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TANZANIA STANDARD

Textiles - Sisal agricultural baler twines for automatic pick-up balers and Similar Machines-Specification

Draft Standard for Public Comments

TANZANIA BUREAU OF STANDARDS

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Foreword

This Draft Tanzania Standard was published under the authority of the Board of Director of Tanzania Bureau of Standards.

Tanzania Bureau of Standards (TBS) is the statutory national standards body for Tanzania established by the Standards Act Cap. 130.

Tanzania Standards are developed through Technical Committees that are representative of key stakeholders including government, academia, consumer groups, private sector and other interested parties. The Technical Committees work under the supervision of Divisional (sectoral) Committees. The Standards are developed in accordance with the Guide and Procedure for Development of Tanzania Standards and TZS 0, *Guide for presentation of Tanzania Standards*.

Tanzania Standards are subject to review, to keep pace with science and technological advances. Users of the Tanzania Standards are therefore expected to ensure that they always have the latest versions of the standards they are implementing.

This Tanzania Standard was developed under the supervision of Textile Divisional Standards Committee (TDC). The Technical Committee responsible for the standard is *TDC 8– Yarns and Twines)*

The reporting of the results of a test or analysis made in accordance with this Tanzania Standard, if the final value, observed or calculated is to be rounded off, shall be done in accordance with TZS 4.

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Textiles - Sisal agricultural baler twines for automatic pick-up balers and Similar Machines-Specification

1 Scope

1.1 This Draft Tanzania Standard classifies and covers the essential requirements of sisal baler twines, used in the baling of straw, hay or similar crops, where the twine is applied around a bundle of the crop by an automatic pick-up baler or similar machine. Recommendations for the care and handling of the twine are given in Annex D.

2 Normative references

The following referenced documents are indispensable for the application of this Tanzania Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies:

TZS 3, *Atmospheric conditions for testing*

TZS 4, *Rounding off numerical values*

3 Terms and definitions

For the purpose of this Tanzania Standard, the following terms and definitions shall apply:

3.1
hairiness
ends of fibre protruding out from the twine

3.2
spool
cross–wound cylindrical unit of twine

3.3
pack
parcel of two or more packages

3.4
sample length
length of twine taken from any one package sufficient to obtain the required number of specimens for strength, linear density and runnage determinations

3.5
Specimen
length taken from any test sample for testing purposes

3.6
runnage
normal measure of the size of twine, expressed in metres per kilogram (see Annex B).

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3.7
linear density
mass per unit length of textile products such as ropes, lines, cords and twines. In the universal count system, it is expressed in tex or kilotex (see Annex B)

3.8
manufacturer's batch
quantity from which a specified number of packs will be drawn for testing

3.9
breaking load
maximum load recorded in a straight pull to a specimen test length of twine (see Annex C).

3.10
Package
container, as a box or case, in which twines are packed

4 Designation

A twine conforming to this Draft Tanzania Standard is designed by the term "sisal agricultural twine", followed by this nominal runnage.

Example of designation: A sisal agricultural twine having a length of 200 metres per Kilogram is designated as follows:

"Sisal agricultural twine No 200".

5 Requirements

5.1 General requirements

5.1.1 The fibre used for the manufacture of the twine shall be of such quality and fineness as is necessary to produce twines having the characteristics given in Table 1 and Table 2. The fibre shall be well hackled, free from knots and of the quality, fineness and colour necessary to produce twine having the characteristics required.

5.1.2 The twine shall be evenly and well spun and shall be substantially circular in cross section. Throughout its length, each package of twine shall be continuous and knotless. The package shall be designed for the twine to be drawn from the centre. Each package shall be capable of working with continuity throughout its length.

5.1.3 To ensure free running through machine, the twine shall be as free from hairiness and winding corrugations as is practicable.

5.1.4 Direction of twist

The twine shall have a Z twist (or right hand lay)

5.1.5 Lubrication and treatment

Odourless and colourless lubricant shall be added for the purpose of dressing and preservation of the fibre. The twine shall be fully treated against vermin, insects and rot.

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5.1.6 Colouring

Twines may be coloured at the purchaser's request.

5.1.7 Twine shall have linear density, runnage and strength characteristics given in Table 1.

Table 1 — Twine classification and properties

Twine No.	Description	Linear density (tex)	Runnage range (m/kg)	Minimum breaking Load (daN)
1	Binder twine	3333-2941	300-340	44
2	Light	5263-4545	190-220	129
3	Medium	6250-5882	160-170	133
4	Medium/heavy	7143-6667	140-150	144
5	Heavy	8333-7692	120-130	184

NOTE – The SI unit for force is the newton (N). A load of 1kg = 0.981 decanewton (daN). Further details are given in annex E.

6 Put up

6.1 Packages and packs shall comply with the requirements given in Table 2.

6.2 Each package shall be suitably wrapped by the manufacturer. The end from which the twine has to be drawn shall be indicated and the other end shall be readily accessible for joining to an adjacent package.

6.3 The packs shall be suitably secured for normal handling during transportation and storage.

Table 2 — Put-up of baler and binder twine

Type of Twine	Twine No.	Dimensions of package (not exceeding)		Net weight of package (kg)	package per pack	Weight of pack (Nominal) (Kg)
		Height *max.* (mm)	Diameter *max.* (mm)			
Baler twine	1 – 4	254	254	9 ± 0.1	2	18
Binder twine	0	197	152.4	0.4 to 1.0	10	4-10

7 Marking

7.1 Each package or each bundle of twines shall have a label securely attached which shall be clearly and legibly marked with the following:

a) manufacturer's name and or trade mark;
b) twine number;
c) the material;
d) length of twine; and
e) any other marking required by the buyer.

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7.2 The packages or bundles may also be marked with the TBS Standards Mark of Quality

NOTE – The TBS Standards Mark of Quality may be used by the manufacturers only under licence from TBS. Particulars of conditions under which the licences are granted may be obtained from TBS.

8 Sampling

Sampling shall be as representative as possible of the batch that is to be subjected to the measurements and tests, and samples shall be selected away from the ends of the packages at points where they are in true lay.

8.1 Lot

A quantity of packages of the same linear density, same type, and same dimensions, manufactured under similar conditions and delivered to a buyer against a dispatch note shall constitute a lot.

8.2 The conformity of the lot shall be determined on the basis of test carried out on the same sample selected from it.

8.3 The number of packages to be selected at random from a lot shall be as given in Table 3:

Table 3 – Sampling plan

Lot size	Sample size
0 to 10 packages	1
11 to 100 packages	10
101 and above	100

8.4 For evaluating the length, linear density, breaking load and the number of packages selected according to 8.3 shall constitute the test sample.

8.5 For evaluating the gross mass of the lot all the package in the lot shall constitute the test sample.

8.6 Length per package

The length of twine per package of each package tested shall be determined in accordance with the method given in Annex A and shall be not less than the length declared.

8.7 Linear density and runnage

The linear density and runnage of sample lengths shall be determined in accordance with the method given in annex B and shall be in accordance with the appropriate figures given in Table 1.

8.8 Breaking load

8.8.1 The breaking load of each sample shall be determined in accordance with the method given in Annex C and shall be not less than that given in Table 1.

8.8.2 For the breaking load test, take into consideration only the results obtained when the break occurs between the grips of the testing machines. If one of the ten specimens from a sample spool fails to reach the minimum breaking load specified in Table 1 for which the twine being tested, the results shall be rejected and another package of twine sampled in its place.

8.8.3 This retest procedure is applicable to all sample packages representing a batch.

8.8.4 Should any test result from the reset sample package or packages fail to reach the minimum breaking load requirement, the batch represented by the sample packages shall be deemed to comply with the requirements of this Tanzania Standard.

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8.9 Criteria for conformity

The lot shall be declared as conforming to this Tanzania Standard if the following conditions are satisfied:

a) The length of each package is not less than the specified length; and

b) The average values of the test results in respect of other requirements conform to the requirements specified in the standard.

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Annex A
(normative)

Method for determination of length per package

Before removing any twine from the package determine the mass of the package and express in kg to an accuracy of ± 1%. To calculate the length of twine, multiply the package mass by the runnage (in meters per kg) as determined in Annex B, and record the result as length per package in meters to the nearest 5 m.

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Annex B
(normative)

Determination of linear density and runnage

B.1 Principle

Weighing, underspecified conditions, specimens of specified length, and then followed by calculation of the linear density and the runnage (or length in meters per kilogram).

B.2 Apparatus

B.2.1 Balance, accurate to 0.5 g.

B.2.2 Wrap-reel of known perimeter.

B.3 Specimens

Selection

Select 10 m (heavier twine) or 20 m (lighter twine) from each package, proceeding in the following manner:

Directly from the centre of each package, in an anti-clockwise direction, draw the first 10 m of twine and discard them. Then draw 30 m of twine and wind them as adjacent turns (without overlapping) on the wrap-reel, exercising, and just sufficient tension on the twine to maintain straightness.

Each specimen of 30 m thus obtained constitutes a test piece.

B.4 Procedure

Weigh each specimen to the nearest 0.5 g (let *m,* be the mass obtained in grams).

B.5 Expression of results

B.5.1 Calculation of linear density

For each specimen, calculate the linear *T,* in Tex, using the following formula;

$$\mathrm{T} = \frac{1000m}{\mathrm{l}}$$

Where;
m, is mass, in grams of the specimen, and *l*, is the length, in meters, of the specimen.

B.5.2 Calculation of runnage

Calculate the runnage L, in meters per kilogram of twine, using the following formula;

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$$L = \frac{10^6}{T}$$

Where

T, is the linear density.

B.5.3 If a specimen is outside the tolerance, a check test shall be carried out on another package.

B.5.4 If the result of the check test is found to be within the limits of the permitted tolerances, it is the result of the check test which is adopted for the value of the linear density.

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Annex C
(normative)

Method for determination of breaking load

C.1 Test the twine on a tensile testing machine of appropriate capacity and type.

C.2 A sample length for the determination of breaking load values shall consist of 10 test specimens.

C.3 The test specimen shall have a minimum length of 500 mm between the centres of the bollards at the commencement of the test. The rate of transverse of the straining head for constant-rate-of-extension (CRE) and constant-rate-of-transverse (CRT) machines shall be within ±10%, numerically equal in mm per minute to the effective length in mm of the test specimen.

C.4 Having discarded the first 10 metres, draw specimens of twine directly from the centre of the package to the grips of the testing machine, care being taken to avoid loss of twist, other than that inevitably lost in drawing out the twines.

C.5 Apply the load until the specimen breaks, and record the maximum load attained.

C.5 Record the breaking load for each specimen in daN to the nearest daN. If any specimen slips in either of the grips or bollards or breaks in or at either of the grips or bollards at a load less than the specified breaking load, the test on the specimen shall be disregarded and a further specimen tested.

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Annex D
(normative)

Recommendation for the care and handling of sisal twines

D.1 Removal

Twine should always be removed from the centre of a package in an anti-clockwise direction.

D.2 Machine parts

See that the surface condition of machine operating parts is good and that all parts are smooth and free from rust and paint.

D.3 Handling

Packages and packs of twine should be handled with care and stored the right way up, otherwise doming of the package may result.

D.4 Local abrasion

Unprotected packages should not be thrown on the ground or against hard objects since abrasion scars may cause considerable weakening of the twine.

D.5 Storage

Twines should be stored in a cool dry place to prevent damage caused by damp and/or heat.

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Annex E

(normative)

Equivalent breaking loads in decanewtons (daN)

Table E.1 – daN equivalent for kg values given in Table 1.

kg	daN
45	44
132	129
136 147 188	133 144 184

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