



SLOVENSKI STANDARD
oSIST prEN 18120-13:2024
01-oktober-2024

**Embalaža - Načrtovanje, ki omogoča recikliranje plastične embalaže - 13. del:
Postopek za ocenjevanje možnosti recikliranja plastične embalaže - Protokoli za
prožno plastično embalažo iz polietilena (PE) in polipropilena (PP)**

Packaging - Design for recycling for plastic packaging - Part 13: Recyclability evaluation
process for plastic packaging - Protocols for PE and PP flexible packaging

Verpackung - Recyclingorientierte Gestaltung von Kunststoffverpackungsprodukten - Teil
13 - Verfahren zur Bewertung der Recyclingfähigkeit von Kunststoffverpackungen -
Protokolle für flexible Verpackungen aus PE und PP

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ICS:

13.030.50	Recikliranje	Recycling
55.020	Pakiranje in distribucija blaga na splošno	Packaging and distribution of goods in general
83.080.20	Plastomeri	Thermoplastic materials

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en,fr,de

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

DRAFT
prEN 18120-13

September 2024

ICS 55.020; 13.030.50; 83.080.20

English Version

**Packaging - Design for recycling for plastic packaging -
Part 13: Recyclability evaluation process for plastic
packaging - Protocols for PE and PP flexible packaging**

Verpackung - Recyclingorientierte Gestaltung von
Kunststoffverpackungsprodukten - Teil 13 - Verfahren
zur Bewertung der Recyclingfähigkeit von
Kunststoffverpackungen - Protokolle für flexible
Verpackungen aus PE und PP

This draft European Standard is submitted to CEN members for enquiry. It has been drawn up by the Technical Committee CEN/TC 261.

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.

This draft European Standard was established by CEN in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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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

Contents	Page
<i>European foreword</i>	4
<i>Introduction</i>	5
1 Scope	7
2 Normative references	7
3 Terms and definitions	8
4 Recyclability evaluation process	8
4.1 Principle	8
4.2 Sampling	10
4.2.1 Test material requirements	10
4.2.2 Control sample selection	11
4.2.3 Virgin resin selection	11
4.3 Test method	11
4.4 Test report	11
4.5 Evaluation	12
<i>Annex A (normative) Experimental determination of the technical recyclability of PE and PP flexible packaging samples</i>	13
A.1 Principle	13
A.1.1 Apparatus	13
A.1.2 Materials	14
A.1.3 Sampling	14
A.1.4 Procedure	14
A.1.5 Expression of results	20
A.1.6 Test report	22
<i>Annex B (normative) Recommendations for virgin and control materials</i>	24
<i>Annex C (informative) Benchmark recommendations for the assessment of technical recyclability</i>	25
<i>Annex D (informative) Overview of the test method</i>	27

***Bibliography*..... 29**

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Document Preview**

[oSIST prEN 18120-13:2024](https://standards.itih.ai/catalog/standards/sist/0aa56945-9a23-4ea4-aaf4-e82aedc3aba7/osist-pren-18120-13-2024)

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prEN 18120-13:2024 (E)**European foreword**

This document (prEN 18120-13:2024) has been prepared by Technical Committee CEN/TC 261 “Packaging”, the secretariat of which is held by AFNOR.

This document is currently submitted to the CEN Enquiry.

This document has been prepared under a standardization request addressed to CEN by the European Commission. The Standing Committee of the EFTA States subsequently approves these requests for its Member States.

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Introduction

EN 18120 consisting of 15 parts aims via a series of guidelines and protocols to establish consistency and improvement for the Design for Recycling of household, industrial and commercial plastic packaging.

- Part 1: Definitions and principles for design-for-recycling of plastic packaging
- Part 2: Process and governance to evaluate the recyclability of plastic packaging
- Part 3: Sortability evaluation process for plastic packaging
- Part 4: Guideline for PET bottles
- Part 5: Guideline for PET rigid packaging (except bottle)
- Part 6: Guideline for PE and PP rigid packaging
- Part 7: Guideline and protocols for PE and PP flexible packaging
- Part 8: Guideline for PS and XPS packaging
- Part 9: Guideline for EPS packaging
- Part 10: Recyclability evaluation process for plastic packaging — Protocols for PET bottles
- Part 11: Recyclability evaluation process for plastic packaging — Protocols for PET other rigid packaging
- Part 12: Recyclability evaluation process for plastic packaging — Protocols for PE and PP rigid packaging
- Part 13: Recyclability evaluation process for plastic packaging — Protocols for PE and PP flexible packaging
- Part 14: Recyclability evaluation process for plastic packaging — Protocols for PS and XPS packaging
- Part 15: Recyclability evaluation process for plastic packaging — Protocols for EPS packaging

Design for recycling guidelines are a common way of describing compatibility with plastic packaging collection, sorting and recycling into high quality recycled plastic into state-of-the-art facilities. They provide guidance on the level compatibility, defined as:

- green: Packaging constituents with full compatibility with recycling;
- yellow: Packaging constituents with limited compatibility with recycling;
- red: Packaging constituents which are not compatible with recycling.

Recyclability guidelines will require regular review and improvement to reflect innovations in design, collection, sorting and recycling.

The Design for recycling guidelines provided in this series of standards are representative of the state of the art in Europe and cover all steps from design for recycling, packaging waste collection, sorting, recycling into recycled plastic and to use in a new application.

prEN 18120-13:2024 (E)

Packaging recyclability is the combination of five parameters: packaging designed for recycling, packaging waste collection, sorting when necessary, recycling and use of recycled plastic in a new application. This series of standards covers one parameter: the design for recycling.

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1 Scope

This document covers the design of PE and PP flexible packaging with respect to compatibility of the design with recycling processes available for PE and PP packaging.

Packaging constituents and components used in/on PE and PP flexible packaging but made of materials other than PE and PP are also covered by this document as these need to be evaluated for compatibility with PE and PP mechanical recycling processes.

2 Normative references

The following documents are referred to in the text in such a way that 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.

prEN 18120-1, *Packaging — Design for recycling of plastic packaging — Part 1: Definitions and principles for design-for-recycling of plastic packaging*

prEN 18120-12, *Packaging — Design for recycling of plastic packaging — Part 12: Recyclability evaluation process for plastic packaging — Protocols for PE and PP rigid packaging*

EN 14477, *Packaging — Flexible packaging material — Determination of puncture resistance — Test methods*

EN ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles (ISO 527-1)*

EN ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2)*

EN ISO 527-3, *Plastics — Determination of tensile properties — Part 3: Test conditions for films and sheets (ISO 527-3)*

EN ISO 1133-1:2022, *Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics — Part 1: Standard method (ISO 1133-1:2022)*

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 3451-1, *Plastics — Determination of ash — Part 1: General methods (ISO 3451-1)*

EN ISO 6383-2, *Plastics — Film and sheeting — Determination of tear resistance — Part 2: Elmendorf method (ISO 6383-2)*

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

EN ISO 18314-1, *Analytical colourimetry — Part 1: Practical colour measurement (ISO 18314-1)*

ISO 4593, *Plastics — Film and sheeting — Determination of thickness by mechanical scanning*

ISO 7765-1, *Plastics film and sheeting — Determination of impact resistance by the free-falling dart method — Part 1: Staircase methods*

ISO 11357-1, *Plastics — Differential scanning calorimetry (DSC) — Part 1: General principles*

prEN 18120-13:2024 (E)

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

ISO 11358-1, *Plastics — Thermogravimetry (TG) of polymers — Part 1: General principles*

ISO 14782, *Plastics — Determination of haze for transparent materials*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 18120-1 and the following apply.

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

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

3.1**machine direction****MD**

direction along the surface of a plastic film which is parallel to the direction of the blow or cast film production line

3.2**transversal direction****TD**

direction along the surface of a plastic film which is perpendicular to the direction of the blow or cast film production line

3.3**melt mass-flow rate****MFR**

rate of extrusion of a molten resin through a die of specified length and diameter under prescribed conditions of temperature, load and piston position in the cylinder of an extrusion plastometer, the rate being determined as the mass extruded over a specified time

Note 1 to entry: MFR is expressed in units of grams per 10 min. Alternative units accepted by SI are decigrams per minute, where 1 g/10 min is equivalent to 1 dg/min.

[SOURCE: EN ISO 1133-1:2022, definition 3.2]

4 Recyclability evaluation process**4.1 Principle**

This document provides a method of evaluating the *technical recyclability* of a flexible PE or PP packaging material sample into a plastic film in *mechanical recycling* processes as they are implemented in Europe. The results characterize both the *processability* of the sample as well as the *quality of the recycled plastic*.

A statement about the recyclability based on other processes such as physical recycling (e.g. solvent-based) or chemical recycling (e.g. pyrolysis) cannot be derived from the method described in this document.¹

Depending on the choice of the sample, the method can either provide a technical recyclability determination *for a full packaging design*, or it can be employed to selectively study the *impact of individual constituents* in flexible PE and PP plastic packaging materials on the technical recyclability. The latter approach may be employed to generate data for the updating of *design-for-recycling guidelines*.

The test method follows the steps (*unit operations*) that occur in a mechanical recycling process for flexible PE or PP packaging into blown or cast films and seeks to simulate each operation on a laboratory scale. The relevant unit operations are shown in Table 1. Steps 1 and 2 describe the plastic recycling process itself whereas step 3 represents the conversion of the recycled plastic into products, either flexible films or rigid products. As such, steps 1 and 2 provide information on the *processability* of the sample whereas step 3 provides information on the *quality of the recycled plastic* that can be obtained.

Table 1 — List of unit operations in mechanical recycling of PE or PP flexible packaging²

Step #	Unit operation	Description of operation
1	Pre-treatment	
1.1	Grinding	PE or PP based flexible packaging waste is ground into flakes
1.2	Washing	The flakes are washed to remove product residue and optionally components such as labels. Most European PE and PP flexible packaging recycling lines use cold water washing conditions, with no detergents nor added chemicals
1.3	Flotation	(Washed) flakes are separated from higher density materials in a float/sink tank. Flakes and other objects that sink are removed; flakes that float together with the PE or PP flakes are recycled with the floating PE or PP flakes
1.4	Drying	The flakes are dried to reduce their moisture to less than 1 wt% by mass
2	Extrusion Pellet production	The dried flakes are extruded into pellets, employing melt filtration and vacuum degassing in the process
3	Converting	
3.1	Pellet blend preparation (dry blending)	The recycled pellets are blended with virgin pellets
3.2a	Blown film extrusion	Pellet blends are converted into film products by blown film extrusion
3.2b	Cast film extrusion	Pellet blends are converted into film products by cast film extrusion

¹ Future versions of this document may include evaluation processes for these recycling technologies.

² This table describes the unit operations in a commercial recycling process. It is not a description of the testing methodology described in this document. For an overview of the methodology described in this document, refer to Annex C.