**Foreword**

This First Edition of this Draft Tanzania Standard has been prepared to specify requirements to be complied with by manufacturers producing High Density Polyethylene (HDPE)/Polypropylene (PP) Woven Sacks for packing sugar.

This Draft Tanzania Standard describes the construction of the sacks, their dimensions and test methods suitable for ensuring long term storage and transportation of foodstuffs.

In preparation of this Draft Tanzania Standard Assistance was derived from

- **IS 12100: 2014 Specification for High Density Polyethylene (HDPE) Woven Sacks for packing flour.**
- **ISO 23560: 2015 Woven Polypropylene Sacks for bulk packaging of foodstuffs.**
1 Scope
This Draft Tanzania Standard prescribes the requirements of two types of HDPE/PP woven sacks suitable for packing flour.

<table>
<thead>
<tr>
<th>Type</th>
<th>Suitable for</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 1</td>
<td>25 and 50kg</td>
</tr>
<tr>
<td>Type 2</td>
<td>5 and 10kg</td>
</tr>
</tbody>
</table>

2 Normative references
The following referenced documents are indispensable for the application of this Draft Tanzanian Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendment) applies.

i) TZS 4, rounding off numerical values
ii) TZS 20, Textiles – Woven fabrics – Determination of number of threads per unit length and per unit width.
iii) TZS 21, Textiles – Woven or knitted fabrics – Determination of mass per unit length and per unit area.
iv) TZS 22, Textiles - Woven fabrics - Determination of breaking load and extension
v) TZS 44, Textiles – Woven or knitted fabrics, determination of width and length.
vi) TZS 834: 2005, Textiles – Determination of commercial mass consignments of textiles fibres and yarns.
vii) ISO 13953, Polyethylene (PE) pipes and fittings -- Determination of the tensile strength and failure mode of test pieces from a butt-fused joint.

3 Terms and definitions
For the purposes of this Draft Tanzania Standard, the following terms and definitions shall apply.

3.1 HDPE/PP Sacks
Container made of woven HDPE/PP fabric closed at one end,

3.2 Liner bag,
Inner bag which is fitted in a sack to provide additional protective properties against air, water vapour migration and effect of light.

3.3 Laminated sacks
Sacks made of superimposed layers of paper, wood or fabric bonded or impregnated with resin and compressed under heat.

3.4 Ends
Yarns running along the length of and parallel to the sacking selvedge.
3.5 Picks
Yarns running across the width of the fabric and “perpendicular” to the sacking selvedge.

3.6 Sacking
course fabric used for making sacks or bags.

3.7 Bale
rectangular pressed rigid package containing woven bags covered with protective wrappings that are stitched and/or securely bound.

3.8 Contract – mass (bale)
mass as obtained by multiplying the nominal mass of a bag by specified number of bags in that bale.

3.9 Lot
All bales containing similar woven bags.

4 Manufacture
4.1 Fabric – The fabric used in the manufacturing of HDPE woven bags shall be woven from HDPE/PP tapes. The minimum width of tapes used for making fabric shall not be more than 3 mm and the linear density of the tape shall be minimum of 600 deniers.

4.2 Sack
The sack may be produced from fabric woven as a tube and cut to the required length or converted from woven fabric produced on a flatbed loom. Such converted material may be laminated prior to conversion into sacks.

4.2.2 Tubular woven fabric
The sack tube is produced conveniently on a circular loom. The sack tube may also be woven on a flatbed loom which effectively weaves two layers of fabric. The weft is passed via the shuttle through each layer in turn in such a way that it forms tube in which the weft is continuous around the tube so formed. When this method is used, the weft direction tape lies in the transverse direction of the finished sack.

4.2.3 The construction of fabric found suitable is given in Appendix A.

4.3 Lamination of the sack
If so agreed to between the buyer and the seller, the sack shall be made out of woven fabric laminated with low density polyethylene film of uniform thickness not less than 25 microns (or mass 23g/m²)

4.3.1 Liner
Alternatively, the sack may be supplied with loose liner of plastic materials such as LDPE, LLDPE, HMHDPE, HDPE or propylene as required by the buyer. The liner should be at least 10% more in length and width of the sack dimensions. In case of LDPE liner, the mass shall not be less than 27 g/m² and for other plastic material, the mass shall not be less than 24 g/m².

4.3.2 The lamination or the loose liner shall be free from pin holes, patches, tears, blisters and any other visible defects. The plastics used for lamination or liner shall be made from virgin material.

4.4 Seam
If the sack is to be fabricated out of a flat fabric (as distinct from fabrication of a sack from a tubular woven fabric), the side and bottom of fabric shall be sewn and in case of tubular woven sack the stitching shall be only at the bottom. The stitching shall be done in two rows of chain or lock stitches. The two row stitches should be separated from each other by about 5mm and the outer row of stitching should be done with fold over seam (to a depth of about 25 mm) so that the stitches pass through a minimum of 4 layers of the fabric. The number of stitches per decimetre shall be between 10 and 20.
4.4.1 The material used for stitching shall be HDPE tape or any other suitable thread having a minimum breaking strength of 50N. It shall have at least 20% higher denier than that used for making the sack. The stitch shall be uniform and without any loose threads or knots.

4.5 Mouth of the Sack

The mouth of the sack should be selvedged, hemmed or heat cut, so that the tapes do not fray. The mouth of the sack should be completely open.

4.6 Capacity

The type 1 sack shall have a nominal capacity of 25 kg or 50 kg as ordered and type 2 sacks shall have nominal capacity of 5 kg or 10 kg as ordered.

Note: The capacity of the sack can also base on an agreement between the buyer and seller but it should not exceed the maximum capacity of 100 kg.

Table 1 – Requirement of the sacks.

<table>
<thead>
<tr>
<th>SN</th>
<th>characteristics</th>
<th>Requirements</th>
<th>Tolerance</th>
<th>Test Methods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Breaking strength of fabric, N, min</td>
<td>500 500 500 500</td>
<td>-</td>
<td>TZS 22</td>
</tr>
<tr>
<td></td>
<td>Width wise a)</td>
<td>500 500 500 500</td>
<td>-</td>
<td>TZS 22</td>
</tr>
<tr>
<td></td>
<td>Length wise b)</td>
<td>250 250 250 250</td>
<td>-</td>
<td>ISO 13953-1</td>
</tr>
<tr>
<td>2</td>
<td>Seam Breaking strength, N, min</td>
<td>250 250 250 250</td>
<td>-</td>
<td>ISO 13953-1</td>
</tr>
<tr>
<td>i)</td>
<td>Side seam</td>
<td>250 250 250 250</td>
<td>-</td>
<td>ISO 13953-1</td>
</tr>
<tr>
<td>ii)</td>
<td>Bottom seam</td>
<td>500 500 500 500</td>
<td>-</td>
<td>TZS 22</td>
</tr>
<tr>
<td>3</td>
<td>Dimensions(mm), min</td>
<td>600 630 550 450</td>
<td>-</td>
<td>TZS 44</td>
</tr>
<tr>
<td>i)</td>
<td>length</td>
<td>540 480 400 300</td>
<td>-</td>
<td>TZS 21</td>
</tr>
<tr>
<td>ii)</td>
<td>width</td>
<td>20 20 20 20</td>
<td>-</td>
<td>TZS 22</td>
</tr>
<tr>
<td>4</td>
<td>Elongation at break of fabric (%</td>
<td>65 65 65 65</td>
<td>-</td>
<td>TZS 21</td>
</tr>
<tr>
<td>i)</td>
<td>Length wise, (min)</td>
<td>40 40 40 40</td>
<td>± 2%</td>
<td>TZS 20</td>
</tr>
<tr>
<td>ii)</td>
<td>Width wise, (min)</td>
<td>40 40 40 40</td>
<td>± 2%</td>
<td>TZS 20</td>
</tr>
<tr>
<td>7</td>
<td>Ash content (for UV stabilized fabrics), Max, Percent</td>
<td>40 40 40 40</td>
<td>-</td>
<td>ISO 3451-1: 2008, Method A.</td>
</tr>
<tr>
<td>8</td>
<td>Average Breaking strength and elongation at break of UV stabilized HDPE/PP fabric after been exposed to UV radiation and weathering, min (kgf),</td>
<td>Not less than 50% of original strength</td>
<td>-</td>
<td>Annex A.</td>
</tr>
</tbody>
</table>

Note 1: Requirement number 8 and number 7 is subjected to the agreement between manufacturer and buyer.
5 Marking and Packaging.

5.1 Marking on Sacks

The Identification mark of the manufacturer, along with any information required by the buyer, shall be printed on the sacks, using ink or another suitable method that will ensure legibility during use.

5.2 Packaging

The sacks shall be packed to form a circular bale, using a layer of woven PP fabric for wrapping, and suitably secured. Each bale shall contain 500 sacks or a multiple thereof.

5.3 Marking on bales

The bales shall be marked with the following information:

a) The name of the manufacturer;
b) The type and size of sack;
c) The gross mass of the bale;
d) The net mass of the bale;
e) The month and year of manufacture;
f) Any other information required by the buyer.

6 Sampling and criteria for conformity.

6.1 In any consignment, all the sacks of the same construction shall be grouped together to constitute a lot.

6.2 The conformity of the lot to the requirements of this Draft Tanzania Standard shall be determined on the basis of the tests carried out on the samples selected from it.

6.3 Unless otherwise agreed to between the buyer and the seller, the number of bales to be selected at random from a lot shall be according to Table 2.

Table 2 - Sample size

<table>
<thead>
<tr>
<th>Number of Bales in the Lot</th>
<th>Number of Bales to be selected</th>
<th>Number of sacks to be selected</th>
<th>Permissible number of defective sacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>8</td>
<td>0</td>
</tr>
<tr>
<td>3 to 6</td>
<td>3</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td>7 to 20</td>
<td>5</td>
<td>20</td>
<td>1</td>
</tr>
<tr>
<td>21 to 70</td>
<td>8</td>
<td>32</td>
<td>2</td>
</tr>
<tr>
<td>71 and above</td>
<td>13</td>
<td>52</td>
<td>3</td>
</tr>
</tbody>
</table>
6.4 Number of Tests – The number of sacks to be selected for testing dimensions and mass of sacks shall be according to column 3 of Table 2.

6.4.1 The number of sacks to be selected for testing breaking strength and seam breaking strength shall be two per bale selected according to column 2 of Table 2 subject to a maximum of 10 bags.

6.5 Criteria for conformity

6.5.1 The lot shall be considered conforming to the requirements given in Table 1 (parameter number 3 and 5), if the number of sacks not meeting the requirements for any one or more of the characteristics is less than or equal to the corresponding acceptance number given in column 4 of Table 2.

6.5.1 The lot shall be considered conforming to the requirements given in Table 1 (parameter number 1) if all sacks selected according to 6.4.1 meet the relevant requirements.
ANNEX A
(Normative)

UV RESISTANCE TEST

A – 1 To determine the effect of UV radiation and weathering on the breaking strength, the HDPE/PP Woven fabrics shall be exposed as given in A - 2 and A – 3.

A – 2 TEST PROCEDURE

The test shall be carried out with fluorescent UV – Lamp type B (313 nm or its equivalent).

The duration of the test shall be 192h (that is eight days) in continuous mode.

The test cycle shall be: 8h at 60± 3˚C with UV – radiation alternating with 4h at 50 ± 3˚C condensation. Irradiance level throughout the test shall be maintained at 0.63 (+0.04/-0) W/m$^2$.

A – 3 TEST PROCEDURE

A – 3.1 Determine the original average breaking strength of fabric as per test method specified in IS 1969 (part 1)

A – 3.2 Expose the specimens alternately to ultraviolet light and condensation in respective test cycle in continuous mode for total 192h.

The type of fluorescent UV lamp, the timing of the UV and condensation exposure and the temperature of the UV exposure and condensation shall be specified in A - 2.

A – 3.3 Determine the average breaking strength of the fabric separately after UV exposure as mentioned above.

A – 3.4 Determine the percent retention of original strength as follows:

Percentage retention of original breaking strength = $\frac{a}{b} \times 100$

Where

a) $a$ = average breaking strength before UV exposure as obtained in A – 3.1
b) $b$ = average breaking strength after UV exposure as obtained in A – 3.3

NOTES

1. The UV source is an array of fluorescent lamps (with lamp emission concentrated in the UV range).
2. Condensation is produced by exposing the test surface to a heated, saturated mixture of air and water vapour, while the reverse side of the test specimen is exposed to the cooling influence of ambient room air.