



TANZANIA STANDARD

Plastics crates for fruits and vegetables – Specification

TANZANIA BUREAU OF STANDARDS

TZS 1532: 2012

This Tanzania Standard was published under the authority of the Board of Directors of Tanzania Bureau of Standards on 2012-07-06.

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ISBN: 978-9987-11-425-2

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0 Foreword

Plastic crates are widely used for carrying and storing food and other consumer products. The usage of plastic crates covers carrying and storing of soft drinks, beer, mineral water, wine, milk, fruits and vegetables. Regarding the Tanzania Standard it covers the crates for fruits and vegetables. The superiority of these crates lies chiefly in their economy, functionality and sales promotional aspect. The surface of plastic crate is smooth and non-porous and consequently does not harbor bacteria. The corner and edge of these crates are round to make free accumulation of dirt materials. They are easy to clean and this is an important factor one should consider in food handling and presentation.

Acknowledgment is hereby made for the assistance drawn from

IS 15532: 2004, *Plastics crates for fruits and vegetables – Specification*

For the purpose of deciding whether a particular requirement of this finalized Tanzania Standard is complied with, the final value; observed or calculated, expressing the result(s) of a test or analysis shall be rounded off in accordance with TZS 4 (see clause 2). The number of significant places retained in the rounded off value shall be the same as that of the specified value in this Tanzania Standard.

1 Scope

This finalized Tanzania Standard prescribes the requirements, methods of sampling and test for rigid and collapsible plastic crates for holding and transporting fruits and vegetables.

2 References

During the preparation of this finalized Tanzania Standard the reference has been drawn from the following published standard;

TZS 4: 2009, *Rounding numerical numbers*

ISO 24153: 2009, *Random sampling and Randomization procedures*

3 Requirements

3.1 The crates shall consist of a rigid or collapsible plastic container with base and side walls, either solid or perforated or its combination.

3.2 Material

The base raw material for crate shall be unpigmented plastic materials preferably High Density Polyethylene (HDPE) or polypropylene copolymer (PPCP).

However, selection of the raw material for a specific type of crates shall be as agreed to between the purchaser and the supplier.

3.2.1 The colour of the crate shall be as agreed to between the purchaser and the suppliers. However, the pigment/colour used shall not be metal based, shall comply with the list and limits of pigments and colorants prescribed in applicable regulation and shall have light fastness certificate from the manufacturer.

3.2.2 Adequate ultraviolet stabilizer (recommended quality and quantity) shall be added, if required for the application as agreed to between the purchaser and the supplier. Alternatively UV stabilized resins of HDPE or PPCP meeting the Melt Flow Index (MFI) and density requirements of **3.2** may also be used as agreed to between the purchaser and the supplier.

3.3 Shape, dimensions and design

3.3.1 The shape dimensions and design of the crate shall be as agreed to between the purchaser and the supplier.

3.3.2 The crates within a given design shall be interchangeable and inter-stackable. The full capacity of the crate is calculated based on weight of equivalent volume of water.

3.4 Mass

The mass of the crate shall depend upon the material used; the capacity and the design selected and therefore, shall be as agreed to between the purchaser and the supplier.

3.5 Appearance and Surface Finish

The inside and outside surface of the crate shall be of a smooth finish and free from edges including handle slot and shall have a handle slot of minimum dimensions of 95 mm x 25 mm for comfortable handling.

3.6 Dimensional stability

Crates when tested in accordance with method prescribed in annex A, shall not show dimensional changes greater than 1.5 %.

3.7 Confluence Line Strength

The confluence line (weld line) of the crate when tested in accordance with method prescribed in annex B shall not show crack or breakages.

3.8 Mechanical Strength

3.8.1 *Compressive Strength (Resistance to Applied Load)*

The compression in the height of a crate when tested in accordance with the method described in annex C shall not exceed 2 percent of its original height. Residual compression after 24 h after removal of the test load shall be 0.8 % or less.

3.8.2 *Resistance to Drop*

When a fully filled crate is tested in accordance with the method described in annex D, no crack on the crate shall occur.

3.9 Resistance to environmental stress cracking

Crates when tested in accordance with the method prescribed in annex E shall show no surface cracking.

3.10 Handle hest

3.10.1 *Suspension test*

The crate's handle when tested in accordance with the method described in annex F shall not crack or break and shall be stackable with itself and with the new crates.

4 Packing and marking

4.1 Packing

The crates shall be packed as agreed to between the purchaser and the supplier.

4.2 Marking

Each crate shall be legibly and permanently marked with the following information:

- a) Manufacturer's name or initial trade-mark, if any;
- b) Month and year of manufacture;
- c) Batch or Code number;
- d) Recycling symbols of HDPE and polypropylene and
- e) Any other markings as desired by the purchaser.

4.2.1 TBS certification marking

The crates may be also marked with the Standard Mark of Quality.

NOTE – The condition for using “tbs” standards mark of quality shall be obtained from Tanzania Bureau of Standards.

5 Sampling

The method of drawing representative sample from a lot and the conformity of a lot to requirements of this Tanzania Standard shall be as prescribed in annex G. The dimensional stability (see 3.6) and environmental stress cracking resistance (see 3.9) shall be type tests.

Annex A
(Normative)

Test for dimensional stability

A.1 Measure the height of the crate at four corners, and length and width at the top and bottom dimensions of the crate. Place the measured empty crate on its base in an air-circulated oven at $80^{\circ}\text{C} \pm 2^{\circ}\text{C}$ for 30 min.

Allow it to cool to ambient temperature by keeping it on its base. Repeat the measurements and calculate the percentage change in the dimensions of the crate.

Annex B **(Normative)**

Determination of confluence line (Weld line)

B.1 Select a crate sample after curing for at least 22 h at $27\text{ °C} \pm 5\text{ °C}$. Drop a steel ball of 2 kg once from a height of 3 m on to the centre of each confluence line (weld line) after placing the crate in a horizontal position. Observe the breakage, cracks or any deformation on the crate.

Annex C **(Normative)**

Determination of compressive strength (Resistance to applied load)

C.1 Stack 6 empty crates one top of other. Put 5 kg load inside the top most crate for proper positioning. Measure the stack height.

C.2 Place 500 kg plate on top of the uppermost crate after removing the earlier placed 5 kg load. Allow the load to remain on the crate for 3 h. At the end of 3 h measure the stack height. Remove the load and measure the stack height after 24 h. The tests are to be conducted at $27\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$.

Annex D

(Informative)

Determination of resistance to drop

D.1 Bottom drop test

D.1.1 Procedure

Load a crate with dummies of the specified load capacity of the crate. Drop the loaded crate in horizontal position from a height of 3 m on a steel plate. Drop the crate four times and observe the cracks, or breakage or deformation occurred on the crate. The test is not valid if full base of the crate is not impacted on each drop.

D.2 Corner drop test

D.2.1 Procedure

Fill a crate with the dummies of the specified load capacity of the crate. Drop the crate from 30 cm height. Repeat the drop with other corners from the same height. Observe the breakage, cracks on the crate.

Drop tests are to be conducted at $5\text{ °C} \pm 1\text{ °C}$ and $27\text{ °C} \pm 1\text{ °C}$.

Annex E
(Normative)

Determination of resistance to environment stress cracking

Prepare a two-percent solution of Teepole B 300 in water. Set the temperature of the solution in the tank at $80\text{ }^{\circ}\text{C} \pm 5\text{ }^{\circ}\text{C}$. After achieving the temperature, submerge a crate in the tank so that it dips fully into the tank and record the time. Remove the crate after 6 h and check the sample for cracks.

Annex F (Normative)

Handle strength test

F.1 General

The crates are subjected to both suspension test and free fall test to ascertain the strength of the handle.

F.2 Suspension test

Fill the crate with dummies to the specified load capacity of the crate. Ensure that the load is properly tied to the crates. Suspend the crate from one handle for 10 min with a canvass strap tied to the handle of the crate. Observe the handle after the test. The handle shall not crack or break.

F.3 Free fall test

Tie 450 mm length after tying canvass strap to the handle of the crate. Raise the crate with load up to the other end of the strap. Allow free fall of the crate (450 mm). Observe the handle after the test. The handle shall not crack or break and shall be stackable with itself and with the new crates.

Annex G (Normative)

Sampling of plastics crates

G.1 Lot

G.1.1 All crates of the same type manufactured from the same material under similar conditions of productions shall be grouped together to constitute a lot.

G.1.2 Samples shall be tested from each lot separately for ascertaining conformity of the lot with respect to the requirements of this Tanzania Standard.

G.1.3 The number of crates to be selected from the lot depends on the size of the lot and shall be in accordance with table 1.

G.1.3.1 These crates shall be selected at random and the procedures of ISO 24153 shall be followed.

G.2 Number of tests and criteria for conformity

G.2.1 Characteristics given in **3.2, 3.3, 3.4** and **3.5**. All crates selected according to table 1 shall be examined for visual, dimensional and other requirements given in **3.2** to **3.5**. A crate failing to satisfy any of these requirements shall be considered as defective. The lot shall be deemed to have satisfied these requirements, if the number of defective crate found in the sample is less than or equal to the corresponding acceptance number given in table 1. The lot having been found satisfactory for these requirements shall be further tested under **G.2.2**.

G.2.2 Characteristics given in **3.7, 3.8** and **3.10**. For each of these characteristics, sufficient number of crates, to carry out tests given in table 1, shall be selected from those already examined and found satisfactory according to **G.2.1**. The lot shall be declared as conforming to the requirements of this Tanzania Standard, if no failure occurs under this clause.

Table 1 – Scale of sampling and permissible number of defectives

(Clauses G.1.3, G.2.1 and G.2.2)

Lot number	Size	For characteristics given in 3.2,3.3,3.4 and 3.5		For characteristics given in 3.7,3.8 and 3.10	
		Sample size	Acceptance no.	Sample size	Acceptance
1	Up to 1 000	32	3	1	0
2	1 001 - 3 000	50	5	2	0
3	3 001 - 5 000	80	7	3	0
4	5 001-10 000	125	10	4	0
5	10 001 and above	200	14	5	0

