BRITISH STANDARD

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Plastics — Recycled Plastics — Characterization of plastics waste

ICS 13.030.50; 83.080.01

National foreword

This British Standard is the UK implementation of EN 15347:2007.

The UK participation in its preparation was entrusted to Technical Committee PRI/89, Plastics recycling.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Foreword

This document (EN 15347:2007) 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of an identical text or by endorsement, at the latest by June 2008, and conflicting national standards shall be withdrawn at the latest by June 2008.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 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—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 waste

— 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

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Introduction

Recycling of plastics waste is a 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 for 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 provides a scheme for the characterisation of plastics wastes, laying out those properties for which the supplier of the waste shall make information available to the purchaser, and identifying test methods where applicable. The scheme provides for a division of information between "**Required Data**", where a statement is required, even if it is "unclassified", and additional "**Optional Data**" which the supplier may choose to provide if it adds value to the waste.

This standard is applicable without prejudice to any existing legislation.

NOTE This standard does not cover the characterisation of plastics recyclates.

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

EN ISO 179-1*, Plastics — Determination of Charpy impact properties — Part 1: Non-instrumented impact test (ISO 179-1:2000)*

EN ISO 179-2*, Plastics — Determination of Charpy impact properties — Part 2: Instrumented impact test (ISO 179-2:1997)*

EN ISO 180*, Plastics — Determination of Izod impact strength (ISO 180:2000)*

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 527-3*, Plastics — Determination of tensile properties — Part 3: Test conditions for films and sheets (ISO 527-3:1995)*

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

EN ISO 1133*, Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics (ISO 1133:2005)*

EN ISO 3451-1, *Plastics — Determination of ash — Part 1: General methods (ISO 3451-1:1997)*

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 apply. The abbreviated terms related to recyclates are given in EN ISO 1043-1:2001.

4 Requirements

4.1 General

The characteristics of a batch of plastics waste that should be provided to the purchaser by the supplier are given in Table 1 and Table 2, and are divided into two types:

— Required characteristics, needed to characterise wastes in general, and required for all batches of waste.

— Optional characteristics, information on which may add value to the batch of waste.

NOTE Waste plastics arise in many different forms and may be a single polymer type or a mixture, depending on how the waste has been collected. A batch of waste material can, therefore, include wastes from a single source, such as factory scrap, or window frames from building demolition, or a mixture of types as in unsorted domestic waste. The forms in which the waste is collected can be equally varied. A batch of waste material offered for sale can be a quantity as collected, or may have been sorted by the collector to add value to it. The wide range of possible forms and compositions of waste plastics offered for sale makes it important for there to be a standardised means of characterising them so that there is a transparent transaction between seller and purchaser.

4.2 Classification scheme

The supplier of a batch of plastics waste shall provide to the purchaser a statement of the characteristics of the waste under the headings in Table 1 and Table 2. If the supplier is unable to classify the batch of waste under any of the headings, he shall state that, for that heading it is **"Unclassified"**, or that he has **"No Information"**.

Where the plastics waste originates from a single source and is comprised of a single polymer type, then the properties of that original material can be reported, provided it is clearly stated that they are the properties of the virgin material rather than that of the waste.

Where properties have been measured on representative samples from the batch of waste, this shall be stated. Other tests may be carried out by agreement between the purchaser and supplier and the results shall be reported.

The supplier may provide, or the purchaser request information on substances which may present impediments to recycling and their concentrations in the waste, with details of the way the information was obtained – via traceability or by analysis, quoting any analytical methods used. The purchaser may indicate those substances for which he/she requires information.

To secure the legal use of the recyclate, the supplier has to provide the necessary information concerning the material composition of the waste, as specified by the purchaser.

Table 1 – Required characteristics of plastic wastes

Property	**Suitable statements/Comments**
	NOTE "Unclassified" or "No Information" are permissible statements.
Batch Size	By Weight or Volume
Colour	Visual assessment e.g. Natural, Single Colours or Mixed Colours and information on shade, e.g. light blue
Form of Waste	For example, as flake or chip, film on/off the reel, bottles, sacks, fibre offcuts, mixed forms
History of Waste	The supplier shall provide information on the original application(s) and the way in which the waste was collected and handled after becoming waste. See EN 15343
Main Polymer Present	Most important polymer component of the waste and the percentage by weight if known
Other Polymers Present	Any other polymers known to be present, with levels if known
Packaging	Type of packaging in which the waste is contained

Table 2 – Optional characteristics of plastic wastes

The supplier should provide as much information as possible **It shall be stated whether any properties reported are those of the original prime material or have been measured on representative samples from the batch of waste.**			
Polymer Properties	Particularly useful when the waste is homogeneous.		
Impact strength	kJ/m^2	EN ISO 179-1 and EN 179-2 or EN ISO 180	
Melt mass flow rate	g/10 min	EN ISO 1133	
Vicat softening temperature	°C	EN ISO 306 Method A	
Additives, Contaminants, Moisture, Volatiles	Any additional information on the material will be useful.		
Ash content	%	EN ISO 3451-1	
Moisture	%	EN 12099[a]	
Tensile strain at break	%	EN ISO 527 (parts 1 to 3)	
Tensile stress at yield	MPa	EN ISO 527 (parts 1 to 3)	
Volatiles	Weight loss at a process temperature		
[a] The scope of EN 12099 is limited but it is considered relevant.			

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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