



DRAFT TANZANIA STANDARD

Textiles - Twines - Specifications -Part 2: Twines made from man-made multifilament fibres (Revision of TZS 490-2:2018)

Draft Standard For Public Comments

TANZANIA BUREAU OF STANDARDS

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National Foreword

This 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 the Textile Divisional Standards Committee (TDC). The Technical Committee responsible for the standard is (TDC 8- Yarns and Twines)

This third edition cancels and replaces the second edition (TZS 490-2 2018), which has been technically revised

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.

Draft Standard For Public Comments

1. Scope

This Draft Tanzania Standard specifies materials; manufacturing and a performance requirement for man-made multifilament fibre twines, (Polyester fibre, Polypropylene fibre Polyamide (Nylon) fibre,) for different applications.

2. Normative references

The following referenced documents are indispensable for the application of this document. 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*

3. Terms and definitions

For the purpose of this document, the following terms and definitions shall apply;

3.1

breaking strength

nominal force (or load) expected to break or rupture a single specimen in a tensile test conducted under a specified procedure

3.2

Decitex

mass of yarn in grams per 10,000 metre

3.3

Linear density

mass per unit length of textile twines. In the universal count system, it is expressed in Tex or kilotex (see annex A)

3.4

Multifilament fibres

filament yarn consisting of many fine continuous filaments produced by the spinning of a polymeric material suitable for fibre production

3.5

Tenacity

force divided by linear density of the unstrained specimen, the maximum specific stress that is developed in a tensile test to rupture

3.6

Package

container, as a box or case, in which something is or may be packed

3.7

linear density

mass per unit length of textile Twines. In the universal count system, it is expressed in Tex or kilotex (see annex A)

3.8

manufacturer's batch

quantity from which a specified number of packs will be drawn for testing

3.9

package

container, as a box or case, in which something is or may be packed in

4. Materials

4.1 Man-made multifilament fibre twines for all three types of materials mentioned above, shall be fabricated from continuous flat multifilament fibre of suitable strength to meet all the requirements of this Tanzania Standard (see Annex C).

4.2 No extraneous materials for all material shall be added for the purpose of weighting the multifilament fibre twines. Extractable matter of the finished multifilament fibre twine shall not exceed 5%.

5. General requirements

5.1 Requirements of man-made multifilament fibres shall be as given in Tables 1, 2 and 3.

5.2 Linear density and runnage — They are subject to a tolerance of $\pm 5\%$ and shall be as specified in Annex A;

5.3 Minimum breaking force — Shall be as specified from Tables 1, 2 and 3 above. Any tolerance to be allowed shall be agreed between the purchaser and the supplier. Breaking force shall be determined as specified in Annex B;

5.4 Weight of package — A tolerance of $+10\%$, -5% shall be allowed on the specific weight of any package provided that the variation from the gross specified Weight of any delivery of one size and description does not exceed 5% ;

5.5 Requirements beyond the scope of this Draft Tanzania Standard shall be established by a mutual agreement between the buyer and the seller.

Table 1 — Performance requirements of Polyester fibre twines

Linear density (Dtex)	Number of Filaments	Breaking Strength <i>Min</i> , (N)	Tenacity (cN/Dtex) Min	Elongation at break % Min
145 – 222	45 – 48	10.0 – 18.0	5.5 – 6.5	15
235 – 470	48 – 96	19.0 – 38	6.5 – 7.0	16
550 – 930	96 – 192	45 – 60	7.0 – 7.5	13
1100	72 – 192	60 – 90	7.0 – 8.0	13
1440	192	115	8.2	13
1670	192-384	120	7	13
2200	384	162	7	13
3300	384	243	7.5	13

Table 2 — Requirements of Polypropylene fibre twines

Linear density (Dtex)	Number of Filaments	Breaking Strength <i>Min</i>, (N)	Tenacity (cN/Dtex)	Elongation at break %
950	98	40	4.5	18
1100	110	60	5.5	20
1440	140	70	5.5	20
2200	230	120	6	20
3300	360	90	6	20

Table 3 — Requirements of Polyamide (Nylon) fibre twine

Linear density (Dtex)	Number of Filaments	Breaking Strength <i>min</i>, (N)	Tenacity (cN/Dtex) Min	Elongation at break % Min
750	100	60	6.8	17
940	140	76	7.5	18
1440	192/210	117	7.8	20
1870	280	152	8.0	20
2100	300	170	8.0	20

Table 4 — Conversion formulas for the various numbering systems

Convert into known	Tex	Decitex (dtex)	Denier (den)	Metric No. (Nm)	English Cotton No. (Ne)
tex		10 x tex	9 x tex	1000/tex	591/tex
Decitex (dtex)	Dtex/10		0.9 x dtex	10000/dtex	5910/dtex
Denier (den)	Den/9	Den/0.9		9000/den	5314/den
Metric No. (Nm)	1000/Nm	10000/Nm	9000/Nm		0.59 x Nm
English Cotton No. (Ne)	591/Ne	5910/Ne	5314/Ne	Ne x 1.69	

NOTES —

Converting Measurements of Tenacity

cN/dtex = g/den divided by 1.1325 cN/tex

= g/den divided by 0.11325

g/dtex = g/den multiplied by 0.9

g/tex = g/den multiplied by 9

5 Packing, packaging and marking

5.1 Packing

Each Spool shall be securely packed in a suitable material to prevent damage during transportation and storage.

5.2 Marking

5.2.1 Each individual Spool shall be marked with following information:

- a) name of the material and construction,
- b) the reference Number
- c) net weight,
- d) colour
- e) country of origin
- f) name and/ or address of the manufacturer
- g) month and year of manufacture.

5.2.2 Each package containing Spool shall be marked with following information:

- a) name of the material and construction,
- b) Net weight,
- c) gross weight,
- d) country of origin
- f) name and/ or address of the manufacturer
- g) month and year of manufacture.

6 Sampling

The sampling criteria shall be in accordance with ISO 2859-1.

Annex A (Normative)

Determination of linear density

A.1 Principle

Weigh, under specified conditions, specimens of specified length, then followed by calculation of the linear density.

A.2 Apparatus

A.2.1 Balance, accurate to 0.5 g.

A-2.2 Wrap – reel of known perimeter

A.3 Specimen

Selection

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

Directly from the center of each package, in an anti – clockwise direction, draw the first 10 m of twine and discard them. Then draw 10 m of twine (for 1000 m/kg and heavier) or 20 m of twine (for lighter than 1000 m/kg) and wind them as adjacent turns (without overlapping) on the wrap – reel, exercising just sufficient tension on the twine to maintain straightness.

Each of 10 m or 20 m thus obtained constitutes a test piece.

A.4 Procedure

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

A.5 Expression of results

A.5.1 Calculation of linear density

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

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

Where,

m , is the mass, in grams, of the specimen and

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

Where,

m , is the mass, in grams, of the specimen and

l , is the length, in meters of the specimen.

A.1.1 Calculation of runnage

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

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

Where,

T , is the linear density

A.1.2 If a specimen is outside the tolerance, a check test shall be carried out on another spool.

A.1.3 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.

l , is the length, in meters of the specimen.

A.5.2 Calculation of runnage

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

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

Where T , is the linear density

Annex B

(normative)

Method for determination of breaking load

B.1 Apparatus

Use a power driven constant rate of extension or constant rate of traverse testing machine, which includes a pair of suitable devices to hold the specimen, a means of elongating the specimen at a suitable rate and a load – indicating mechanism to indicate or record continuously the load applied to the specimen.

The machine shall comply with the specified requirements for grade A machine, that is; the maximum permissible error shall not exceed 1 % of the applied load or 0.2 % of the maximum of the scale, whichever is the greater. Subject to agreement between the purchaser and the supplier a power-driven machine of the constant rate of loading type may be employed.

B.2 Specimens

Take ten or more than 10 specimens per sample length. The free length of the test specimen between the holding devices at the start of the test shall be 500 mm.

B.3 Speed

The rate of traverse of the straining head of Constant rate of extension (CRE) and Constant rate traverse (CRT) machines shall be $500 \text{ mm} \pm 50 \text{ mm}$ per minute.

If a Constant rate of loading (CRL) machine is used, the rate of loading shall be that the time to break is 60 ± 10 seconds.

B.4 Procedure

Insert the specimen carefully between the holding devices, set the machine in operation and increase the load continuously until the specimen breaks. Record the maximum load attained. Should any specimen slip in either of the holding devices or break in or at either of the holding devices at a load less than the appropriate minimum breaking load specified in the schedule, disregard the result and test a fresh specimen.

B.5 Results

Express the result for the breaking load of each specimen in N or Kg or decanewton

(daN) to the nearest 1 %

The SI unit for force is the newton (N). A load of 1kg = 0.981 decanewton (daN)

Annex C
(normative)

Methods for determination of number of filaments

C.1 Apparatus

C.1.1 Microscope

C.1.2 Microscopic Slides

C.1.3 Glycerol/Water

C.1.4 Cutter & Measuring Scale

C.2 Principle

The specimens in the form of filament yarn are cuttings from different places so as to cover the entire surface in each direction/different cone. Mount those specimens on the microscopic slides using glycerol / Water.

C.3 Procedure

C.3.1 Take 5 specimens of yarn cuttings from separated different places so as to cover the entire surface in each direction/different cone.

C.3.2 Mount the specimens on the microscopic slides using glycerol and tease the strands so as to achieve maximum separation of all individual filaments.

C.3.3 Mount the slides on the microscope.

C.3.4 Count the individual number of filaments visually.

C.3.5 Write or note down the number of filaments on the work sheet.

C.3.6 Repeat the same process for all the specimens.

C.3.7 Then report the number of filaments average of five readings as the direction wise in case of fabric.