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Post consumer polyethylene Terephthalate (PET) recyclates — Specification



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Foreword

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- (a) a member of International Organisation for Standardisation (ISO)
- (b) a contact point for the WHO/FAO Codex Alimentarius Commission on Food Standards, and
- (c) the National Enquiry Point on TBT Agreement of the World Trade Organisation (WTO).

The work of preparing Uganda Standards is carried out through Technical Committees. A Technical Committee is established to deliberate on standards in a given field or area and consists of key stakeholders including government, academia, consumer groups, private sector and other interested parties.

Draft Uganda Standards adopted by the Technical Committee are widely circulated to stakeholders and the general public for comments. The committee reviews the comments before recommending the draft standards for approval and declaration as Uganda Standards by the National Standards Council.

The committee responsible for this document is Technical Committee UNBS/TC 303, Plastics and related products.

Post-consumer poly(ethylene terephthalate) (PET) bottle recyclates — Specification

1 Scope

This Draft Uganda standard specifies requirements, sampling and test methods for post-consumer polyethylene terephthalate (PET) recyclates in the form of flakes and pellets

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.

ASTM D7486-14, *Standard Test Method For Measurement Of Fines And Dust Particles On Plastic Pellets By Wet Analysis*

ASTM F2013-10, *Standard Test Method for Determination of Residual Acetaldehyde in Polyethylene Terephthalate Bottle Polymer Using an Automated Static Head-Space Sampling Device and a Capillary GC with a Flame Ionization Detector*

ISO 1133-2, *Plastics — Determination of the melt mass-flow rate (MFR) and melt volume-flow rate (MVR) of thermoplastics — Part 2: Method for materials sensitive to time-temperature history and/or moisture*

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

ISO 1628-5, *Plastics — Determination of the viscosity of polymers in dilute solution using capillary viscometers — Part 5: Thermoplastic polyester (TP) homopolymers and copolymers*

US ISO 2859-1, *Sampling procedures for inspection by attributes — Part 1: Sampling schemes indexed by acceptance quality limit (AQL) for lot-by-lot inspection*

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

ISO 12418-1, *Plastics — Post-consumer poly(ethylene terephthalate) (PET) bottle recyclates — Part 1: Designation system and basis for specifications*

US ISO 12418-2, *Plastics — Post-consumer poly(ethylene terephthalate) (PET) bottle recyclates — Part 2: Preparation of test specimens and determination of properties*

ISO 15512, *Plastics — Determination of water content*

ISO 15270, *Plastics — Guidelines for the recovery and recycling of plastics waste*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

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

— ISO Online browsing platform: available at <http://www.iso.org/obp>

3.1 pellet
small mass of preformed moulding material, having relatively uniform dimensions in a given lot, used as feedstock in moulding and extrusion operations

3.2 recyclate
plastic material resulting from the recycling of post consumer PET waste

3.3 post-consumer
descriptive term covering material, generated by the end-users of products, that has fulfilled its intended purpose or can no longer be used (including material returned from within the distribution chain)

3.4 flake
plate-like regrind

3.5 regrind
shredded and/or granulated recovered plastics material in the form of free-flowing material

3.6 recycled PET (rPET)
recovered materials resulting from industrial packagings and post-consumer PET materials that have been cleaned, prepared and processed into new recyclates

3.7 bulk density
weight per unit volume of plastic flakes or pellets

3.8 intrinsic viscosity
limiting value of the reduced viscosity or the inherent viscosity at infinite dilution of the polymer

4 Requirements

4.1 General requirements

4.1.1 The recycling process shall be done in accordance with ISO 15270.

4.1.2 The input to the recycling process shall originate from a product loop which is in a closed and controlled chain ensuring that only PET materials are used and any contamination is ruled out.

4.1.3 The designation system for the post-consumer PET recyclates shall be done as described in ISO 12418-1.

4.1.4 The recyclates shall be manufactured in accordance with good manufacturing practice (GMP) so that, under normal or foreseeable conditions of use, they do not transfer their constituents to food in quantities

which could endanger human health; bring about an unacceptable change in the composition of food; bring about deterioration in the organoleptic characteristics (taste, odour and texture) thereof.

4.2 Specific requirements

4.2.1 Recycled PET flakes shall comply with the specific requirements in Table 1 when tested in accordance with the test methods specified therein

Table 1 – Specific requirements for recycled PET flakes

S/No	Parameters	Requirement	Test methods ^b
i.	Fine particle content, %	≤ 0.1	ASTM D7486
ii.	Intrinsic viscosity (IV), dl/g	.0.60 – 0.84	ISO 1628-5 in combination with ISO 1628- 1
iii.	Contamination due to label and other visible contaminants, mg/kg, max	300	ISO 12418-2
iv.	Contamination due to Polyvinyl Chloride (PVC), mg/kg	< 5	
v.	Contamination due to Polyolefins (including adhesives), mg/kg, max	50	
vi.	Metal (aluminium, steel), mg/kg	< 5	Spectroscopic analysis: FTIR or XRF
vii.	Water content, %	≤1.00	ISO 15512 method B
viii.	Bulk density, kg/m ³	As specified by manufacturer	ISO 12418-2

4.2.2 Recycled PET pellets shall comply with the physical and chemical requirements in Table 2 when tested in accordance with the test methods specified therein

Table 2 – Specific requirements for recycled PET pellets

S/N	Parameters	Requirement	Test methods ^b
i.	Fine particle content, % (max) (percentage of particles passing through the sieve 1mm)	0.05	ASTM D7486
ii.	Metal (aluminium, steel), mg/kg, max	<5	Spectroscopic analysis: FTIR or XRF
iii.	Intrinsic viscosity (IV) ^a , dl/g, min	0.61	ISO 1628-5 in combination with ISO 1628- 1
iv.	Haze 3mm thick plaques, %, max at 550nm	13	ISO 14782
v.	Acetaldehyde content, ppm (max)	1.0	ASTM F2013-10
vi.	Limonene, µg/kg (max)	< 20	GC/MS
vii.	Water content, %	< 0.3	ISO 15512

a Solvent – mixture of phenol and 1,1,2,2-tetrachloroethane (6:4)

b A certificate of analysis, including the test results for each batch of recyclate, the sampling method and the number of replicates, shall be provided by the supplier to the purchaser on request. The sampling method and the number of replicates are important in determining the quality of the material. Quality levels can vary within the batch and from batch to batch, depending on the source of the recyclate

4.2.3 The specific migration limit of compound from the recyclates shall not exceed the limit specified in Table 3 when determined in accordance with the test method specified therein.

Table 3 — Specific migration limits for compounds used in the manufacture of recyclates.

S/N	Compound	Specific Migration Limit, mg/kg of food, max.	Test method
i.	Mono- and diethylene glycol (including the ester of stearic acid with ethylene glycol)	30	ASTM D4754-98
ii.	Terephthalic acid	7.5	
iii.	Isophthalic acid	5.0	
iv.	Antimony trioxide(calculated as antimony)	0.04	
v.	2-Aminobenzamide (anthranilamide)	0.05	

5 Packaging

The recyclates shall be packaged in suitable packaging materials that maintain their integrity prevent the ingress of dust, moisture and other foreign matters during transportation and storage

6 Labelling

The following information shall be legibly and indelibly labelled on the packaging, container or in accompanying documents:

- a) name of product as “PET Recyclates”
- b) form of product as ,”flakes” or “pellets”
- c) name, trade mark and physical address of the manufacturer;
- d) batch number;
- e) date of manufacture; and
- f) words “for food contact” or symbol for food contact material.



- g) symbol indicating that the product is made from recycled PET material



7 Sampling

The sampling criteria shall be in accordance with US ISO 2859-1

Bibliography

- [1] DRS 499-1: 2022, *Post-consumer polyethylene terephthalate (PET) containers — Specification — Part 1: Food grade PET recyclates, preforms and containers*
- [2] US ISO 472: 2013, *Plastics - Vocabulary*

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