

DRAFT TANZANIA STANDARD
Textiles - Method for determination of twist in a yarn



TANZANIA BUREAU OF STANDARDS

Textiles – Method for determination of twist in a yarn

0 Foreword

This Draft Tanzania Standard has been prepared with a view to eliminate as far as possible, variations in testing procedures for the determination of turns per metre in yarns.

In preparations of this Draft Standard, assistance was derived from:

IS 832:2011 (*Method for determination of twist in yarn*, published by the International Organization for Standardization)

In reporting the result of a test made in accordance with this Draft Standard, if the final value, observed or calculated, is to be rounded off, it shall be done in accordance with TZS 4:2009 (see clause 2).

1 Scope

1.1 This Draft Tanzania Standard prescribes a method for determination of direction of twist and amount of twist in terms of turns per metre of single, plied or cabled yarn, with the use of direct count type twist tester. In case of plied or cabled yarn, the method also provides for the determination of twist take up and twist release.

1.2 The method prescribed in this Draft Standard is applicable to all textile yarns.

1.3 The method prescribed in this Draft Standard may also be used to determine the twist of single, plied or cabled yarn removed from fabrics.

1.3.1 However, in case of wool, it is not the practice to determine the twist of yarn removed from fabrics.

1.3.2 The turns per metre of yarn removed from fabric may not have a fair relationship with the original twist inserted in the yarn during spinning, particularly in the case of crepe fabrics wherein the crepe effect is produced by the use of highly twisted yarns.

2 Reference

2.1 For the purpose of this Draft Standard the following references shall apply:

- a) TZS 3: 1979 – *Atmospheric conditions for testing*
- b) TZS 4: 2009 – *Rounding off numerical values*
- c) TZS 264: *Textiles – Designation of the direction of twist in yarns and related products.*

3 Terminology

For the purpose of this Draft Standard, the following definitions shall apply:

3.1 Package – A general term for bobbin, cop, pirn, cone cheese, bundle, etc. of yarn indicating that the yarn is in a form convenient for transport or further processing.

3.2 Twist – Number of turns about the axis of the yarn expressed as turns per unit length of the yarn in the twisted state.

3.3 Twist release – The extension in length of yarn on untwisting expressed as a percentage of the length of the yarn in the twisted yarn.

3.4 Twist take up – The extension in length of yarn on twisting expressed as a percentage of the length of yarn before twisting.

3.4.1 As the length of the yarn before twisting may not be known, the length of the yarn after untwisting may be treated as equal to the length of the untwisted yarn for practical purposes.

4 Sampling

4.1 Yarn in Packages

4.1.1 Lot – All the cases of yarn of the same type, count and quality delivered to one buyer against one dispatch shall constitute a lot.

4.1.2 The conformity of a lot to specification shall be determined on the basis of tests conducted on the sample selected from the lot.

4.1.3 The number of cases to be selected at random from the lot shall be in accordance with table 1.

Table – Number of cases to be

Number of cases in the lot	Number of cases to be selected from the lot
3 or less	1
4 to 10	2
11 to 30	3
31 to 75	4
76 or more	5

4.1.4 From each of the cases selected as in 4.1.3, 10 packages shall be selected at random

4.1.4.1 From each of these packages, an equal number of specimens of adequate length shall be selected from different parts of the package. The exact length and the total number of test specimens so drawn (from the packages) shall be in accordance with column 2 and 3 respectively of table 2. Before cutting each test the specimen from the package, a length of 10 metres of yarn shall be discharged. While drawing the specimens from the packages, care shall be taken to avoid any change in yarns.

4.1.4.2 As far as possible, the test specimens shall be drawn, just before testing, that is each test specimen shall be tested soon after it is drawn from the piece of the cloth.

5 Conditioning of test specimens

5.1 The specimen shall be conditioned in accordance with TZS 3: 1979 (see clause 2 (a)

a) the twist tester shall be provided with

1) **Two clamps** – One rotatable and the other non – rotatable, to grip the test specimen;

2) **A scale** – Graduated in centimetres and millimetres to measure the distance between the clamps.

3) **A revolution counter** – Positively connected to a rotatable capable of recording the number of revolutions of the clamp to an accuracy of:

one turn, for testing specimens of length more than 50 mm;
one tenth of a turn, for testing specimens of length equal to or less than 50 mm and for testing yarns with low twist.

4) **A suitable scale** – Graduated in millimetres, to measure the elongation or contraction of the test specimen, and

5) **A suitable magnifying glass** – To examine visually the test specimen during the test.

b) The distance between the clamps shall be capable of being set to any distance up to 500 mm as required.

c) The rotatable clamp shall be capable of being revolved in either direction on its axis parallel to the longitudinal axis of the test specimen

d) The revolution counter shall be capable of being set to zero mark after each test.

e) The non-rotatable clamp shall be mounted on its support in such a manner that the required tension could be applied to the test specimen.

f) Dissecting needle

7 Test specimens

7.1 Length of test specimen

7.1.1 The length of test specimen between the inside edges of the clamps shall as great as possible and shall comply with the requirements of table 2.

7.1.2 In the case of single spun yarn, the length of specimens to be tested shall be as long as convenient but somewhat less than the staple length of the fibre used to spin the yarn.

Table 2 – Length and number of test specimens

Type of yarn	Length of test specimen	Number of test specimen
a) Cotton-type yarn	5 mm or below	100
b) Worsted-type yarn	50 mm or below	100
c) Woollen-type yarn	50 mm or below	100
d) Jute-type yarn	250 mm or below	100
e) Single filament yarn	500 mm or below	10
f) Plied or cabled yarn	500 mm or below	10

7.2 Unless otherwise specified the number of test specimens shall be in accordance with column 3 of table 2.

7.2.1 The exact number of tests to be made for each type of yarn depends upon the estimated or assumed coefficients of variation of individual values and the permissible error in the estimate of the test result at a desired probability level.

7.2.2 The values given in table 2 for the number of test specimens have been calculated assuming the following coefficients of variation for the respective individual values, with a permissible error of five per cent at a probability level of 95% as shown in table 3.

Table 3 – Coefficient of variation per cent of yarns

Type of yarn	Coefficient of variation %
a) Cotton-type yarn	25
b) Worsted-type yarn	25
c) Woollen-type yarn	25
d) Jute-type yarn	25
e) Single filament yarn	8

f) Plyed or cabled yarn	8
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7.2.3 If however, all the particulars necessary for the calculation of exact number of test specimens are available, the test may be conducted accordingly.

8 Procedure

8.1 Twist in single yarn

8.1.1 Set the clamps so that the distance between the clamps is equivalent to the applicable value of the length of test specimen in table 2 and ensure that the distance so set is within an accuracy of one per cent or 0.5 mm whichever is greater. The revolution counter to zero position, set the tensioning deviance so as to apply a tension of about 0.5 ± 0.1 cN / tex on the test specimen (see clause 8.1.1.1)

8.1.1.1 It is assumed that the universal count, in tex of yarn under test would be determined by weighing a known length of yarn taken from the conditioned sample.

8.1.2 Secure the free end of the test specimen in the non-rotatable clamp. Pass the other end of the specimen through the open rotatable clamp and pull it through the clamp till the specified pretension becomes effective, and then secure the specimen

8.1.3 Determine the direction of twist 'S' or 'Z' (see clause 2) by visually examining the specimens (see TZS 264: 1985).

8.1.4 Revolve the rotatable clamp in the proper direction so as to untwist the specimen. Continue the rotation in the same direction until it is possible to pass a needle from one clamp to the other between the untwisted fibres of the specimen, use the magnifying glass, if necessary, to make sure that all the twist has been removed. Note down the number of turns.

8.1.5 From the value obtained as in 8.1.1 and the length of the test specimen before untwisting, calculate the turns per metre in the test specimen

8.1.6 By following the procedure given in 8.1.1 to 8.1.5 determine the turns per metre in the remaining test specimens. Calculate the mean of all the values so obtained and the coefficient of variation of the values.

8.2 Test Report

8.2.1 State that the test procedure was conducted in accordance with this Draft Tanzania Standard.

8.2.2 The test report shall include the following:

- a) Type of yarn;
- b) Direction of twist 'S' or 'Z' of single yarn;
- c) Length in millimetres of the specimen;
- d) Number of specimens tested;

- e) Pre – tension used;
- f) Mean value of turns per metre of plied yarn, and
- g) The coefficient of the variation of turns per metre values if desired.

8.3 Twist in plied yarn

8.3.1 Determine (a) the direction of twist, (b) the number of turns in the test specimens by following the procedure prescribed in 8.1.1 to 8.1.4 but noting, for the purpose of 8.1.4, the end point of the test when it is possible pass a needle between component yarns of the specimen. Record also the extension in length obtained on untwisting the test specimen.

8.3.2 From the value of number of turns obtained as in 8.3.1 and the length of the specimen before untwisting, calculate the turns per metre in the test specimen.

8.3.3 Cut off all but one component strand of single yarn close to the inside edges of the clamps. Test the component strand (still in the clamps) of single yarn for the direction of twist and the number of turns by following the procedure given under 8.1, but adjusting the length of the test specimen to comply with the requirements table 2.

8.3.3.1 It is assumed that all the component single yarns have the same amount of twist. If this fact is not known, it should be verified. If it is found that they differ in respect of the amount of twist, each component single yarn shall be tested and the results reported.

8.3.4 Test similarly the remaining test specimens for a) turns per metre of the plied yarn, and of the component single yarns, b) twist take up and twist release of plied yarn. Calculate the mean of all the values so obtained and the coefficient of variation of the values.

8.4 Test Report

8.4.1 State that the test procedures were conducted in accordance with this Draft Tanzania Standard.

8.4.2 The test report shall include the following:

- a) Type of yarn;
- b) Direction of twist 'S' or 'Z' of single yarn;
- c) Length in millimetres of the specimen;
- d) Number of specimens tested;
- e) Pre – tension used;
- f) Mean value of turns per metre of plied yarn;
- g) The coefficient of the variation of turns per metre values if desired and
- h) Mean value of twist take up and twist release of plied yarn

8.5 Twist in cabled yarn

8.5.1 Determine a) the direction of twist, and b) the number of turns in the test specimens by following the procedure prescribed in 8.1.4 but noting for the purpose of 8.1.4 the end point of the test when it is possible to a needle between the strands of the component plied yarn of the specimen. Record also the extension in length obtained on untwisting the test specimen.

8.5.2 From the value of number of turns obtained as in 8.5.1 and the length of the specimen before untwisting, calculate the turns per metre in the test specimen.

8.5.3 Cut off all one component strand of the plied yarn, close to the inside edges of the clamps.

Test the component strand of plied yarn for the direction of twist and the number of turns per metre, in the plied and component single yarns (still in the clamps) by following the procedure given under 8.3

8.5.3.1 It is assumed that all the component plied yarns have the same amount of twist. If this fact is not known, it should be verified. If it found that they differ in respect of the amount of twist, each component plied yarn shall be tested and the results reported.

8.5.4 Test similarly the remaining test specimens for the turns per metre of the cabled yarn, of the component plied yarns, and of the component single twist yarns the twist take-up and twist release of cabled yarn and of plied yarn. Calculate the mean of all values so obtained and coefficient of variation of turns per metre values.

8.6 State that the test procedures were conducted in accordance with this Draft Tanzania Standard.

8.6.1 The test report shall, in addition to those mentioned in 8.4 include the following:

- a) Mean value of the turns per metre of the cabled yarn and the coefficient of variation of the turns per metre values, if desired;
- b) Means value of the twist take up and twist release of the cabled yarn; and
- a) Direction of twist 'S' or 'Z' of the cabled yarn.

