DRAFT TANZANIA STANDARD

GDC 4 (1076) DTZS Polyethylene terephthalate (PET) bottles for packaging liquids products -Specification

TANZANIA BUREAU OF STANDARDS

1st Edition

EXECUTIVE SUMMARY OF GDC 4 (1076) DTZS POLYETHYLENE TEREPHTHALATE (PET) BOTTLES FOR PACKAGING LIQUIDS PRODUCTS - SPECIFICATION

This draft Tanzania standard specifies requirements, method of sampling and test for bottles made from Polyethylene Terephthalate (PET) intended for the packaging of liquids.

This standard does not cover PET bottles for packing pharmaceutical products.

It is anticipated that this draft Tanzania Standard will be made **COMPULSORY i**n its application.

NATIONAL FOREWORDS

0.1 The Tanzania Bureau of Standards is the statutory national standards body for Tanzania, established under the Act.No.3 of 1975, amended by Act.No.2 of 2009.

This draft Tanzania Standard has been adopted by Packaging Technical committee, under the supervision of the General Techniques Standards Divisional Committee (GTDC) and it is in accordance with the procedures of the Bureau.

Polyethylene Terephthalate popularly known as PET bottles are popular for packaging of different liquids including foodstuffs. Their glass like clarity, lightness and better barrier properties for moisture and air permeation and excellent organoleptic property make them popular for food packing industry. PET can be used in pure form without any additive. Due to this, there is no organoleptic quality of food packed in PET bottles. However, to ensure the compatibility and suitability of PET bottles for their shelf life a compatibility test has been included for this standard. Hence due these reasons and increasing use of PET containers for packaging of liquid foodstuff and other products in our country has led to the formulation of this standards.

In formulating this standard, considerable information was derived from the following documents:

IS 2798 Methods of test for plastic containers.

IS 13123 Polyethylene Terephthalate (PET) Bottles for Packing of Liquid Pesticides.

IS 12887 Polyethylene Terephthalate (PET) Bottles for Packaging of Edible Oils.

Acknowledgement is hereby made for the assistance derived from this source.

0.2 Terminology and conventions

Some terminology and certain conventions are not identical with those used as Tanzania Standard; attention is drawn to the following:

The comma has been used as decimal marker for metric dimensions. In Tanzania, its current practice to use a full point on the baseline as decimal marker.

Whenever the words “International Standard” appear, referring to this draft Tanzania Standard, they should read as “Tanzania Standard”.

1. Scope

This draft Tanzania standard specifies the requirements, method of sampling and testing for removable head or open head drums, manufactured from galvanized or ungalvanized steel sheets.

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 3574:2012 Cold-reduced carbon steel sheet of commercial and drawing qualities

ISO 3573:2012 Hot-rolled carbon steel sheet of commercial and drawing qualities

ISO 228-1:2000 Pipe threads where pressure-tight joints are not made on the threads — part 1: dimensions, tolerances and designation

ISO 15750-3:2002 Packaging — steel drums — part 3: inserted flange-type closure systems

3. Terms and definitions

For the purpose of this document, the following terms and definitions shall 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 http://www.iso.org/obp

3.1 chimb
projecting edge rim or brim at the ends of a drum. Also used to refer to the depth of the end stamping of a drum

3.2 drum
cylindrical packaging made of steel, the bottom end of which is permanently fixed to the body and the top end can be removed as a lid and closed by means of a closing ring

NOTE: The top end may have additional openings for filling and venting.

3.3 round seam
seam consisting of six or more layers of steel

3.4 nominal capacity
capacity, in litres, which by convention is used to represent a class of drums of similar brimful capacities

3.5 total capacity
volume of water, in litres, held by the drum when filled completely, i.e. following the removal of any air trapped in the drum, the drum being closed and having a lid fitted with closures

3.6 strap handle
handle formed of strip metal with cranked ends, riveted, soldered or welded to the head of the container

4. Materials

4.1 Body and ends shall be of steel sheet CR1 (commercial quality) for cold-reduced steel, according to ISO 3574, or of steel sheet HR1 (commercial quality) for hot-rolled steel according to ISO 3573. Steel of higher strength is permitted.

4.2 Closure flanges shall be manufactured from metal, and closure plugs from metal or plastic materials.

5. Requirements

5.1 General requirements

5.1.1 Construction

5.1.1.1 Body and heads shall be constructed of steel of thickness specified in this standard in relation to the intended use.

5.1.1.2 The longitudinal seam of the body shall be welded.

5.1.1.3 The body and bottom end shall be permanently fixed by round seaming using a non-hardening seaming compound, or other joining methods (e.g. welding).

5.1.1.4 Two rolling hoops (beads) expanded or rolled into the body shall be located as shown in Figure 1.

5.1.1.5 Constructions of rolling hoops other than those shown are allowed including a third rolling hoop (bead), or replacement of the beads by small corrugations.

NOTE: The preferred drum type is the drum with two rolling hoops only.

5.1.1.6 The removable top end shall be fitted with a gasket of suitable material.

5.1.1.7 The construction of the closing ring shall be such that the tightness of the drum is not jeopardized.

5.1.1.8 If additional closures are provided in the top end, the following are applicable:

a) The closures shall be positioned in the top end, diametrically opposed as indicated in Figure 1.

b) The nominal pitch diameter and pitch of the closures shall be as defined in ISO 228-1, threads G 3/4 and G 2.

c) The closures should be as specified in ISO 15750-3, unless otherwise agreed between the purchaser and manufacturer.

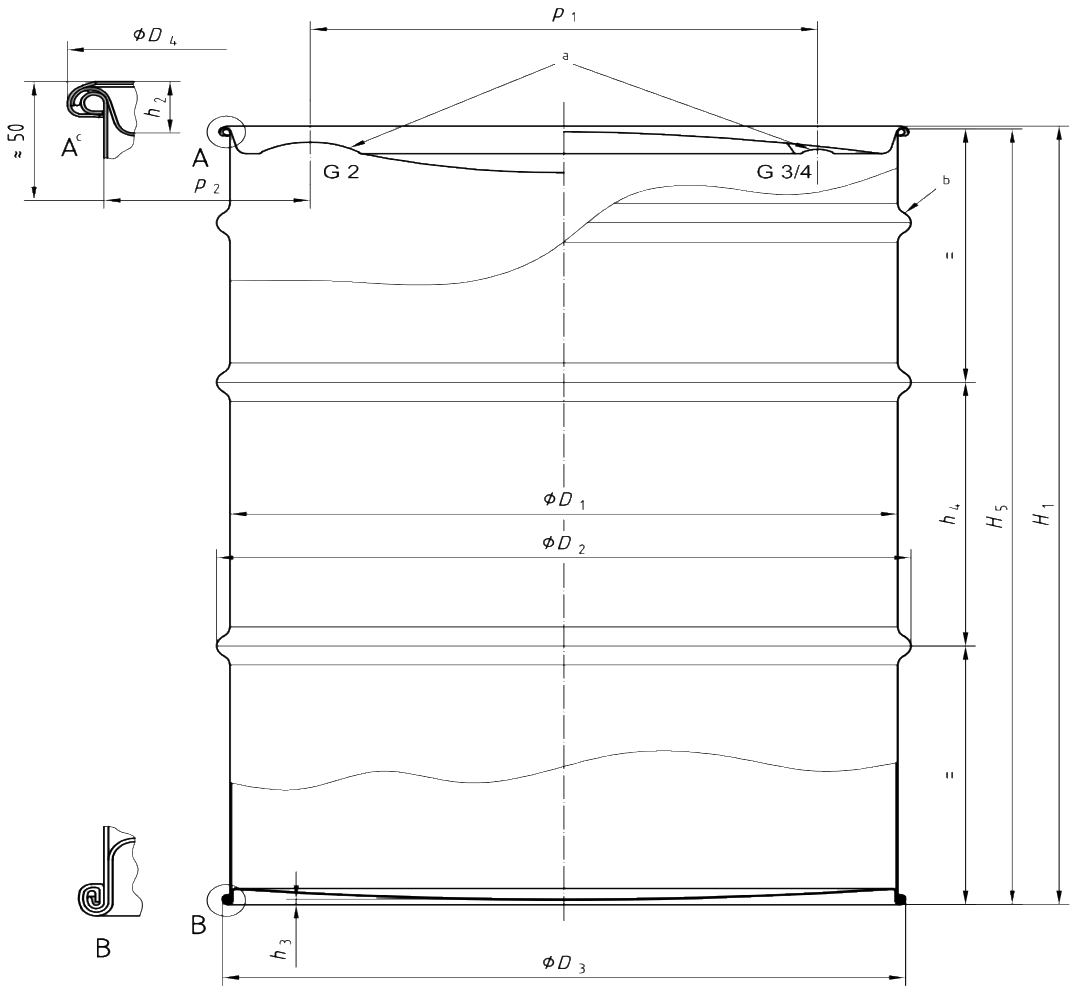
d) Gaskets/washers or other sealing elements shall be used with the closures unless the fittings are inherently leak proof.

e) The metal or plastic plugs shall be fitted with washers/gaskets of suitable materials.

5.1.1.9 The nature of the internal and external finishes shall be agreed between the purchaser and manufacturer.

5.1.1.10 If materials used for the body, heads and fittings are not in themselves compatible with the contents to be transported, suitable internal protective coatings or treatments shall be applied. These coatings or treatments shall retain their protective properties under normal conditions of transport.

Dimensions in millimetre



[a] Closures (optional).

[b] Third bead is optional.

[c] Detail of drum type B + D.

Figure 1 — Removable head (open head) drum

D_1- Internal diameter
D_2- External diameter over rolling hoops
D_3- Diameter over bottom chimb
D_4- Diameter over closing ring
H_1- Total drum height
of closures
H_5- Height with cover off
h_1- Depth of top
h_2- Clearance from floor
h_3- Distance between beads
h_4- Distance between
p_1- Centre-to-centre distance
p_2- Location of G2 (50 mm) closure to outside body, measured approximately 50 mm from top

5.2 Specific requirements

5.2.1 Drop impact strength

The drum shall show no sign of rupture or leakage when tested in accordance with the method described in Annex A.

5.2.2 Internal air pressure

The drum when subjected to an internal air pressure of 40 kPa shall show no leakage when tested in accordance with the method described in Annex B.

5.2.3 Handle pull strength

The handle of the drum shall show no permanent distortion or damage on the handle retaining lugs or rivets or welding on the handle seat when tested in accordance with the method described in Annex C.

5.2.4 Thickness

5.2.4.1 Thickness of the steel sheet

The thickness of the sheet metal used for the body and the ends shall be between 0.6 mm and 1.6 mm, with tolerances according to ISO 3573 or ISO 3574.

5.2.4.2 Thickness of the handle

The minimum nominal sheet thickness of the strap handle shall be 0.5 mm, and the wire thickness of the wire handle shall be 5 mm.

6. Marking

The drums shall be marked indelibly or embossed with the following information on top or bottom ends:

a) Manufacture's name or identification mark.

b) Year of manufacture.

c) Nominal capacity.

d) Use /or use restrictions e.g., for chemicals only, food safe, not for corrosive materials etc.

7. Sampling

7.1 The drum shall be type tested for the requirements given in clauses 5.2.1, 5.2.2, 5.2.3 and 5.2.4. Any change in design, material or capacity makes it necessary for the new drums to be tested in accordance with all the tests specified.

7.2 The frequency of sampling and the number of samples are deemed to the matter of agreement between the purchaser and supplier. Nevertheless, the sample size given in the test methods namely, drop impact, handle strength and internal

pressure shall be used as these are the minimum necessary to obtain meaningful test results regardless of the batch size under consideration.

Annex A

(Clause 5.2.1)

Drop Impact Test

A1. The drums shall be subjected to the drop tests detailed in A2 and A3.

A2. Fill the drum to 98 percent of its total capacity with water, close the drum properly and keep its diagonal in a vertical position. Drop the drum four times from a height of one metre on a concrete floor, drops shall be arranged in such a manner that the following four points of the drum strike the floor on each drop-in turn:

a) The bottom rim near its junction with the side seam;

b) The top rim near its junction with the side seam;

c) The bottom rim diametrically opposite to the position at (a); and

d) The top rim diametrically opposite to the Position at (b).

A3. The drum shall not show any sign of leakage. Empty the drum after the conclusion of the four drops.

Annex B

(Clause 5.2.2)

Air Pressure Test

B1. The drums shall be subjected to the drop tests detailed in B2 and B3.

B2. The drum when required for packing liquid products, shall be subjected to an internal air pressure of 40 kPa while fully immersed under water or coated over with soap water.

B3. The drum shall show no sign of leakage.

Annex C

(Clause 5.2.3)

Handle Pull Test

C1. The handle of the drum shall be subjected to the gradual pull as given below, distributed uniformly over the length of the handle for a period of two minutes.

Nominal Capacity	Pull load ,kg
Up to 10 Litres	30
Above 10 Litres	72

C2. After removal of the load, no permanent distortion or damage shall be observed on the handle retaining lugs or rivets or welding on the handle seat.