



BSI Standards Publication

Plastics – Bio-based polymers, plastics, and plastics products – Terminology, characteristics and communication

National foreword

This British Standard is the UK implementation of EN 17228:2019. It supersedes PD CEN/TR 15932:2010, DD CEN/TS 16137:2011 and PD CEN/TS 16398:2012, which are withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/89, Plastics - Environmental Aspects.

A list of organizations represented on this committee can be obtained on request to its secretary.

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English Version

Plastics - Bio-based polymers, plastics, and plastics
products - Terminology, characteristics and
communication

Plastiques - Polymères, plastiques et produits en
plastique biosourcés - Terminologie, caractéristiques
et communication

Kunststoffe - Biobasierte Polymere, Kunststoffe und
Kunststoffprodukte - Begriffe, Merkmale und
Kommunikation

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European foreword

This document (EN 17228:2019) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

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of an identical text or by endorsement, at the latest by September 2019, and conflicting national standards shall be withdrawn at the latest by September 2019.

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 supersedes CEN/TR 15932:2010, CEN/TS 16137:2011, CEN/TS 16295:2012, CEN/TS 16398:2012.

This document has been prepared in agreement with the EC Mandate M/430 (“Mandate addressed to CEN for the development of European Standards and CEN workshop agreements for bio-polymers and bio-lubricants in relation to bio-based product aspects”). The mandate M/430 requested the preparation of interim outputs for biopolymers. The interim outputs were: CEN/TS 16137:2011, CEN/TS 16295:2012, CEN/TS 16398:2012, and CEN/TR 15932:2010. The mandate also requested to develop as final output and on the same basis a European Standard for biopolymers. This document represents the final output and will supersede the interim outputs taking into account the standards developed in the meantime by the Technical Committee CEN/TC 411 “Bio-based products”.

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, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

Introduction

Acknowledging the need for common standards for bioplastics, the European Commission issued mandate M/430 (Mandate Addressed to CEN for the Development of European Standards and CEN Workshop Agreements for Bio-Polymers and Bio-Lubricants in Relation to Bio-Based Product Aspects), resulting in a series of technical specifications developed by CEN/TC 249 on bioplastics. Subsequently the European Commission issued mandate M/492 (Mandate Addressed to CEN, CENELEC and ETSI for the Development of Horizontal European Standards and Other Standardization Deliverables for Bio-Based Products), 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. These standards are horizontal, i.e. they cover all the possible products and sectors and provide a common basis to be implemented in each specific product category.

This European Standard applies the approach developed by CEN/TC 411 for the bio-based plastics considering the main aspects identified by CEN/TC 411 i.e.:

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

The terms “biopolymers” and “bioplastics” are commonly used to identify polymers and plastics that are either bio-based, biodegradable, or feature both properties. While these definitions are quite widespread and used by industry, it is recognized that they are susceptible to misunderstanding and thus inappropriate for standardization purposes.

When associated with plastics, the prefix “bio” can be perceived by consumers as an indication of biodegradability or of full natural origin. However, polymers and plastics derived from biomass can be either biodegradable or non-biodegradable. Biodegradability is linked to the structure of the polymer chain; it does not depend on the origin of the raw materials. The process of biodegradation depends on material, on its form (e.g. thickness, shape), and on environmental conditions (e.g. temperature, inoculum, humidity).

In the market today there are different fossil based plastics which are biodegradable according to the relevant standards and there are also plastics which are made from biomass and are highly resistant to biodegradation. One historically relevant example is polycaprolactone (PCL) which is industrially prepared starting from cyclohexanone, a typical petrochemical. The biodegradability of PCL in several environments has been well known since the 1970s. On the other hand, there are different bio-based materials in the market which are not biodegradable according to the relevant standards. For example: polyethylene, can be produced from substances derived from biomass (e.g. sugar cane) but still is recalcitrant to biodegradation.

This is cause of concern as it can be the source of misleading information and confusion across the supply chain and especially for the final consumers. Therefore, when referring to the origin of the feedstock it is essential to use the correct and precise terminology: bio-based polymer/plastics/plastics product instead of biopolymer/bioplastics/bioplastics product.

Polymers derived from biomass have to be distinguished into two groups.

The first group included polymers, which have been synthesized by living organisms (plants, algae, microorganisms) and have been extracted and purified. The initial chemical structure is used (e.g.