DRAFT TANZANIA STANDARD

Agro textiles – Bird protection nets for agriculture and horticulture purposes – specification: Part 1 – Knotted bird protection nets

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 18310: 2023 Agro textiles – Bird protection nets for agriculture and horticulture purposes – specification: Part 1 - Knotted bird protection nets

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.*

Agro textiles – Bird protection nets for agriculture and horticulture purposes – specification: Part 1 – Knotted bird protection nets

1. Scope

1.1 This Draft Tanzania Standard specifies, constructional, requirements, test methods for knotted bird protection nets manufactured from mono filament yarns for agriculture and horticulture purposes to restrict the entry of birds.

1.2 The knotted bird protection nets manufactured as per this standard may also be used in domestic or commercial buildings to restrict the entry of birds inside the premises.

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 23/ISO 105-B02 *Textiles - Tests for colour fastness - Part B02: Colour fastness to artificial light: Xenon arc fading lamp test*

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

TZS 3088-1/ISO 16663-1 Textiles - Fishing nets - Method of test for the determination of mesh size - Part 1: Opening of mesh size.

ISO 1806 *Fishing nets — Determination of mesh breaking force of netting*

ISO 1805 *Fishing nets — Determination of breaking force and knot breaking force of netting yarns*

ISO 1973 *Textile fibres — Determination of linear density — Gravimetric method and vibroscope method*

TZS 3376/ISO 7211 *Textiles - Woven fabrics - Construction - Methods of analysis - Part 4: Determination of twist in yarn removed from fabric*

3. Terms and definitions

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

3.1. cable

strong, thick, and flexible strand made by twisting or plying together two or more yarns, cords, or ropes.

3.2 tie cord

narrow cord, tape, or string used to fasten, tie, or secure parts of a textile product or garment.

3.3 overlock border rope

corded edging or rope inserted along the border or seam of a textile article and secured by overlock stitching.

3.4 knotted nets

net structures in which the intersections of the meshes are formed by tying knots in the yarns or twines to secure them in position

3.5 horticulture

branch of agriculture concerned with the cultivation of plants such as fruits, vegetables, flowers, and ornamental plants

4. Requirements

4.1 General

4.1.1 Manufacture

4.1.1.1 Monofilament yarn shall be manufactured from HDPE granules, which shall be UV stabilized by adding suitable UV stabilizer. The linear density of the monofilament yarn used for the manufacture of knotted bird protection nets shall be as specified in Table 1.

4.1.2 Twine

The HDPE filament yarn (*see* **4.1.1**) shall be converted into twine with three plies that is (twisted 1 400 D/3 ply) and the twine manufactured shall conform to the requirements as specified in Table 1.

NOTE: *Preferably used twine deniers for manufacturing of knotted bird protection nets are: (500 D × 3) × 3, (280 D× 5) × 3, (380 D × 4) × 3.*

4.1.3 Cable

The twine (twisted 1 400 D/3 ply) so manufactured shall be converted into cable with three plies and shall conform to the requirements as specified in Table 1.

4.1.4 Fabric

The fabric used in the manufacture of knotted bird protection nets shall be made through knotted netting machines and shall have a width as per the agreement between the buyer and the seller. The knot shall be firmly tightened during manufacture.

4.1.5 Types

Based on the mass in g/m^2, the knotted bird protection nets shall be classified as follows:

a) Type I — Having GSM of 56 g/m^2; and

b) Type II — Having GSM of 80 g/m^2.

4.1.6 Colour

The colour or a mixture of color of the bird protection net fabric shall be as per the agreement between the buyer and the seller. The color/shade 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.

4.1.7 Tie cord

A braided or twisted tie cord of minimum 4 mm diameter shall be provided at each corner of the bird protection net. The length, and color of the tie cord shall be as agreed between the buyer and the seller.

4.1.8 Over lock border rope

A braided or twisted border rope of minimum 4 mm diameter shall be over lock stitched to netting sides with stitching twine. The color of border rope shall be as agreed between buyer and the seller.

4.1.9 Stitching twine

Stitching twine of minimum 1.25 mm diameter shall be used for over locking of border rope to net with a stich density of minimum 12 stiches/100 mm.

4.2 Specific Requirement

4.2.1 The knotted bird protection nets shall meet the requirements as given in Table 2.

4.2.2 The knotted bird protection nets shall be made to the dimensions as specified in the contract or order. The following tolerance shall be permissible for length and width:

Dimension	*Tolerance, percent*
Length	+5 percent of declared length
Width	+3 percent of declared width

Table 1: Requirements for Twine

S/N	Characteristic	Requirement	Tolerance	Test Methods
1.	Number of plies	3	—	Visual
2.	Twist per meter (TPM): a) Ply TPM b) Cable TPM	 185 (S way) 185 (Z way)	 ± 10 percent	 TZS 3376/ISO 7211
3.	Linear density (runnage), m/kg	1970	± 8 percent	ISO 1973
4.	Twine breaking strength, N, *Min*	160	—	ISO 1805
5.	Twine knot breaking strength, N, *Min*	250	—	ISO 1805

Table 2: Requirements of knotted bird protection nets made from plied yarns

S/N.	Characteristic	Requirement		Tolerance	Test Methods
		Type I	Type II		
1.	Mass, g/m^2, Min.	56	80	-	TZS 21
2.					
3.	Average mesh size, mm	25	19	± 2 mm	TZS 3088-1/ISO 16663-1
4.	Breaking strength, N, *Min*	100	125	-	ISO 1806

5.	Linear density, Denier, Min	1 400	-	TZS 262
6.	Shrinkage temperature[1], a) At 60°C b) At 95°C	 ≤5% ≤8%	-	Annex B
7.	Retention of breaking strength after UV exposure of 144 hours, %, *Min.*	85 percent of original actual value (fabric)	-	Annex A and ISO 1806
8.	Color fastness to artificial light (*see* Note)	4 or better	-	ISO 105-B02
NOTE: Applicable for colored bird protection nets only.				

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 and marking/labelling

5.1 Packaging

5.1.1 The knotted bird protection nets shall be packed in roll form in length of 50 m or in bundle form or as agreed to between the buyer and the seller.

5.1.2 Each roll/bundle 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 knotted bird protection net fabric roll/bundle shall be marked or labelled legibly with the following information:

a) Name of the product;
b) Country of origin;
c) Manufacturer's name and address;
d) Declared length and width of the knotted bird protection net;
e) Mass per square meter and type of the knotted bird protection nets; and
f) Batch number and date of manufacture.

6. Sampling

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

ANNEX A
UV RESISTANCE TEST

A-1 TEST SPECIMENS

The test specimens for breaking strength shall be cut from the sample as specified in TZS 22.

A-2 TEST CONDITIONS

A-2.1 The test shall be carried out with fluorescent UV-B lamp (313 nanometer or its equivalent).

A-2.2 The duration of the test shall be 144 h (that is 6 days).

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

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

A-3 TEST PROCEDURE

A-3.1 Determine the original average breaking strength of bird protection nets specimens separately as per the tests specified in ISO 1806.

A-3.2 Expose the specimens alternately to ultraviolet light alone and to condensation in one respective cycle.

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

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

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

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

Where:

a = average breaking strength before UV exposure as obtained in **A-3.1**, and
b = average breaking strength after UV exposures 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 vapor, while the reverse side of the test specimen is exposed to the cooling influence of ambient room air.

ANNEX B
DIMENSIONAL STABILITY

B.1 OBJECT

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

B.2 APPARATUS

B.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.

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

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

B.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.

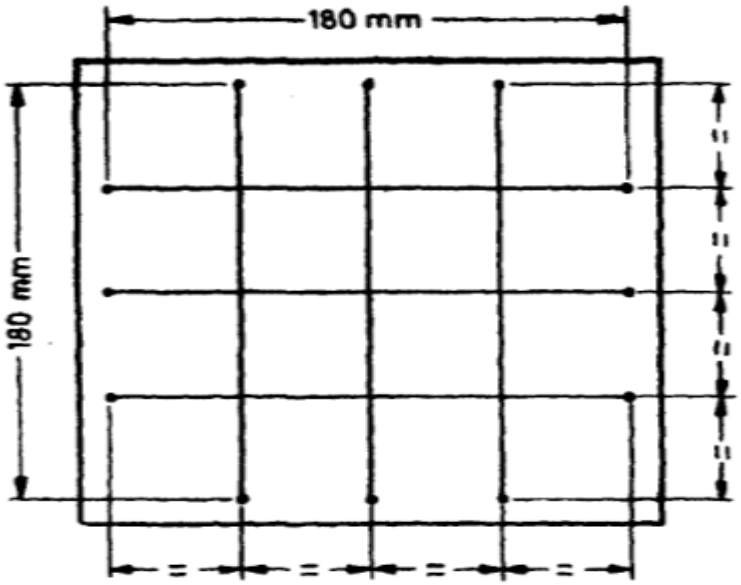

Figure 3: Reference marks on test specimen

B.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.

B.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.