

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 has been prepared under a Mandate M/491 [1] given to CEN by the European Commission and the European Free Trade Association, for the development of European Standards for solvents and surfactants in relation to bio-based product aspects. It has been prepared by CEN/TC 411/WG 2 “Bio based solvents”, the secretariat of which is held by the European Solvents Industry Group and NEN.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: 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.

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 bio-based products' benefits in relation to the depletion of fossil resources and climate change. Bio-based products may also provide additional product functionalities. This has 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/492[1)], 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' [3]. 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 Technical Specification has been developed with the aim to fulfil part of a Mandate [1] to describe the technical requirements of bio-based solvents in relation to bio-based product aspects.

Solvents are liquids which have the ability to dissolve, suspend or extract other materials. In Europe, thousands of producers and manufacturers and more than 10 million workers use solvents every day. The solvent producing industry is composed of both small and medium-sized enterprises as well as multinationals. Downstream users generally tend to be SMEs and micro-SMEs.

Solvents are mainly produced from fossil feedstock. The amount of fossil feedstock used for solvent production is however low with less than 1 % of the total world's fossil feedstock consumption (see www.esig.be).

This document describes the approach that can be taken in describing the technical requirements of bio-based solvents in relation to bio-based product for the customers using bio-based solvents. This document examines how to prove the criteria for "bio-based solvents". The purpose of this document is to define how the criteria of performance, health, safety and environment can be determined (measured and calculated) for the

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.

bio-based solvent placed on the market. This approach intends to strengthen the reputation of “bio-based solvents” and the confidence of the customer in this product group.

The criteria for "bio-based solvents" published in this Technical Specification are complementary to the other, horizontal standards by CEN/TC 411.

1 Scope

This Technical Specification sets requirements for bio-based solvents in terms of properties, limits, application classes and test methods. It lays down the characteristics and details for assessment of bio-based solvents:

— fit for purpose in terms of performance related properties;

— comply with the requirements regarding the health, safety and environment which apply to general solvents;

— are derived from a certain minimum percentage of biomass; and

— comply with at least similar sustainability criteria as comparable (regular) solvents.

The criteria of the Regulation for Environmental Assessment of Chemicals (REACH) [2] are included in the discussions that have led to this Technical Specification.

NOTE EN 16575 defines the term “bio-based” as derived from biomass and clarifies that “bio-based” does not imply “biodegradable”. In addition, “biodegradable” does not necessarily imply the use of “bio-based” material.

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.

CEN/TS 16640, *Bio-based products - Determination of the bio based carbon content of products using the radiocarbon method*

EN 16575:2014, *Bio-based products - Vocabulary*

prEN 16751:2014, *Bio-based products - Sustainability criteria*

prEN 16760:2014, *Bio-based products - Life Cycle Assessment*

EN ISO 12185, *Crude petroleum and petroleum products - Determination of density - Oscillating U-tube method (ISO 12185)*

EN ISO 14040, *Environmental management - Life cycle assessment - Principles and framework (ISO 14040)*

EN ISO 14044, *Environmental management - Life cycle assessment - Requirements and guidelines (ISO 14044)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16575:2014 apply.

4 General purpose of solvents

Solvents are liquids which have the ability to dissolve, suspend or extract other materials. They make it possible to process, apply, clean or separate materials. Solvents have significantly changed modern living and are an invaluable solution for industries as diverse as pharmaceuticals and microelectronics to domestic cleaning and printing. In fact, without solvents, many of the products we use and rely on, from penicillin to industrial paint, would not perform to the standards we demand today.

Organic solvents are any organic compound which is typically used, alone or in combination with other agents, and without undergoing a chemical change, to dissolve raw materials, products or waste materials.

Examples of applications for solvents are (as presented in the Solvents Emissions Directive [4]):

— cleaning agent,

— dissolver,

— dispersion medium,

— viscosity adjuster,

— surface tension adjuster,

— plasticiser, or

— preservative.

NOTE For more examples of applications, see the website of the European Solvents Industry Group, www.esig.org.

5 Performance

5.1 Generalities around performance

This section gives a common set of technical properties characterizing the performance of solvents including bio-based solvents. In absence of international solvent specification standards, it is necessary to provide to potential users the means to qualify the bio-based solvent products, especially for its technical performance. There are a number of other factors which will determine the acceptance of a solvent product such as the Health, Safety and Environmental properties which are treated in another section of this document.

Solvents are used in a wide variety of applications and it is not convenient to evaluate their performance with respect to each application. Therefore, a practical approach is to define a set of measurable solvent properties which enable technical specialists to select appropriate solvents and guide their evaluation.

A set of seven properties has been selected which describe essential properties associated with a solvent.

5.2 Technical performance properties

5.2.1 Chemical composition

While chemical composition is not a property in itself, it provides essential information regarding the suitability of a solvent in process and applications.

Quantitative chemical composition of the product should be provided. To identify substances or mixtures as relevant, use of the nomenclature as in EU CLP [5] shall be used.

5.2.2 Solvency power

Very different ways have been defined to measure solvency power, generally experimental measurements such as solubility in water, solubility in oil, Aniline point, Kauri Butanol index, polarity, etc. However, such methods are not able to describe the full extent of the solubility properties of products exhibiting a wide variety of polarities.

A well-known quantitative assessment of solvency power has been developed through the means of the Hansen Solubility parameters [6], which provide a suitable description of solvency properties. Annex A gives a detailed description on how to determine these solubility parameters.