DRAFT TANZANIA STANDARD

Textiles — Woven ground covers for horticulture application — Specification

TANZANIA BUREAU OF STANDARDS

Foreword

This Draft Tanzania Standard is being developed by the Specialized Textiles Technical Committee under supervision of the Textile and Leather Divisional Standards Committee and it is in accordance with the procedures of the Bureau.

In the preparation of this standard, assistance has been obtained from the following standard:

IS 16202: 2018 Argo-textiles — Woven ground covers for horticulture application — Specification

In reporting the result of a test or analysis made in accordance with this standard if the final value, calculated or observed is to be rounded off, it shall be done in accordance with TZS 4 *Rounding off numerical values*.

1.Scope

This Draft Tanzania Standard specifies constructional, requirements, test methods and sampling for woven ground covers made from UV stabilized polypropylene (PP) tape yarns for applications in horticulture.

2.Normative reference

For the purpose of this Draft Tanzania Standard, the following references shall apply. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies:

TZS 4 *Rounding off numerical values.*

TZS 21/ISO 7211-6 *Textiles — Methods for analysis of woven fabrics construction — Part 6: Determination of the mass of warp and weft per unit area of fabric*

TZS 262 *Textiles – Yarn from packages – Determination of linear density (mass per unit length) – Skein method*

ISO 13934-2 *Textiles — Tensile properties of fabrics Part 2: Determination of maximum force using the grab method*

TZS 3672-2/ISO 13937-2 *Textiles - Tear properties of fabrics - Part 2: Determination of tear force of trouser-shaped test specimens (Single tear method)*

TZS 4091/ISO 11058 *Textiles - Geotextiles and geotextile-related products - Determination of water permeability characteristics normal to the plane, without load.*

ISO 9237 *Textiles — Determination of the permeability of fabrics to air*

ISO 11092 *Textiles — Physiological effects — Measurement of thermal and water-vapour resistance under steady-state conditions (sweating guarded-hotplate test)*

3.Terms and definitions

For the purpose of this standard the following definitions shall apply:

3.1 horticulture

the science or art of cultivating fruits, vegetables, flowers, or ornamental plants. Etymologically, “horticulture” can be broken down into two Latin words: hortus (garden) and cultus (tilling).

3.2 woven fabrics

fabric composed of at least two sets of yarns, one warp (longitudinal) and one filling (crosswise), laced at right angles to each other.

3.3 ground covers

covers that are made up of natural or synthetic materials that are either woven or non-woven products used to suppress weed growth around the crop by covering the soil, blocking extreme climatic conditions of sunlight or cold.

4. Requirements

4.1 General requirements

4.1.1 Manufacture

Ground covers shall be woven from PP tapes, which shall be stabilized by adding suitable UVstabilizer.

4.1.2 Fabric

The ground covers shall be woven with plain weave and a set of 80 ends/dm and 40 picks/dm. The tolerance on ends/dm and picks/dm shall be ± 2.

The width of the ground cover shall be minimum 90 cm. Guiding stripes of suitable colour may be inserted while weaving to help the plant alignment at the time of laying.

4.1.3 Colour

The colour of the fabric shall preferably be black. However, any other colour or colour combination may be supplied as per the agreement between the manufacturer and the supplier. The colour or colour combination shall be as specified in the contract or order. In case a sample has been agreed upon and sealed, the supply shall be made in conformity with the sample in such respects.

4.2 Specific Requirement

4.2.1 The ground cover shall meet the requirements as given in Table 1.

4.2.2 The ground cover shall be made to the dimensions as specified in the contract or order. The dimensions shall be determined by the method prescribed in TZS 3116. The following tolerance shall be permissible for length and width.

Dimension tolerance, percent

Length ± 1 percent of declared length

Width ±1 percent of declared width

Table 1: Requirements for woven ground covers made from PP tape yarns

S/N	Characteristics	Requirements	Test Methods
1.	Mass, g/m^2, *Min*	100	TZS 21/ISO 7211-6
2.	Tensile strength, kgf, *Min* a) Warp way b) Weft way	 65 35	ISO 13934-2
3.	Tear strength, kgf, *Min* a) Warp way b) Weft way	 30 18	TZS 3672-2/ISO 13937-2
4.	Air permeability, cft/ft^2/s, *Min*	20	ISO 9237
5.	Linear density, Denier, Min	1200	TZS 262
6.	Shrinkage temperature[1], a) At 60°C b) At 95°C	 ≤5% ≤8%	Annex C
7.	Index puncture resistance, kgf, *Min*	25	Annex A
8.	UV accelerated exposure testing, percent strength retained, *Min*	70	Annex B
9.	Water permeability lt/m^2/s, *Min*	7	TZS 4091/ISO 11058
10.	Water vapour permeability, g/m^2/day, *Min*	730	ISO 11092

Note 1: For determining the shrinkage, the tape shall be subjected to the specified temperature for a period of 10 min in

an air circulating oven and hot water bath respectively.

5. Packaging, Marking and Labelling

5.1 Packaging

5.1.1 The ground cover fabric shall be packed in rolls of the length and width as per agreement between buyer and seller.

5.1.2 Each roll shall be protected by wrapping it in a suitable material to prevent it from the adverse impact of heat and moisture, oil, grease, dirt, dust and other stains during shipment and storage prior to use.

5.2 Marking and labelling

The ground cover fabric roll shall be legibly marked or labelled with the following information:

a) Name of the product;
b) Country of origin;
c) Manufacturer's name and address;
d) Declared length, width, color and gsm and
e) Batch number.

6. Sampling

Sampling shall be done in accordance with ISO 2859-1.

ANNEX A

TEST METHOD FOR INDEX PUNCTURE RESISTANCE

A-1 SCOPE

A-1.1 This test method is used to measure the index puncture resistance of ground covers.

A-2 PRINCIPLE

A-2.1 A test specimen is clamped without tension between circular plates of a ring clamp attachment secured in a tensile testing machine. A force is exertedagainst the center of the unsupported portion of the test specimen by a solid steel rod attached to the load indicator until rupture of the specimen occurs. The maximum force recorded is the value of punctureresistance of the specimen.

A-3 APPARATUS

A-3.1 Tensile/Compression Testing Machine, of theconstant-rate-of extension (CRE) type.

A-3.2 Ring Clamp Attachment, consisting of concentric plates with an open internal diameter of45 ± 0.025 mm capable of clamping the test specimenwithout slippage. A suggested clamping arrangement is shown in Fig. 1. The external diameter is suggestedto be 100 ± 0.025 mm. The diameter of the six holes used for securing the ring clamp assembly is suggestedto be 8 mm and equally spaced at a radius of 37 mm.

The surfaces of these plates can consist of grooves with rings or coarse sandpaper bonded onto opposing surfaces.

A-3.3 Solid Steel Rod, with a diameter of 8 ± 0.01 mmhaving a flat end with a 45° × 0.8 mm chamfered edgecontacting the test specimen's surface (*see* Fig. 1 and 2).

A-4 SAMPLING

A-4.1 Laboratory Sample

For the laboratory sample take a swatch extending thefull width of the product, of sufficient length along theselvage from each sample roll so that the requirementsof **A-4.2** can be met.

A-4.2 Test Specimens

Select from the laboratory sample, sufficient number ofsamples each having a minimum diameter of 100 mmto facilitate clamping. Space the specimens along a diagonal on the unit of the laboratory sample. Take nospecimens nearer the selvage or edge of the ground cover.

A-5 CONDITIONING

A-5.1 Bring the specimens to moisture equilibriumin the atmosphere for testing ground covers (65 ± 5

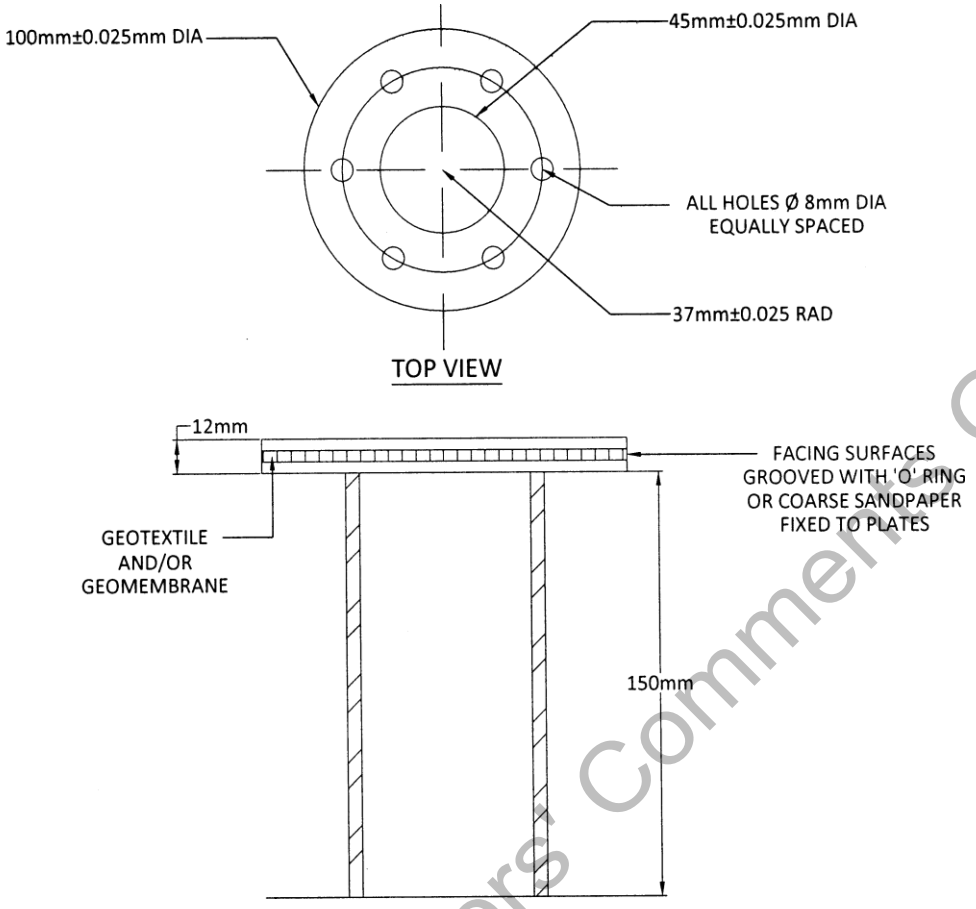

FIG. 1 TEST FIXTURE DETAIL (NOT TO SCALE)

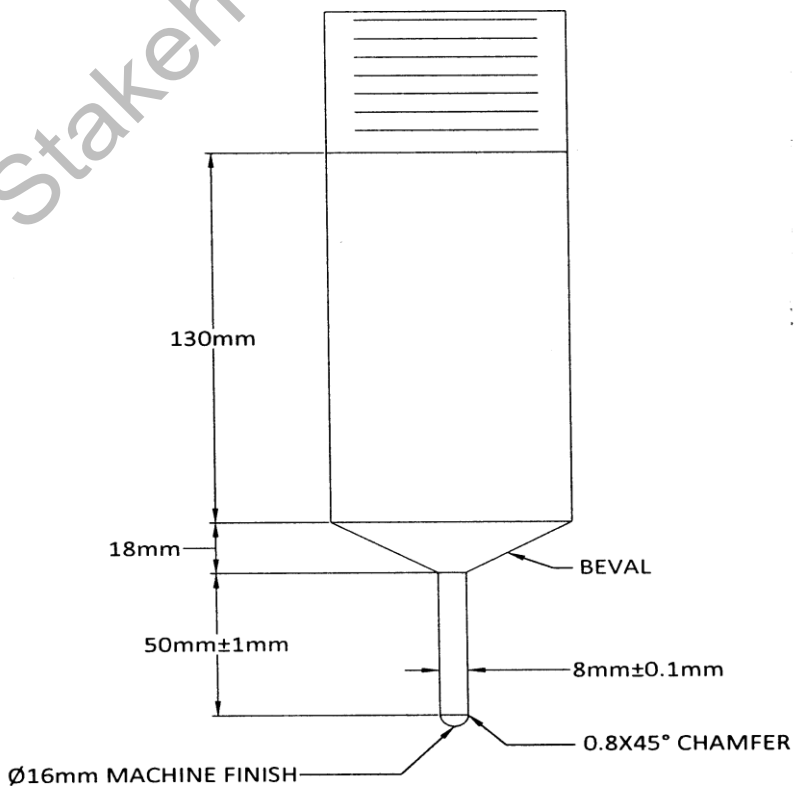

FIG. 2 TEST PROBE DETAIL (NOT TO SCALE)

percent relative humidity and 27 ± 2°C temperature). Equilibrium is considered to have been reached when the increase in the mass of the specimen, in successive weightings made at intervals of not less than 2 h, does not exceed 0.1 percent of the mass of the specimen.

A-6 PROCEDURE

A-6.1 Select the load range of the tensile/compressiontesting machine such that the rupture occurs between 10 and 90 percent of the full-scale load.

A-6.2 Center and secure the specimen between the holding plates ensuring that the test specimen extendsto or beyond the outer edges of the clamping plates.

A-6.3 Test at a machine speed of 300 ± 10 mm/min until the puncture rod completely ruptures the test specimen.

NOTE — The rate of testing specified is not an indication ofthe performance of the specimen for its end use.

A-7 CALCULATION

A-7.1 Calculate the average puncture resistance and standard deviation for all tests as read directly from the recording instrument

ANNEX B

UV RESISTANCE TEST

B-1 TEST SPECIMENS

The test specimens for breaking strength shall be cut from the sample as specified in ISO 13934-2 for grab test.

B-2 TEST CONDITIONS

B-2.1 the test shall be carried out with Fluorescent-B lamp (313 nanometer or its equivalent).

B-2.2 the duration of the test shall be 144 h (that is6 days).

B-2.3 The test cycle shall be 8 h at 60 ± 3°C with UV radiation alternating after 4 h at 50 ± 3°C with condensation.

B-2.4 Irradiation level throughout the test shall be maintained at 0.63 + 0.03 W/m².

B-3 TEST PROCEDURE

B-3.1 Determine the original average breaking strength of ground cover specimens separately as per the grab test specified in ISO 13934-2.

B-3.2 Expose the specimens alternately to ultraviolet

B-3.2.1 The type of fluorescent UV lamp, the timing of the UV exposure and the temperature of condensation shall be specified in **B-2**.

B-3.3 Determine the average breaking strength of the specimens separately after UV exposure as mentioned above.

B-3.4 Determine the percent retention of original strength as follows:

$$\textit{Percent retention of original breaking strength} = \frac{a}{b} \times \mathbf{100}$$

Where:

a = average breaking strength before UV exposure as obtained in **B-3.1**, and
b = average breaking strength after UV exposures obtained in **B-3.3**.

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

ANNEX C
DIMENSIONAL STABILITY

C.1 OBJECT
To determine the dimensional stability of woven ground covers for horticulture application.

C.2 APPARATUS
C.2.1 A circulating air oven having thermostatic control that will maintain a temperature of 60 ± 2°C and 95 ± 2°C and equipped with horizontal rigid metal plates or wired shelves for supporting the test piece. The shelves shall be at least 25mrn larger than the test piece in each direction.

C.2.2 A travelling microscope or suitable scale capable of measuring to an accuracy of 0·01 mm.

C.2.3 A steel plate 180 x 180 mm and 12.5 mm thick for keeping the test piece flat during measurement.

C.3 TEST SPECIMEN
Test specimen shall not be less than 200 X 200 mm. Three sets of equally spaced reference marks shall be marked along each linear dimensions of the surface of the test specimen, the marks in each set being 180 mm apart (see Figure 3). Two test specimens shall be tested.

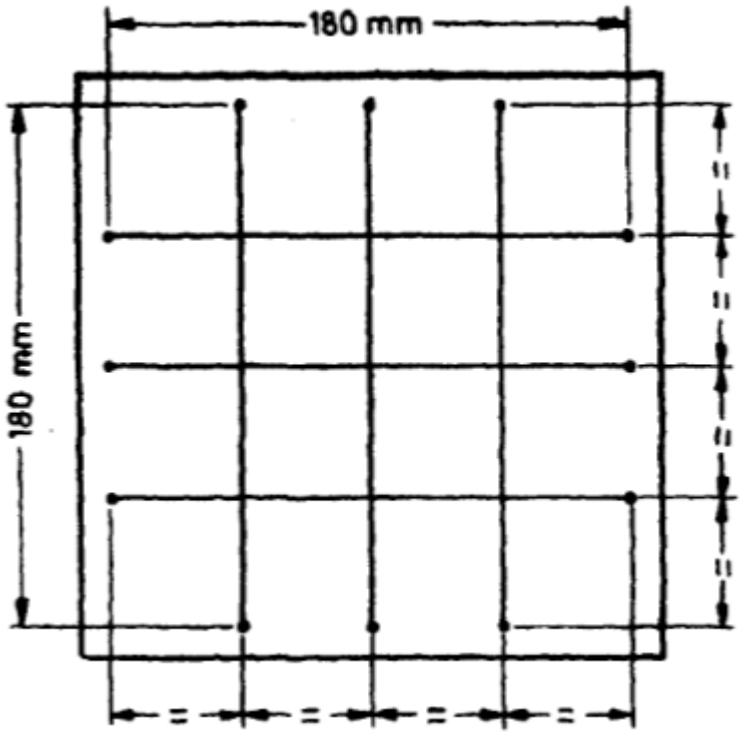

Figure 3: Reference marks on test specimen

C.4 PROCEDURE
Immediately after conditioning as given in 2, the test specimen shall be placed on a perfectly flat surface with the 12.5 mm thick steel plate on top of it, and the distance between each pair of marks shall be measured to the nearest 0.01 mm. The steel plate shall then be removed and test specimen shall be placed horizontally on one of the shelves of the oven, with its wearing surface upwards and maintained at a temperature of 60 ± 2°C and 95 ± 2°C for six hours. The test piece shall then be removed from the oven allowed to cool to room temperature and then shall again be conditioned as given in 2. The distance between each pair of reference marks shall then be measured.

C.5 REPORT
Any change in the distance between each pair of marks shall be calculated as a percentage of the original distance and the average value of the changes in the distance of the three pairs of marks in each linear

direction shall be reported as the dimensional stability in that direction,