



**SLOVENSKI STANDARD**  
**oSIST prEN 18120-11:2024**  
**01-oktober-2024**

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**Embalaža - Načrtovanje, ki omogoča recikliranje plastične embalaže - 11. del:  
Postopek za ocenjevanje možnosti recikliranja plastične embalaže - Protokoli za  
togo plastično embalažo iz polietilen tereftalata (razen PET-plasten)**

Packaging - Design for recycling for plastic packaging - Part 11: Recyclability evaluation process for plastic packaging - Protocols for PET rigid packaging (except bottles)

Verpackung - Recyclingorientierte Gestaltung von Kunststoffverpackungsprodukten - Teil 11: Verfahren zur Bewertung der Recyclingfähigkeit von Kunststoffverpackungen - Protokolle für starre Verpackungen aus PET (außer Flaschen)

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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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**DRAFT**  
**prEN 18120-11**

September 2024

ICS 55.020; 13.030.50; 83.080.20

English Version

**Packaging - Design for recycling for plastic packaging -  
Part 11: Recyclability evaluation process for plastic  
packaging - Protocols for PET rigid packaging (except  
bottles)**

Verpackung - Recyclingorientierte Gestaltung von  
Kunststoffverpackungsprodukten - Teil 11: Verfahren  
zur Bewertung der Recyclingfähigkeit von  
Kunststoffverpackungen - Protokolle für starre  
Verpackungen aus PET (außer Flaschen)

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

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## **European foreword**

This document (prEN 18120-11:2024) 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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**prEN 18120-11:2024 (E)****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 and protocols for PET bottles
- Part 5: Guideline and protocols for PET rigid packaging (except bottles)
- Part 6: Guideline and protocols for PE and PP rigid packaging
- Part 7: Guideline and protocols for PE and PP flexible packaging
- Part 8: Guideline and protocols for PS packaging
- Part 9: Guideline and protocols 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 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.

Packaging recyclability is the combination of two parameters: packaging designed for recycling and the existence of a recycling stream. Design for recycling guidelines act as a first indicator.

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## prEN 18120-11:2024 (E)

### 1 Scope

This document covers the design of PET pots and trays with respect to compatibility of the design with recycling processes.

Packaging constituents and packaging components made of other materials than PET are also covered by this document as they need to be evaluated on compatibility with polymer recycling.

### 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.

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

prEN 18120-3, *Packaging — Design for recycling of plastic packaging — Part 3: Sortability evaluation process for plastic packaging*

prEN 18120-5, *Packaging — Design for recycling of plastic packaging — Part 5: Guideline for PET rigid packaging (except bottles)*

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

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

EN ISO 1628-1, *Plastics — Determination of the viscosity of polymers in dilute solution using capillary viscometers — Part 1: General principles (ISO 1628-1)*

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

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

### 3 Terms and definitions

For the purposes of this document, the terms and definitions given in prEN 18120-1 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/>

### 4 Recyclability evaluation process

#### 4.1 Principle

This standard provides a method of evaluating the technical recyclability of a PET rigid packaging (except bottles) sample 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.



Depending on the choice of the sample, the method can either provide a technical recyclability determination for a given packaging design or item, or it can be employed to selectively study the impact of individual design elements of a PET rigid packaging on 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 PET rigid packaging (mainly thermoforms) and seeks to simulate each operation on a laboratory scale.

The relevant unit operations are shown in Table 1. Steps 0 to 5 describe the plastic recycling process itself whereas step 6 represent the conversion of the recycled PET into articles, in this case plaques is preferred because it offers greater repeatability at laboratory scale than the sheet extrusion.

As such, steps 0 to 4 provide information on the processability of the sample whereas steps 5 and 6 provide information on the quality of the recycled plastic that can be obtained.

To perform the recyclability evaluation process, the below elements shall be considered:

- design for recyclability evaluation process guidelines on PET rigid packaging (except bottles) described in prEN 18120-5;
- targeted intended use(s) for the final recyclate, this is needed to ensure the testing will be made in relation to dedicated specifications, as described in part 1 of this series of standards.

And in this document:

- list of unit operations for the whole process until the recyclate is used (grinding, washing, extrusion, ... for example);
- specification of unit operations process capability to be used for the evaluation based on state of the art of PET rigid packaging recycling processes in Europe (grinding size for example);
- relevant process conditions settings for testing for all relevant unit operations (temperature for washing for example);
- list of mandatory sampling and tests to be performed on the samples for each unit operation (IV measurement as per EN ISO 1628-1 for example);
- reference benchmark recommendation values for assessing the results of the tests performed (Colour deviation Delta B below 1 for example) and help building the final assessment.

The goal of the evaluation process is to identify all foreseeable critical points and establish a testing strategy that either confirms or excludes a negative impact for each critical point considered. The testing strategy will use all or only some of the tests described below that will depend on the innovation type and expected impacts on the recycling process and the recyclate.

For PET rigid packaging the following unit operations are applicable to the whole process until the recyclate is used. Depending on the intended application 2 different routes may be applied on the last steps (4.2.1, 4.2.2).

The 'reference test procedures' column refers to the subclauses of this document.

Table 1 — List of applicable unit operations for PET Rigid packaging (except bottles)

Step #	Unit operation	Brief operation description	Reference test procedures
0	Control selection	Before any testing, control material to compare the evaluated packaging needs to be selected. The selection of the control material needs to be approved by the appropriate technical committee.	
1	Sortability evaluation by means of IR sorting or colour sorting	Testing to ensure the PET container is sortable, after compaction, via NIR or other sorting technologies into the correct stream.	This testing shall be performed according to prEN 18120-3.
2	<b>Pre-treatment: flakes preparation</b>	<b>This step simulates the preparation of PET flakes from rigid packaging by grinding, washing and sink/float separation</b>	
2.1	Pre-treatment: grinding	Control and evaluated application PET containers are separately grinded in order to fit the throat of a standard laboratory extruder.	4.2.1 Pre-treatment grinding
2.2	Pre-treatment - Prewashing	Simulation of the prewashing step, in hot water with caustic and with mechanical agitation.	4.2.3 Pretreatment - Prewashing
2.3	Pre-treatment - Washing	Simulation of the washing step, in hot water and caustic with detergent and mechanical agitation.	4.2.4 Pretreatment - Washing
2.4	Pre-treatment - Hot rinsing	Simulation of the rinsing step, in hot conditions, without additives and with mechanical agitation.	4.2.5 Pretreatment - Hot Rinsing
2.5	Pre-treatment - Cold rinsing and floatation	Simulation of cold rinsing and floatation process allowing PET flake separation from polyolefins (labels, lids...) by density in water without additives.	4.2.6 Pretreatment - Cold rinsing and floatation
2.6	Pre-treatment - Drying	Reduce the flake moisture with hot air.	4.2.7 Pretreatment - Drying
2.7	Pre-treatment: air elutriation	Control and evaluated application; PET flakes are separately elutriated with air to remove light fraction.	4.2.8 Pretreatment - Air elutriation