
TANZANIA BUREAU OF STANDARDS

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Flexible Plastic Packaging Materials – Specification

1 Scope

This draft Tanzania Standard specifies requirements for flexible plastic packaging materials. This draft standard covers the thickness and printing requirement of these plastic packaging materials.

This draft standard does not cover woven and non-woven plastic materials.

This draft standard cover exempted flexible plastic packaging materials and flexible plastic material used in other application other than packaging as prescribed by the National environmental legislations.

2 Normative references

The following standards contain provisions, which, through reference in this text, constitute provisions of this Tanzania Standard. All standards are subject to revision and, since any reference to the standard is deemed to be a reference to the latest edition of that standard, parties to agreements based on this Tanzania Standard are encouraged to ensure the use of most recent edition of the standard indicated below.

TZS 928:2006/ISO 4593:1993 (E)/SANS 4591, Plastics – Film and sheeting – Determination of average thickness of a sample, and average thickness and yield of a roll, by gravimetric techniques (gravimetric thickness);

TZS 4:1979, Rounding off numerical values;

ASTM D 3826:1998, Standard practice for determining degradation end point in degradable polyethylene and polypropylene, using a tensile test;

ASTM D 5208:2001, Standard practice for operating fluorescent ultraviolet (UV) and condensation apparatus for exposure of photodegradable plastics.

TZS 928:2006-ISO 4593/SANS 4591, Plastics – Film and sheeting – Determination of average thickness of a sample, and average thickness and yield of a roll, by gravimetric techniques (gravimetric thickness)

ISO 472, Plastics — Vocabulary

ISO 4591, Plastics — Film and sheeting — Determination of average thickness of a sample, and average thickness and yield of a roll, by gravimetric techniques (gravimetric thickness)

ISO 7765-2, Plastics film and sheeting — Determination of impact resistance by the free-falling dart method — Part 2: Instrumented puncture test


D4635-08a Standard Specification for Polyethylene Films Made from Low-Density Polyethylene for General Use and Packaging Applications.

D4801-08 Standard Specification for Polyethylene Sheeting in Thickness of 0.25 mm [0.010 in.] and Greater

D5047-09 Standard Specification for Polyethylene Terephthalate Film and Sheeting
3 Definitions

For the purposes of this draft Tanzania Standard, the following definitions shall apply:

3.1 Film
Thin planar product of arbitrarily limited maximum thickness, the thickness being very small compared to the length and width.

3.2 Sheet
Thin, generally plane product in which thickness is small compared to the length and width.

*NOTE*-It can be made in continuous lengths and be supplied in roll form

3.3 Laminate
Bonding of two or more layers of one or more materials.

3.4 Coated plastic
Application of a thin layer of material in the form of a fluid or powder to a substrate (plastic).

3.5 Metallized plastic
Plastic part or film(sheet) on which a metal has been deposited, generally by vacuum sublimation, but also by chemical reaction.

*NOTE*: Metallizing by vacuum sublimation and chemical reaction generally gives deposits about 0.1 mm thick. The metal thickness is then commonly increased by electroplating.

3.6 Flexible plastic film and sheets
Continuous layer of flexible material, made of plastic materials of which are continually being developed or modified to enhance specific properties to meet the needs of the following.

- a. Flexible plastic films in the form of bags, sachets, pouches, tabular and heat-sealable flexible lidding materials
- b. Flexible plastic films used in cling, stretch and shrink wrapping
- c. Flexible plastic films used as liners, sheeting and overwrapping
- d. Flexible plastic films used as labels for bottles and jars, as flat glued labels or heat shrinkable sleeves
- e. Flexible plastic bands to provide external tamper evidence
- f. Flexible plastics for diaphragms on rigid plastics and glass jars to provide product protection and tamper evidence

3.7 Package
Packaging and its content

3.8 Packaging
Product to be used for the containment, protection, handling, delivery, storage, transport, and presentation of goods from raw materials to processed good, from the producer to the user or consumer, including processor, assembler or other intermediary.
4 Requirements

4.1 General Requirements

4.1.1 Flexible Plastic material

The flexible plastic material shall be made from films and sheets that are free from defects such as gels, streaks, pinholes, and particles of foreign matter, in dispersed raw materials, cuts and tears that would impair the performance of the material.

4.1.2 Colour and opacity

Plastics material may be coloured, printed, decorated or labelled in several ways, depending on the use. Alternatively, some plastic materials are transparent, others have various levels of transparency, and their surfaces can be glossy or matte. The colour and level of opacity of the flexible plastic material shall be as agreed to between the purchaser and the supplier. Printing shall be done as per clause 5 and Table 1.

4.1.3 Odour

The plastic used in manufacturing of flexible packaging material shall not impart any objectionable odour.

4.1.4 Construction of flexible plastic materials for films and sheets

4.1.4.1 Thicknesses of flexible plastic films and sheets

Based on thickness, construction of plastic films shall be defined as flexible plastic of less than 100 μm thick (1 micron is 0.000001 m or 1 × 10⁻⁶ m) and sheets shall be defined as flexible plastic of up to 250 μm and can be available as a monolayer or be combined with other plastics and other materials in laminates or metallized basing on the following.

a. Monolayer film/sheet. The film or sheet that neither metallized nor combined with other layers

b. Co-extruded film/sheet: The films/sheet combined with other plastics by co-extrusion, blending, lamination and coating to achieve properties that the components could not provide alone. Co-extrusion shall involve combination of layers of two or more plastics together at the point of extrusion. Lamination involves combination of two or more layers of plastics combined together by the use of adhesives. Several types of coating are available to apply plastic coatings.

c. Metallized film/sheet: The film that metallizing with a very thin layer of aluminium.

The minimum thicknesses for flexible packaging material as prescribed by environmental legislations shall be as per Table 1.

4.1.4.2 Material forms for flexible plastics

Construction of flexible plastics shall involve manufacture of the film, sheet and the end use of the plastic films/sheets.

Construction of flexible plastic packages shall be made by the use flexible plastic films or sheets through folding, cutting and sealing with welded seams. Flexible plastic packages shall include bags, sachets, pouches and heat-sealable flexible lidding films.

4.1.4.2 Material types for flexible plastic

The material based on monolayer or multilayer shall be easily identified as per Clause 4.2 and the construction of material shall be recyclable based on recycling material type that may include types of polyethylene (PE), polypropylene (PP), polyesters (PET, PEN, PC) (Note: PET is referred to as PETE in some markets), ionomers, ethylene vinyl acetate (EVA), polyamides (PA), polyvinyl chloride (PVC),...
polyvinylidene chloride (PVdC), polystyrene (PS), styrene butadiene (SB), acrylonitrile butadiene styrene (ABS), ethylene vinyl alcohol (EVOH), polymethyl pentene (TPX), high nitrile polymers (HNP), fluoropolymers (PCTFE/PTFE), cellulose-based materials and polyvinyl acetate (PVA).

4.2 Specific Requirements

4.2.1 Dimensions

The nominal thickness, width and length of flexible plastic materials as defined in Clause 3.6 shall be established by mutual agreement between the purchaser and the supplier. The nominal sizes for flexible plastic shall be as per exempted activity and shall meet the following requirements.

4.2.2 Minimum thicknesses for exempted flexible plastic materials

The minimum thicknesses for exempted flexible plastic materials shall conform to Table 1.

Table 1 Prescribed minimum thickness for exempted flexible plastics applications

<table>
<thead>
<tr>
<th>S. No</th>
<th>Exempted flexible plastics applications</th>
<th>Minimum thickness in micrometers</th>
<th>Printing requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Food Packaging</td>
<td>30</td>
<td>Printed</td>
</tr>
<tr>
<td>2.</td>
<td>Vegetable &amp; Fruit</td>
<td>30</td>
<td>Printed</td>
</tr>
<tr>
<td>3.</td>
<td>Freezer / Vacuum Bags</td>
<td>40</td>
<td>Plain Printed DF (Deep Freeze ink)</td>
</tr>
<tr>
<td>4.</td>
<td>Milk &amp; Dairy</td>
<td>40</td>
<td>Printed DF</td>
</tr>
<tr>
<td>5.</td>
<td>Meat, Fish, Chicken</td>
<td>30</td>
<td>Printed DF</td>
</tr>
<tr>
<td>6.</td>
<td>Medicine Safety Bags</td>
<td>30</td>
<td>Printed</td>
</tr>
<tr>
<td>7.</td>
<td>Shrink Wrap</td>
<td>60</td>
<td>Plain</td>
</tr>
<tr>
<td>8.</td>
<td>Animal Feed Bags</td>
<td>30</td>
<td>Printed</td>
</tr>
<tr>
<td>9.</td>
<td>Construction Sheeting</td>
<td>70</td>
<td>Plain</td>
</tr>
<tr>
<td>10.</td>
<td>Agriculture Sheeting</td>
<td>50</td>
<td>Printed</td>
</tr>
<tr>
<td>11.</td>
<td>Laundry</td>
<td>30</td>
<td>Printed</td>
</tr>
<tr>
<td>12.</td>
<td>Detergent Liners</td>
<td>30</td>
<td>Printed</td>
</tr>
<tr>
<td>13.</td>
<td>Industrial Liners</td>
<td>30</td>
<td>Plain</td>
</tr>
<tr>
<td>14.</td>
<td>Seed Bags</td>
<td>30</td>
<td>Plain, Printed</td>
</tr>
<tr>
<td>15.</td>
<td>Spare Parts Safety Bags</td>
<td>50</td>
<td>Plain, Printed</td>
</tr>
<tr>
<td>16.</td>
<td>Courier Bags</td>
<td>30</td>
<td>Plain, Printed</td>
</tr>
<tr>
<td>17.</td>
<td>Warning Tapes</td>
<td>20</td>
<td>Plain</td>
</tr>
<tr>
<td>18.</td>
<td>Hardware Packaging</td>
<td>40</td>
<td>Plain, Printed</td>
</tr>
<tr>
<td>19.</td>
<td>Tamper proof bags</td>
<td>30</td>
<td>Printed</td>
</tr>
</tbody>
</table>

NOTE: Plastic flexible material for other application such as labels, shrink sleeve shall be agreement between manufactures and purchaser.

4.2.3 Nominal Width

The nominal width shall be as agreed between the purchaser and supplier; however, the variation shall be within the tolerances of −0, +10 mm.

4.2.4 Nominal Length

The nominal length shall be as agreed between the purchaser and supplier; however, the variation shall be within the tolerances of −0, +20 mm.
4.2.5 Dart Impact Properties for films and sheets

When tested as per ISO 7765-2 the film or sheet shall not puncture and the dart drop impact for all thickness of film and sheets shall be as specified in Table 2.

Table 2-Dart Impact Properties for films and sheets

<table>
<thead>
<tr>
<th>Film Thickness μm</th>
<th>Drop Dart (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 to 49</td>
<td>140</td>
</tr>
<tr>
<td>50 to 79</td>
<td>180</td>
</tr>
<tr>
<td>80 to 100</td>
<td>250</td>
</tr>
</tbody>
</table>

5. Printing requirements

5.1 Types of ink

5.1.1 Ink used for printing shall be classified as one of the following types:

- Type A: Ink that is a single resin-based system, based on a co-solvent polyamide.
- Type B: Ink that does not comply with the requirements for type A.

5.1.2 When compliance with the requirements for type A ink (see 5.1.1) is claimed, the claimant shall supply a declaration of conformity with the requirements for type A with each consignment or batch of bags.

5.1.3 When dried ink is tested in accordance with 5.2, type A ink shall not exhibit any change of colour.

5.2 Ink adhesion

In case of printed packages, the print shall remain on the package when tested as prescribed in Annex B.

5.3 Permitted coverage of printing

5.3.1 For ink of type A, the mass percentage of dried solid printed ink, relative to the mass of an unprinted bag, shall not exceed 2.5%.

5.3.2 For ink of type B, the mass percentage of dried solids of printed ink, relative to the mass of unprinted bag, shall not exceed 1.125%.

6 Marking

The following information shall be printed on each flexible plastic material.

a) Types of material.
b) Recyclable code.
c) Thickness of the film or sheet (micron).
d) Name of manufacturer and Trade mark.
e) Country of origin.

NOTE: Markings shall either be in English, Kiswahili or both.
7. Sampling

Representative samples of the product for ascertaining conformity to the requirements of this draft Tanzania Standard shall be drawn as prescribed in Annex C.
Annex A
(normative)

Test methods

A.1 Film thickness

Measure the thickness of the plastic film using the method described in TZS 928-ISO 4593/SANS 4591, and check the results for compliance with 4.6.

A.2 Type of ink (nitrocellulose spot test)

A.2.1 Principle

A solution of diphenylamine in concentrated sulfuric acid is used to indicate the presence of nitrocellulose. The reagent causes an almost instantaneous formation of a dark blue colour on contact with nitrocellulose.

CAUTION – The substances used for this test are extremely dangerous. Gloves and safety glasses should be used throughout the preparation and use of this solution.

A.2.2 Preparation of test solution

A.2.2.1 Carefully mix together the following ingredients in a conical flask whilst cooling the flask under running water:

a) 0.5 g diphenylamine \( \text{C}_{12}\text{H}_9\text{N}) \);

b) 10.0 g distilled water; and

c) 30.0 g concentrated sulfuric acid (98 %).

CAUTION – Add the acid slowly to the water.

A.2.2.2 Carefully add a further 60.0 g of concentrated sulfuric acid, and mix gently.

A.2.2.3 Transfer the contents of the flask to a dark glass bottle, and label and date the bottle.

NOTE – The solution should have a shelf life of approximately one month. The solution will initially be yellow/orange colour, and it should be discarded and prepared afresh if it shows any signs of discoloration (which would probably indicate a reaction with light, oxidation or contamination).

A.2.3 Procedure

A.2.3.1 Place one drop of the test solution on a sample of the dried ink to be tested.

A.2.3.2 Check after 30 seconds for any colour change.

NOTE – If the colour changes to dark blue, it indicates the presence of nitrocellulose.
Annex B

(normative)

Ink adhesion test

B.1 Method

B.1.1 Cut a piece of 25 mm wide pressure sensitive tape (for example, adhesion tape) about 75 mm long from the roll.

B.1.2 Press the tape on the bag using firm finger pressure. Within 30 sec. of application, remove the tape by pulling.

B.1.3 Examine for removal.

Annex C

(normative)

Sampling

C.1 Lot

C.1.1 In any consignment all the plastic materials of same dimension and shape manufactured by one organization under the same conditions of manufacture shall be grouped together to form a lot.

C.2 Scale of sampling

C.2.1 Samples shall be tested from each lot separately for ascertaining the conformity of plastic carrier and flat bags to the requirements of this draft Tanzania Standard.

C.2.2 The number of packets to be selected from the lot shall be in accordance with column 1 and column 2 of table 3.

Table 3 – Scale of sampling

<table>
<thead>
<tr>
<th>S/No.</th>
<th>No. of packets in lot (1)</th>
<th>No. of packets to be selected (2)</th>
<th>No. of bags to be selected (3)</th>
<th>Acceptance number (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Up to 35</td>
<td>4</td>
<td>32</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>36 to 150</td>
<td>6</td>
<td>48</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>151 to 500</td>
<td>10</td>
<td>80</td>
<td>7</td>
</tr>
<tr>
<td>4</td>
<td>501 to and above</td>
<td>16</td>
<td>128</td>
<td>10</td>
</tr>
</tbody>
</table>

C.2.3 From each packet selected, eight plastics shall be drawn at random, so as to get the total number of plastic bags from the lot as shown in column 3 of table 3.

C.2.4 When the packets are contained in master packs, the number of master packs to be selected shall be half the number given in column 2 of table 3. Two packets shall be drawn from each master pack selected.

C.2.5 Packets and plastics shall be selected at random. To ensure randomness of selection, random number tables shall be used.
C.3 Number of tests

C.3.1 All plastic carrier and flat bags selected as in C.2.3 shall be inspected for requirements given in 4.1 to 4