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Plastics — Carbon and environmental footprint of biobased plastics —

Part 3:

Process carbon footprint, requirements and guidelines for quantification

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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).

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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 voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 61, Plastics, Subcommittee SC 14, Plastics and environment.

A list of all parts in the ISO 22526- series can be found on the ISO website.

Introduction

Increased use of biomass resources for manufacturing plastic products can be effective in reducing global warming and the depletion of fossil resources.

Current plastic products are composed of biobased synthetic polymers, fossil-based synthetic polymers, natural polymers and additives that can include biobased materials.

Biobased plastics refer to plastics that contain materials wholly or partly of biogenic origin.

In this series of International Standards, *Plastics — Carbon and environmental footprint of biobased plastics*, is described in 5 parts

- *Part 1: General principles*
- *Part 2: Material carbon footprint*
- *Part 3: Process carbon footprint, requirements and guidelines for quantification*
- *Part 4: Environmental (total) footprint (Life Cycle Assessment)*
- *Part 5: Reporting and evaluation*

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Plastics — Carbon and environmental footprint of biobased plastics —

Part 3: Process carbon footprint, requirements and guidelines for quantification

1 Scope

This document specifies principles and requirements for the quantification and reporting of the Process Carbon Footprint of biobased plastics (see ISO/CD 22526-1), being a partial carbon footprint of a bioplastic product, based on ISO 14067 and consistent with the ISO standards on life cycle assessment (ISO 14040 and ISO 14044).

This document is applicable to Process Carbon Footprint studies (P-CFP) of plastic materials, being a partial carbon footprint of a product, whether or not the results are intended to be publicly available.

The Process Carbon Footprint study is carried out according to ISO 14067 as a partial carbon footprint, using the specific conditions and requirements specified in this standard.

Requirements and guidelines for the quantification of a partial carbon footprint of a product (partial CFP) are provided.

Where the results of a P-CF study are reported according to this International Standard, procedures are provided to support transparency and credibility, and also to allow for informed choices.

Offsetting is outside of the scope of this International Standard.

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.

ISO 14026, *Environmental labels and declarations — Principles, requirements and guidelines for communication of footprint information*

ISO/TS 14027, *Environmental labels and declarations — Development of product category rules*

ISO 14040, *Environmental management — Life cycle assessment — Principles and framework*

ISO/TS 14071, *Environmental management — Life cycle assessment — Critical review processes and reviewer competencies: Additional requirements and guidelines to ISO 14044:2006*

ISO 14044:2006, *Environmental management — Life cycle assessment — Requirements and guidelines*

ISO 14050, *Environmental management — Vocabulary*

ISO 14067, *Greenhouse gases— Carbon footprint of products— Requirements and guidelines for quantification*

NOTE References in this draft to ISO 14067 are based on document ISO/TC 207/SC 7/WG 8/ISO/FDIS 14067:2017.

3 Terms, definitions and abbreviated terms

3.1 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 14050, ISO 14067 and the following 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 <http://www.iso.org/obp>

3.1.1 Terms relating to CFP quantification

3.1.1.1

Process carbon footprint of a product

Process CFP

P-CFP

sum of greenhouse gas emissions and removals of the cradle-to-gate processes of a product system, expressed as CO₂ equivalents and based on the relevant stages or processes within the life cycle.

Note 1 to entry: The process carbon footprint, being a partial CFP, is based on or compiled from the cradle-to-gate processes or information modules which are part of a product system and may form the basis for quantification of a P-CFP.

3.1.2 Abbreviated terms

CFP	carbon footprint of a product
P-CFP	Partial carbon footprint of a product
CFP-PCR	carbon footprint of a product – product category rules
CO ₂ e	carbon dioxide equivalent
dLUC	direct land use change
GHG	greenhouse gas
GWP	global warming potential
iLUC	indirect land use change
IPCC	Intergovernmental Panel on Climate Change
LCA	life cycle assessment
LCIA	life cycle impact assessment
LCI	life cycle inventory analysis
LUC	land use change
PCR	product category rules

4 Application

As with all ISO International Standards, this document is not intended to create barriers to trade or to contradict any World Trade Organization requirements.

In applying this document, it is advisable to take into consideration societal, environmental, legal, cultural, political and organizational diversity, as well as differences in economic conditions.

Further, it is not intended to provide a basis for trade regulations, legal actions, complaints, defences or other claims in any international, domestic or other proceeding, nor is it intended to be cited as evidence of the evolution of customary international law (adopted from ISO 26000).

Possible applications of this document include the provision of information for research and development of products, improvement of technologies and communication, where relevant.

5 Principles

5.1 General

The following principles are the basis for the subsequent requirements in this document.

5.2 Life cycle perspective, cradle to gate stage

The development of P-CFP quantification takes into consideration all stages of the cradle-to-gate LCA of a product, including acquisition of raw materials, production, transportation/delivery, as applicable.

NOTE 1 Under certain conditions partial CFPs can be added together to quantify the CFP (see [6.1](#)).

NOTE 2 By means of a systematic overview and life cycle perspective, the shifting of a potential impact between life cycle stages or individual processes can be identified and possibly avoided.

5.3 Relative approach and functional unit

The P-CFP study is structured around a declared unit and the results are calculated relative to this declared unit.

[SOURCE: ISO 14040:2006, 4.1.4, modified]

5.4 Iterative approach

An iterative approach of continuous reassessment as needed is taken when applying the four phases of LCA (goal and scope definition, life cycle inventory analysis (LCI), life cycle impact assessment (LCIA) and interpretation, see [6.1](#)) to a P-CFP study. The iterative approach will contribute to the consistency of the P-CFP study and the reported results.

[SOURCE: ISO 14040:2006, 4.1.5, modified]

5.5 Priority of approach

Preference to natural science (such as physics, chemistry, biology) is given when making decisions in P-CFP study. If this is not possible, other scientific approaches (such as social and economic) or approaches contained in conventions relevant and valid within the geographical scope as defined in [6.3](#) of this document are used. Only if neither a natural scientific basis exists nor a justification based on other approaches or international conventions is possible, decisions based on professional judgement are permitted.

[SOURCE: ISO 14040:2006, 4.1.8, modified]

NOTE For information on allocation procedures see ISO 14067, 6.4.6.2.