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Polyethylene terephthalate (PET) bottles for edible oils - Specification

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Foreword

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This African Standard was prepared by **ARSO/TC 14, Food packaging and labelling.**

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Polyethylene terephthalate (PET) bottles for edible oils -Specifications

1 Scope

This African Draft standard prescribes the requirements and the methods of sampling and testing for polyethylene terephthalate (PET) bottles edible oils.

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.
ISO 472:2013 Plastics – Vocabulary
ISO 21067-1:2016 Packaging — Vocabulary — Part 1: General terms
ASTM D5094-04 Standard Test Methods for Gross Leakage of Liquids from Containers with Threaded or Lug-Style Closures
ASTM D2463-95 Standard Test Method for Drop Impact Resistance of Blow-Molded Thermoplastic Containers
ISO 12048:2001Packaging. Complete, filled transport packages. Compression and stacking tests using a compression tester
ARS 17I6 Migration of constituents of plastic materials and articles intended to come into contact with foodstuffs- Specifications
ISO 1306 Plastics — Blow-moulded polypropylene containers for packaging of liquid foodstuffs
ISO 12048 Packaging. Complete, filled transport packages Compression and stacking tests using a compression tester

3 Terms and definitions

For the purpose of this African Draft standard the definitions prescribed in in ISO 472 Plastics – Vocabulary and ISO 21067-1 Packaging - Vocabulary - Part 1: General terms shall apply.

3.1
blow moulding
method of forming hollow objects by inflating a parison into a mould with compressed gas

3.2
food
article or substance (except a medicine as defined in legislation) ordinarily eaten or drunk by a person or purported to be suitable, or manufactured or sold for human consumption, or that includes any part or ingredient of any such article or substance, or any substance used or intended or destined to be used as a part or ingredient of any such article or substance

3.3
food contact
surface of a material or article that is in direct contact with the food

3.4
high-density polyethylene - PE-HD
polyethylene, containing very few short-chain branches (< 4 per 1 000 carbon atoms), having a density greater than 0,940 grams/cubic centimetre

3.5
low-density polyethylene - PE-LD
polyethylene which is highly branched (short and long chains) and has a density of 0,910 grams/cubic centimetre to 0,925 grams/cubic centimetre

3.6

migration testing
the analysis performed on plastic and polymeric products that are in contact with food to determine whether chemical substances are transferred from packaging and food contact materials to food

3.7
overall migration limit - OML
maximum permitted amount of non-volatile substances that is released from a material or an article and migrates into food simulants

3.8
packaging
anything within which a foodstuff, a cosmetic or a disinfectant is covered, enclosed, contained or packed

3.9
poly(ethylene terephthalate) - PET
Polyethylene Terephthalate (PET) the basic material produced by the catalytic condensation at high temperature and reduced pressure of dimethyl terephthalate (DMT) terephthalic acid (PTA) and if required, relatively small amounts of dimethyl isophthalate (DMI) isophthalic acid (IPA) with monoethylene glycol

3.10
polymerization
process of converting a monomer or a mixture of monomers into a polymer

3.11
plastic (noun)
material which contains as an essential ingredient a high polymer and which, at some stage in its processing into finished products, can be shaped by flow

3.12
polymer
any macromolecular substance obtained by a polymerization process such as polyaddition or polycondensation, or by any other similar process of monomers and other starting substance, or by chemical modification of natural or synthetic macromolecules, or by microbial fermentation

3.13
polyolefins
polyolefins are the largest group of thermoplastics, often referred to as commodity thermoplastics; they are polymers of simple olefins such as ethylene, propylene, butenes, isoprenes, pentenes, copolymers of such, or modifications thereof

3.14
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)

Note 1: The term “post-use” is sometimes used synonymously.

3.15
preform
consist of a fully formed (meaning this part doesn't change) bottle/jar 'neck' and a thick tube of plastic (like a test tube) which is then blown and moulded into the desired shape of a bottle/jar

3.16
recyclate
plastics material resulting from the recycling of plastics waste

Note 1: The terms “secondary raw material”, “recycled plastics” and “regenerate” are sometimes used synonymously with “recyclate”.

Note 2: As soon as the used plastics material is treated in such a way that it is ready to replace virgin product, material or substance in a production process, it loses its characteristics as waste.

3.17
recycling
processing of waste materials for the original purpose or for other purposes, excluding energy recovery

3.18
thermoplastic (adjective)
capable of being softened repeatedly by heating and hardened by cooling through a temperature range characteristic of the plastic and, in the softened state, of being shaped by flow repeatedly into articles by moulding, extrusion or forming

3.19
thermoplastic (noun)
plastic that has thermoplastic properties

3.20
migration limit -
maximum permitted amount of a given substance that is released from a material or article into food or food simulants

3.21
virgin polymer
polymer that has not been processed before

3.22
virgin plastic
plastic material in the form of pellets, granules, powder, floc, etc., that has not been subjected to use or processing other than that required for its initial manufacture

4 Requirements

4.1 General Requirements

4.1.1 Materials

4.1.1.1 Cap

The material for the cap and plug (if required) as agreed between the purchaser and the supplier shall be food grad.

4.1.1.2 Wad

The wad, if required, shall be of cork board or pulp-board or any other suitable material compatible with the contents and suitable for food contact applications

4.1.1.3 Labelling Adhesive

The adhesive used for the label (if required) shall be water soluble

4,1.2 Shape and Design

The shape and design shall be as agreed to between the purchaser and the supplier.

4.1.3 Workmanship and Finish

The bottles and closures shall be manufactured in accordance with Good Manufacturing Practices and shall be free from any burnt, oxidised or un-homogenised particles. The bottles shall be as agreed between manufacturer and supplier in either transparent or opaque bottles and, free from any scratches.

4.2 Specific Requirements

4.2.1 Tolerances

4.2.1.1 Filling Capacity

The tolerance on the filling capacity of the bottle shall be ±5 percent.

4.2.1.2 Dimensions

The tolerance on the specified diameter and overall height of the bottle shall be as under:

Up to and including 100mm	±1.5mm
Over 100mm and up to and including 200mm	±2.0mm
Over 200mm	±2.5mm

4.2.2.3 Wall Thickness

The minimum wall thickness of the bottle measured at any point by a dial calliper gauge fitted with spherical anvil, Vernier callipers or micro-metre shall be 0.25mm. Mean of three readings at any location shall be taken as the wall thickness at that point.

4.2.2 Migration requirements

4.2.3.1 Overall Migration

The recycled polyethylene terephthalate (rPET), shall be manufactured in compliance with good manufacturing practice so that, under normal or foreseeable conditions of use, they do not transfer their constituents to food in quantities which could endanger human health

In addition to complying with specifications of ARS 1716- Migration of constituents of plastic materials and articles intended to come into contact with foodstuffs, the following shall apply;

4.2.3.1 (i) Recycled polyethylene terephthalate (rPET); intended to be brought into contact with food intended for infants and young children shall not transfer their constituents to food simulants in quantities exceeding sixty milligrams of total of constituents released per kg of food simulant (*60 mg/kg)*

4.2.3.1(ii) Recycled polyethylene terephthalate (rPET); shall not transfer their constituents to food simulants in quantities exceeding ten milligrams of total constituents released per dm^2 of food contact surface ($10mg/dm^2$)

4.2.2.2 Specific Migration

Recycled polyethylene terephthalate (rPET); shall not release the following substances in quantities exceeding the specific migration limits below:

Table 4: Heavy metals

Sub.No	***Substances***	***Maximum Limit mg/kg food or food simulant***	***Test methods***
1	*Aluminium*	***1***	*EN 13130/2004*
2	*Ammonium*	***-***	
3	*Antimony*	***0.04***	
4	*Arsenic*	***ND***	
5	*Barium*	***1***	
6	*Cadmium*	***ND***	
7	*Calcium*	***1***	
8	*Chromium*	***ND***	
9	*Cobalt*	***0.05***	
10	*Copper*	***5***	
11	*Europium*	***0.05***	
12	*Gadolinium*	***0.05***	
13	*Iron*	***48***	
14	*Lanthanum*	***0.05***	
15	*Lead*	***ND***	
16	*Lithium*	***0.6***	
17	*Magnesium*	***1***	

Sub.No	*Substances*	*Maximum Limit mg/kg food or food simulant*	*Test methods*
18	*Manganese*	***0.6***	
19	*Mercury*	***ND***	
20	*Nickel*	***0.02***	
21	*Potassium*	***1***	
22	*Sodium*	***-***	
23	*Terbium*	***0.05***	
24	*Zinc*	***5***	

5 Test(s)

The bottles shall not show any leakage, cracks or permanent buckling when subjected to the following test as specified international standards or their equivalent:

Test	**Test method**
stacking test	ISO 2234
Drop Impact test	ASTM D2463-95

6 Labelling and Packaging

6.1 Batch bottle shall be indelibly and legibly marked with the following information.

a) manufacturer's name and registered trademark, if any;
b) date of manufacture;
c) disposal and safety instructions;
d) country of origin;
e) dimension and carrying capacity of the bottle;
f) batch or code number.
g) international code of the plastic used.
h) The packages shall carry the symbol for food grade (carrying spoon or fork and cup e.g. Fig. 1) or the word "for food grade" on it

6.2 The bottle immediately after manufacture shall be packed under hygienic conditions in a suitable protective covering that will preclude the ingress of dust, moisture and other foreign

Fig.1

7 Sampling

The sampling method shall be traceable to ISO 2415.

7.1 Scale of Sampling

In any consignment all the bottles of the same material, nominal capacity and drawn from a single batch of manufacture shall be grouped together to constitute a lot.

Samples shall be tested from each lot to ascertain the conformity of the lot to the requirements in clause 4.
The number of rPET bottles shall be selected at random from a lot as specified in Table 5.

Table 5 - **Scale of Sampling**

Number of Bottles in the lot	Number of Bottles to be Selected	Acceptance Number	Sub-sample Size
Up to 500	20	06	03
501 to 1200	32	10	03
1201 to 3200	50	14	05
3201 to 10000	80	20	08
10001 and above	125	28	13

7.2 Number of Tests

7.2.1 The PET bottle shall be tested in line with the requirements specified in clause 4. Each PET bottle selected as in 7.1 shall be inspected for packaging and labelling criteria as specified in clause 6.

Bibliography

EN 1186-1/2002 “Materials and articles in contact with foodstuffs - Plastics - Part1: Guide to the selection of conditions and test methods for overall migration".

EN 13130-1/2004 “Materials and articles in contact with foodstuffs – Plastics substances subject to limitation – Part 1: Guide to test methods for the specific migration of substances from plastics of substances in plastics and the selection of conditions of exposure to food”.

EN 13130: 2004 Standard for the reliable control substances specific migration

Regulation (EU) 10/2011 Amendment 2020/1245 Regulation (EU) No 10/2011 details the requirements for plastic materials in contact with food.

IS 7028 (PART 2): 1973 PERFORMANCE TESTS FOR COMPLETE, FILLED TRANSPORT PACKAGES PART 2 VIBRATION TEST AT FIXED LOW FREQUENCY

Regulation (EC) No 1935/2004 of the European parliament and of the council of 27 October 2004 on materials and articles intended to come into contact with food.

Commission Regulation (EU) No 10/2011 on plastic materials and articles intended to come into contact with food, Amend 2023.