SLOVENSKI STANDARD
oSIST prEN 15346:2022

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Polimerni materiali - Reciklirani polimerni materiali - Karakterizacija reciklatov polivinilklorida (PVC)

Plastics - Recycled plastics - Characterization of poly(vinyl chloride) (PVC) recyclates

Kunststoffe - Kunststoff-Rezyklate - Charakterisierung von Polyvinylchlorid (PVC)-Rezyklaten

Plastiques - Plastiques recyclés - Caractérisation des recyclats de poly(chlorure de vinyle) (PVC)

Ta slovenski standard je istoveten z: **prEN 15346**

ICS:

13.030.50	Recikliranje	Recycling
83.080.20	Plastomeri	Thermoplastic materials

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English Version

Plastics - Recycled plastics - Characterization of poly(vinyl chloride) (PVC) recyclates

Plastiques - Plastiques recyclés - Caractérisation des recyclats de poly(chlorure de vinyle) (PVC)

Kunststoffe - Kunststoff-Rezyklate - Charakterisierung von Polyvinylchlorid (PVC)-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.

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

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European foreword

This document (prEN 15346:2022) has been prepared by Technical Committee CEN/TC 249 “Plastics”, the secretariat of which is held by NBN.

This document will supersede EN 15346:2014.

prEN 15346:2022 includes the following significant technical change with respect to EN 15346:2014:

— Clause 2 “Normative references” was updated;

— in Clause 3 “Terms and definitions” term 3.1 was removed;

— in Clause 5 Table 1 “Characterization of PVC recyclates” was revised;

— Annex A “Typical compositions of PVC compounds” was removed;

— Annex C “Size and distribution of particles contained in micronized recycled PVC compounds by sieving” and Annex D “Size and distribution of recycled PVC crushes by sieving” were revised.

This document is one part of 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 of 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.

1 Scope

This document defines a method of specifying delivery conditions for poly(vinyl chloride) (PVC) recyclates.

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

It is intended to support parties involved in the use of recycled PVC by mechanical recycling to agree on specifications for specific and generic applications.

This document does not cover the characterization of plastics wastes, which is covered by EN 15347, neither treaceability topics which are covered by EN 15343.

This document is applicable without prejudice to any existing legislation.

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.

EN 12099, *Plastics piping systems — Polyethylene piping materials and components — Determination of volatile content*

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

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

EN ISO 182-2, *Plastics — Determination of the tendency of compounds and products based on vinyl chloride homopolymers and copolymers to evolve hydrogen chloride and any other acidic products at elevated temperatures — Part 2: pH method (ISO 182-2)*

EN ISO 182-3, *Plastics — Determination of the tendency of compounds and products based on vinyl chloride homopolymers and copolymers to evolve hydrogen chloride and any other acidic products at elevated temperatures — Part 3: Conductometric method (ISO 182-3)*

EN ISO 182-4, *Plastics — Determination of the tendency of compounds and products based on vinyl chloride homopolymers and copolymers to evolve hydrogen chloride and any other acidic products at elevated temperatures — Part 4: Potentiometric method (ISO 182-4)*

EN ISO 306, *Plastics — Thermoplastic materials — Determination of Vicat softening temperature (VST) (ISO 306)*

EN ISO 472, *Plastics — Vocabulary (ISO 472)*

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 868, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868)*

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

EN ISO 1269, *Plastics — Homopolymer and copolymer resins of vinyl chloride — Determination of volatile matter (including water) (ISO 1269)*

EN ISO 3451-5, *Plastics — Determination of ash — Part 5: Poly(vinyl chloride) (ISO 3451-5)*

EN ISO 6186, *Plastics — Determination of pourability (ISO 6186)*

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

ISO 182-1, *Plastics — Determination of the tendency of compounds and products based on vinyl chloride homopolymers and copolymers to evolve hydrogen chloride and any other acidic products at elevated temperatures — Part 1: Congo red method*

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

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 PVC recyclates

A single batch is the quantity of recyclate that has homogeneous characteristics within the specified tolerances.

The characteristics of PVC recyclates, which shall be met for every batch of PVC recyclate are shown in Table 1, and divided into two types:

a) required characteristics needed to characterize PVC recyclates in general, and required for all recyclates;

b) optional characteristics needed to characterize PVC recyclates according to customer specifications and applications.

These characteristics shall be assessed by using the test methods given in Table 1.

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

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

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 PVC recyclates

Characteristic	Units	Test method	PVC-U		PVC-P		Comments
			Non micro nized **	Micro nized	Non microni zed **	Micro nized	
Bulk density	kg/m 3	Annex A or ISO 60	O	M	O	M	
Ash content	%	EN ISO 3451-5 Method A	O	O	O	O	Linked with filler and mineral content
Colour		Visual inspection or lab value according to EN ISO/CIE 11664-4 if a specific colour is required	O	O	O	O	e.g. natural colour, single, mixed
Hardness		EN ISO 868	-	-	M	M	For calendering stiffness may be evaluated instead of hardness. See Annex E.
Impurities	%	Annex B	-	O	O	O	An alternative method agreed by both parties may also be used (for example visual evaluation after extrusion on strips)
Particle size	g, %	Annex C [a] Annex D [b]		M		M	An alternative method agreed by both parties may also be used (for example using a laser particle size equipment)
Particle size distribution	g, %	Annex C [a] Annex D [b]	-	O	-	O	An alternative method agreed by both parties may also be used (for example using a laser particle size equipment)
Shape		Visual	M	M	M	M	e.g. micronized material, pellets, particles
Dry flow rate	s	EN ISO 6186	-	O	O	O	Recommended for micronized materials or small particle size recyclates
Density	kg/m 3	EN ISO 1183-1 Method A	O	O	O	O	

Characteristic	Units	Test method	PVC-U		PVC-P		Comments
Fitness of processing of PVC recyclates — by calendaring or — by extrusion		Annex E Annex F	O O	O O	O O	O O	An alternative method agreed by both parties may also be used.
Residual humidity	%	EN 12099 [c]	O	O	O	O	Weight loss, 105 °C Any alternative method (e.g. halogen heated oven…) may be used upon common approval with the customer through a specification
Tensile stress at yield	MPa	EN ISO 527-1 EN ISO 527-2	O	O	M	O	
Tensile strain at break	%	EN ISO 527-1 EN ISO 527-2	O	O	O	O	Elongation
Elasticity modulus		EN ISO 178	M *	O	O	O	
Thermal stability	min	ISO 182-1 EN ISO 182-2 EN ISO 182-3 EN ISO 182-4	O	O	O	O	Linked to stabilizer content Specify which is used.
Vicat softening temperature	°C	EN ISO 306 Method B50	M *	O	O	O	
Volatile content	%	EN ISO 1269	O	O	O	O	Linked to moisture content

Key

M/O: The characteristic is mandatory (M) or optional (O)

* required when the recycler is selling a compound ready to use

** e.g. pellets, flakes

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

[a] Only applicable for micronized recycled PVC compounds.

[b] Only applicable for recycled PVC crushes.

[c] Although the scope of EN 12099 is limited, it is considered relevant.