



SLOVENSKI STANDARD
SIST EN 15346:2008
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Polimerni materiali - Reciklirani polimerni materiali - Karakterizacija recikliranega polivinilklorida (PVC)

Plastics - Recycled plastics - Characterisation 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)

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English Version

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

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

This European Standard was approved by CEN on 25 October 2007.

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Foreword

This document (EN 15346:2007) has been prepared by Technical Committee CEN/TC 249 "Plastics", the secretariat of which is held by NBN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2008, and conflicting national standards shall be withdrawn at the latest by June 2008.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This standard 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—Characterisation of Polyethylene (PE) recyclates
- EN 15345 Plastics—Recycled Plastics—Characterisation of Polypropylene (PP) recyclates
- EN 15346 Plastics—Recycled plastics—Characterisation of poly(vinyl chloride) (PVC) recyclates
- EN 15347 Plastics — Recycled Plastics — Characterisation 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

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Introduction

Recycling of plastics waste is one type of material recovery process intended to save resources (virgin raw materials, water, and energy), while minimising 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 standard has been produced in accordance with the guidance produced by CEN on Environmental Aspects and in accordance with CEN/TR 15353, Plastics—Recycled Plastics—Guidelines for the development of standards relating to recycled plastics.

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 may occur that could affect the product's suitability for recycling into the intended application.

1 Scope

This European Standard 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 to agree on specifications for specific and generic applications.

This Standard does not cover the characterisation of plastics wastes. See EN 15347.

This standard is applicable without prejudice to any existing legislation.

2 Normative references

The following referenced documents are indispensable for the application 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*

EN ISO 306, *Plastics — Thermoplastics materials — Determination of Vicat softening temperature (VST) (ISO 306:2004)*

EN ISO 472:2001, *Plastics — Vocabulary (ISO 472:1999)*

EN ISO 527-1, *Plastics — Determination of tensile properties — Part 1: General principles (ISO 527-1:1993 including Corr 1:1994)*

EN ISO 527-2, *Plastics — Determination of tensile properties — Part 2: Test conditions for moulding and extrusion plastics (ISO 527-2:1993 including Corr 1:1994)*

EN ISO 868, *Plastics and ebonite — Determination of indentation hardness by means of a durometer (Shore hardness) (ISO 868:2003)*

EN ISO 1043-1:2001, *Plastics — Symbols and abbreviated terms — Part 1: Basic polymers and their special characteristics (ISO 1043-1:2001)*

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 1183-1:2004)*

EN ISO 3451-5, *Plastics — Determination of ash — Part 5: Poly(vinyl chloride) (ISO 3451-5:2002)*

EN ISO 6186, *Plastics — Determination of pourability (ISO 6186:1998)*

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 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 182-3, *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 182-4 *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 565, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*

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

CEN/TR 15353:2007, *Plastics — Recycled plastics — Guidelines for the development of standards for recycled plastics*

3 Terms, definitions and abbreviated terms

For the purposes of this European Standard, the terms and definitions given in EN ISO 472:2001 and CEN/TR 15353:2007 and the following apply.

3.1

sieve retention

percentage, in mass, of the recycled test sample retained on a sieve at the end of the test

3.2

container retention

percentage of recycled material retained in the container at the bottom of a stack of sieves, or under a simple sieve, at the end of the testing method compared to the mass of the sample tested

3.3

average particulate dimension

single value of size, expressed to the nearest 0,001 mm, representing the dominant mass size for the whole test sample

3.4

tetrahydrofuran

THF

tetrahydrofuran

4 Characterisation of PVC recyclates

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

The characteristics of PVC recyclates, given in Table 1, are divided into two types:

- Required characteristics needed to characterize PVC recyclates in general, and required for all recyclates.
- 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.

NOTE Typical compositions of PVC compounds are given in Annex A.

To secure the legal use of the recyclate, the supplier shall provide the necessary information about the material composition of the recyclates, as specified by the purchaser.

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Table 1 — Characterisation of PVC recyclates

Characteristic	Units	Test method	PVC-U	PVC-P	Comments
Required					
Bulk density	kg/m ³	Annex B	X	X	
Colour		Visual Inspection	X	X	e.g natural colour, single, mixed
Hardness	sh	EN ISO 868		X	For calendering stiffness can be evaluated instead of hardness. See Annex F.
Impurities	%	Annex C	X	X	An alternative method agreed by both parties may also be used.
Particle size and distribution	g, %	Annex D ^a Annex E ^b	X	X	Size distribution is needed for materials with a low particle size.
Shape		Visual	X	X	e.g. micronized material, pellets, particles
Optional					
Ash content	%	EN ISO 3451-5 Method A	O	O	Linked with filler and PVC content
Dry flow rate	s	EN ISO 6186	O	O	Recommended for micronized materials or small particle size recyclates
Density	kg/m ³	EN ISO 1183-1 Method A	O	O	
Fitness of processing of PVC recyclates — by calendering		Annex F	O	O	
— by extrusion		Annex G	O	O	
Residual humidity	%	EN 12099 ^c	O	O	Weight loss, 105 °C
Tensile stress at yield	MPa	EN ISO 527-1 EN ISO 527-2	O	O	
Tensile strain at break	%	EN ISO 527-1 EN ISO 527-2	O	O	Elongation
Thermal stability	min	ISO 182-1 ISO 182-2 ISO 182-3 ISO 182-4	O	O	Linked to stabilizer content Specify which is used.
Vicat softening temperature	°C	EN ISO 306 Method B50	O		
Volatile content	%	ISO 1269	O	O	Linked to moisture content
X : required characteristics to be quantified. O : optional characteristics to be quantified.					
^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.					
NOTE Other tests may be carried out by an agreement between the purchaser and the supplier. The test results should be reported.					

5 Quality Assurance

In order that the purchaser of the recyclate may have confidence in the quality of the product, the supplier shall maintain records of the quality control carried out, including incoming materials, processes and finished products.

NOTE 1 A quality management system certified to EN ISO 9001 may be a suitable guarantee of consistent recyclate quality.

The specification and the standard deviation or range of values within and between batches of material shall be agreed between the supplier and the purchaser.

Where a statement of recycled content, or the previous history of the material, is requested, documentary evidence shall be provided, where there is no analytical method available to supply such information. These records should be available to the purchaser on request.

Where a recyclate has been produced via a melt process, the supplier may choose to state the level of filtration applied during that process. This will determine the maximum size of any non-melting contaminants present in the recyclate. The statement of filtration level shall include details of the filter. Recyclates which have not passed through a melt process cannot be quantified in the same way, and the supplier may state this.

NOTE 2 EN 15343 describes a qualified recycling process and gives details of traceability and the assessment of recycled content.

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