



SLOVENSKI STANDARD
oSIST prEN 15348:2022
01-maj-2022

Polimerni materiali - Reciklirani polimerni materiali - Karakterizacija reciklatov polietilen-tereftalata (PET)

Plastics - Recycled plastics - Characterization of poly(ethylene terephthalate) (PET) recyclates

Kunststoffe - Kunststoff-Rezyklate - Charakterisierung von Polyethylenterephthalat (PET)-Rezyklaten

Plastiques - Plastiques recyclés - Caractérisation des recyclats de poly(éthylène téréphtalate) (PET)

Ta slovenski standard je istoveten z: prEN 15348

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ICS:

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English Version

Plastics - Recycled plastics - Characterization of poly(ethylene terephthalate) (PET) recyclates

Plastiques - Plastiques recyclés - Caractérisation des
recyclats de poly(éthylène téréphtalate) (PET)

Kunststoffe - Kunststoff-Rezyklate - Charakterisierung
von Polyethylenterephthalat (PET)-Rezyklaten

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 249.

If this draft becomes a European Standard, CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

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European foreword

This document (prEN 15348:2022) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

This document is currently submitted to the CEN Enquiry.

This document includes the following significant changes with respect to EN 15348:2014:

- Scope has been clarified;
- Normative References have been updated;
- Terms and definitions have been removed, reference to EN ISO 472 and CEN/TR 15353 remained;
- Clause 4 “Symbols and abbreviations” has been added;
- Clause 5 “Characterization of PET recyclates” and Table 1 “Characterization of PET recyclates” have been completely revised;
- In Clause 6 “Quality assurance” requirement regarding traceability has been added;
- Annex C “Rapid method for the determination of residual contaminants” has been revised;
- Annex D “Rapid method for the determination of Polyolefin contaminants” has been added.

This document is one part of a series of CEN publications on Plastics Recycling, which is structured as follows:

- EN 15342, *Plastics — Recycled Plastics — Characterization of polystyrene (PS) recyclates*
- EN 15343, *Plastics — Recycled Plastics — Plastics recycling traceability and assessment of conformity and recycled content*
- EN 15344, *Plastics — Recycled Plastics — Characterization of Polyethylene (PE) recyclates*
- EN 15345, *Plastics — Recycled Plastics — Characterization of Polypropylene (PP) recyclates*
- EN 15346, *Plastics — Recycled plastics — Characterization of poly(vinyl chloride) (PVC) recyclates*
- EN 15347, *Plastics — Recycled Plastics — Characterization of plastics wastes*
- EN 15348, *Plastics — Recycled plastics — Characterization of poly(ethylene terephthalate) (PET) recyclates*
- CEN/TR 15353, *Plastics — Recycled plastics — Guidelines for the development of standards for recycled plastics*

Introduction

Recycling plastic waste, by mechanical recycling, is one type of material recovery process intended to save resources (virgin raw materials, water, and energy), while minimizing harmful emissions into air, water and soil as well as any impacts on human health. The environmental impact of recycling has to be assessed over the whole life cycle of the recycling system (from the waste generation point to the disposal of final residues). To ensure that recycling constitutes the best environmental option for treating the available waste, some prerequisites should preferably be met:

- recycling scheme being contemplated should generate lower environmental impacts than alternative recovery options;
- existing or potential market outlets should be identified that will secure a sustainable industrial recycling operation;
- collection and sorting schemes should be properly designed to deliver recyclable plastics waste fractions fitting reasonably well with the available recycling technologies and with the (changing) needs of the identified market outlets, preferably at minimum costs to society.

This document has been produced in accordance with the guidance produced by CEN on Environmental Aspects and in accordance with CEN/TR 15353.

NOTE CEN/TR 15353 considers the general environmental aspects, which are specific to the recycling process.

It is often impossible to trace back each individual product at the end user stage and to check whether the product has been used correctly through its life. Consequently, products are out of industrial control for a period of time. It is possible that during this period contamination with other materials might occur that could affect the product's suitability for recycling into the intended application.

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1 Scope

This document defines a method of specifying delivery conditions for poly(ethylene terephthalate) (PET) recyclates.

It gives the most important characteristics and associated test methods for assessing PET recyclates intended for use in the production of semi-finished/finished products.

It is intended to support parties involved in the use of polyethylene terephthalate (PET) by mechanical recycling to agree on specifications for specific and generic applications.

This document is applicable without prejudice to any existing legislation.

This document does not cover the characterization of plastic waste, which is covered by EN 15347, neither traceability topics which are covered by EN 15343.

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.

CEN/TR 15353, *Plastics — Recycled plastics — Guidelines for the development of standards for recycled plastics*

EN 15343, *Plastics — Recycled Plastics — Plastics recycling traceability and assessment of conformity and recycled content*

EN ISO 60, *Plastics — Determination of apparent density of material that can be poured from a specified funnel (ISO 60)*

EN ISO 472, *Plastics — Vocabulary (ISO 472)* <https://standards.iteh.ai/catalog/standards/sist/b7d6b5fb-f5cc-42e2-9fc0-bb822caf3118/osist-pren-15348-2022>

EN ISO 1133-2, *Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics — Part 2: Method for materials sensitive to time-temperature history and/or moisture (ISO 1133-2)*

EN ISO 1183-1, *Plastics — Methods for determining the density of non-cellular plastics — Part 1: Immersion method, liquid pycnometer method and titration method (ISO 1183-1)*

EN ISO 11357-3, *Plastics — Differential scanning calorimetry (DSC) — Part 3: Determination of temperature and enthalpy of melting and crystallization (ISO 11357-3)*

EN ISO/CIE 11664-4, *Colorimetry — Part 4: CIE 1976 L*a*b* Colour space (ISO/CIE 11664-4)*

EN ISO 15512, *Plastics — Determination of water content (ISO 15512)*

EN ISO 23900-5, *Pigments and extenders — Methods of dispersion and assessment of dispersibility in plastics — Part 5: Determination by filter pressure value test (ISO 23900-5)*

ISO 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

ISO 1628-5, *Plastics — Determination of the viscosity of polymers in dilute solution using capillary viscometers — Part 5: Thermoplastic polyester (TP) homopolymers and copolymers*

ISO 3534-2, *Statistics — Vocabulary and symbols — Part 2: Applied statistics*

ISO 12418-2, *Plastics — Post-consumer poly(ethylene terephthalate) (PET) bottle recyclates — Part 2: Preparation of test specimens and determination of properties*

ASTM D6980-12, *Standard Test Method for Determination of Moisture in Plastics by Loss in Weight*

ASTM D1895, *Standard Test Methods for Apparent Density, Bulk Factor, and Pourability of Plastic Materials*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN ISO 472 and CEN/TR 15353 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>

4 Symbols and abbreviations

For the purposes of this document, the symbols and abbreviations related to recyclates are given in EN ISO 1043-1.

5 Characterization of PET recyclates

A single batch is the quantity of recycle that has homogenous characteristics within the specified tolerances.

The characteristics of PET recyclates, which shall be met for every batch according to ISO 3534-2 of PET recycle are shown in Table 1, and are divided into two types:

- required characteristics needed to characterize PET recyclates in general and required for all recyclates;
- optional characteristics needed to characterize PET recyclates according to customer specifications and applications.

These characteristics shall be assessed by using the test methods given in Table 1. Where possible, the supplier should provide information on the original applications.

If the recyclates are produced under the conditions of food contact approvals, the supplier shall provide all the necessary information related to the food contact agreements obtained from the authorities and conditions established in these agreements.

Other tests may be carried out by agreement between the purchaser and the supplier and results reported.

A certificate of analysis giving the test results for each batch of recycle shall be provided by the supplier to the purchaser upon request.

Where several methods are listed in Table 1, the certificate of analysis should specify the method used for each measured parameter.

The purchaser may require some additional information on recyclate composition from the recycler in order to facilitate the legal use of the recyclate.

Table 1 — Characterization of PET recyclates

Characteristics	Unit	Test methods	Flakes (M/O)	Pellets (M/O)	Comments
Shape	-	Visual	M	M	Flakes, pellets
Fine particle content	%	Annex A	M	-	Value in percentage of the particles passing the sieve of 1 mm.
Colour		Visual inspection	M	-	For example Unicolour, transparent, mixed
Colour	L, a, b values	Colorimeter according to EN ISO/CIE 11664-4	O	M	Pellets or Injection molded flat piece <i>Observer: 10°</i> <i>Illuminant: D65</i>
Water content	%	Annex B or EN ISO 15512 or ASTM D6980.12 <i>In addition, standardized methodology for moisture analyser to be developed</i>	O	O	Any alternative method may be used upon common approval with the customer through a specification
PVC content	mg/kg	Annex C or ISO 12418-2	M	-	Any alternative method may be used upon common approval with the customer through a specification
Polyolefin content	mg/kg	Annex C or ISO 12418-2 or Annex D	M	-	Any alternative method may be used upon common approval with the customer through a specification

Characteristics	Unit	Test methods	Flakes (M/O)	Pellets (M/O)	Comments
Other visible contaminants: Ferrous / non-ferrous metals Labels of PET bottles Other contaminants		Annex C or ISO 12418-2	M	-	Any alternative method may be used upon common approval with the customer through a specification
Bulk density	kg/m ³	EN ISO 60 or ASTM D1895, Method C	M	O	Any alternative method may be used upon common approval with the customer through a specification
Density	kg/m ³	EN ISO 1183-1	O	O	
Pellet size	g or number	Weight of 100 pellets or number of pellets in 1 g		M	
Determination Melt Mass-Flow Rate (MFR)		EN ISO 1133-2	O	O	
Intrinsic viscosity (I.V.)	dl/g	ISO 1628-5 or EN ISO 1133-2	-	M	
Melting point	°C	EN ISO 11357-3	O	O	
Alkalinity	pH	Annex E	O	-	Any alternative method may be used upon common approval with the customer through a specification
Filterability	MPa/(h·cm ²)	Annex F or EN ISO 23900-5	O	-	
Product name					
Reference					
Applications					