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# INTERNATIONAL STANDARD



# 1890

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## Textile glass products — Continuous filament yarns and staple fibre yarns — Determination of twist

*Produits en verre textile — Fils de silionne et de verranne — Détermination de la torsion*

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UDC 677.521 : 677.017.33

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**Descriptors** : textile glass, textile glass yarns, tests, mechanical tests, twisting, torsion tests.

## FOREWORD

ISO (the International Organization for Standardization) is a worldwide federation of national standards institutes (ISO Member Bodies). The work of developing International Standards is carried out through ISO Technical Committees. Every Member Body interested in a subject for which a Technical Committee has been set up has the right to be represented on that Committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work.

Draft International Standards adopted by the Technical Committees are circulated to the Member Bodies for approval before their acceptance as International Standards by the ISO Council.

Prior to 1972, the results of the work of the Technical Committees were published as ISO Recommendations; these documents are now in the process of being transformed into International Standards. As part of this process, Technical Committee ISO/TC 61 has reviewed ISO Recommendation R 1890 and found it technically suitable for transformation. International Standard ISO 1890 therefore replaces ISO Recommendation R 1890-1971 to which it is technically identical.

<https://standards.iteh.ai/catalog/standards/sist/5d75246a-3fef-42bc-9b1b-4761e9101010-iso-1890-1971>

ISO Recommendation R 1890 was approved by the Member Bodies of the following countries :

Australia	Greece	South Africa, Rep. of
Austria	Israel	Spain
Belgium	Italy	Sweden
Canada	Japan	Switzerland
Czechoslovakia	Korea, Rep. of	Turkey
Egypt, Arab Rep. of	Netherlands	United Kingdom
France	New Zealand	U.S.A.
Germany	Romania	U.S.S.R.

No Member Body expressed disapproval of the Recommendation.

The Member Body of the following country disapproved the transformation of ISO/R 1890 into an International Standard :

Canada

# Textile glass products – Continuous filament yarns and staple fibre yarns – Determination of twist

## 1 SCOPE AND FIELD OF APPLICATION

This International Standard specifies a method for determining the twist in textile glass continuous filament yarns and staple fibre yarns.

In the case of staple fibre yarns, the results obtained should be regarded as indicative only.

## 2 REFERENCES

ISO 2, *Textiles – Designation of the direction of twist in yarns and related products.*

ISO 1886, *Textile glass products – Continuous filament yarns, staple fibre yarns and rovings in the form of packages – Sampling of batches or consignments.*

ISO 1889, *Textile glass products – Continuous filament yarns, staple fibre yarns and rovings in the form of packages – Determination of linear density.*

ISO 2078, *Textile glass yarns – Designation.*

## 3 PRINCIPLE

Counting, by means of a twist tester, of the number of turns necessary for the complete untwisting of 500 mm of yarn secured between the clamps of the apparatus, and calculation of the mean of a specified number of measurements.

## 4 APPARATUS

**Twist tester**, i.e. an apparatus which has two clamps, one fixed and one movable, mounted on a bar, and a means for securely fastening a section of yarn stretched under tension between the clamps. The movable clamp has a means for untwisting the yarn and the tensioning device maintains constant tension on the yarn along its axis. The yarn is untwisted and the number of turns to completely untwist the yarn is counted. The change in length of the yarn may be determined by accurate measurement of the length of yarn before and after the untwisting operation.

Additionally the twist tester shall satisfy the following conditions :

- it shall be capable of yielding results accurate to one twist;

- it shall be possible to set the yarn between clamps under a known and adjustable tension, the distance between clamps being 500 mm for yarns of any type;
- the clamps shall not damage the yarn;
- an indicator shall permit measurement with an accuracy of 1 mm of the change in the length of the specimen between the clamps.

## 5 SAMPLING AND NUMBER OF TESTS

The size of the sample from a given consignment of packages shall be in accordance with ISO 1886.

If the textile glass continuous filament yarns and staple fibre yarns have another origin (fabrics, mats, etc.) refer to the specifications concerning the products from which the yarns come whenever sampling procedures are given. If not, the method for selection of samples shall be decided by previous agreement.

In cases where only a small sample is available, the procedure described in this International Standard may be followed, but the result thus obtained will only be approximate.

**5.1** First, untwist the yarn to determine its construction, i.e. the number of individual yarns used.

The aim of this operation is

- a) to find out if the yarn is a single, folded or cabled yarn;
- b) to determine the value of the standard pre-tension or pre-tensions (for definition and value refer to ISO 1889), which must be known to determine the twist in accordance with this International Standard.

**5.2** From each package of the sample, pull off yarn tangentially, allowing the package to revolve, or alternatively pull off yarn over-end, if this is the intended method of use of the package, under a slight tension lower than the standard pre-tension.

**5.3** Reject 10 m of yarn before making a series of ten measurements in conformity with the procedure specified in clause 6 and without cutting the yarn.

Make five measurements at random along the yarn, at irregular intervals of not less than 2 m. Wind off about 100 m of the yarn and make a further set of five random measurements at intervals of at least 2 m.

If there is any doubt concerning the regularity of the twist between beginning and end of the packages, first make the measurements as indicated in the previous paragraph on the outside sections of the package, then unwind enough yarn to reach the deeper layers and make a second series of ten measurements according to the same procedure.

## 6 PROCEDURE FOR EACH TWIST TEST

For each test, unwind the yarn from the outside of the package perpendicularly to the axis or over-end, as appropriate, and without cutting it, directly from the package to the twist tester and secure it under standard pre-tension between the fixed clamp and the rotatable clamp.

In order to avoid any change in twist before or while securing the yarn in the clamps, it is important

- a) to select a length of yarn slightly greater than the required initial length, so as to necessitate handling the yarn only once before securing it between the clamps;
- b) to adjust the initial length of yarn without the yarn rubbing on any part of the apparatus, for instance against the half-opened jaws of the clamp where the yarn will ultimately be secured.

### 6.1 Single yarn

Remove the twist completely; this can be checked by passing a needle between the untwisted elements. Record the number of turns necessary for this complete untwisting, as well as the S or Z direction of the twist (see ISO 2).

### 6.2 Folded yarn

In a folded yarn the standard pre-tension is the sum of the standard pre-tensions found for each of the single yarns constituting the folded yarn. It is useful, in carrying out the test, to apply this pre-tension by means of two weights, the first weight corresponding to the pre-tension of one single constituent yarn, the other weight added to reach the pre-tension of the folded yarn.

Completely untwist the folded yarn. Record the number of turns necessary for this operation as well as the direction of twist in the folded yarn.

Next, reduce the pre-tension to the value found for a single constituent yarn by removing the second weight initially added. By cutting close to the clamps, remove all but one of the individual yarns separated by the first untwisting operation. Record the length of the remaining yarn.

Completely remove the twist of the remaining yarn, recording the number of turns necessary as well as the direction of twist.

### 6.3 Cabled yarn

In a cabled yarn the standard pre-tension is again the sum of the standard pre-tensions found for each constituent single yarn.

Completely untwist the cabled yarn. Record the number of turns necessary for this operation as well as the direction of twist in the last component of the cabled yarn.

Next, single out one of the folded or cabled yarns separated by the previous untwisting operation, in conformity with the procedure described in 6.2. Reduce its pre-tension to the corresponding value by adjusting the weight applied. Then record its length and untwist it by repeating the operation described above in 6.2 or 6.3.

Continue this procedure for each component of the yarn until a single yarn is obtained.

## 7 EXPRESSION OF RESULTS

7.1 Calculate the twist  $T$  in turns per metre of each component of the specimen length of yarn tested by means of the formula

$$T = \frac{N}{L}$$

where

$N$  is the number of turns necessary to untwist each component of the yarn;

$L$  is the length, in metres, under standard pre-tension prior to untwisting.

Thus the twist in single, folded or cabled yarns is expressed as the number of turns per metre of single, folded or cabled yarns, for each component of the yarn.

7.2 Calculate the mean of the ten tests per package, giving the mean twist of the package, for each component of the yarn.

- ◆ In the case where the twist tests on the outside and inside of packages have been performed separately (see 5.3), also state the average results of outside and inside separately, for each component of the yarn.

7.3 Using these average values, calculate the mean twist of the consignment for the total of the packages (or parts of packages, outside or inside); for folded or cabled yarns calculate the twist in each component of the yarn.

7.4 Determine the standard deviation and 95 % confidence intervals for the mean of the results for each component of the yarn. If the tests have been made both on the outside and inside of the packages, determine the confidence interval corresponding to the mean of the values found on the outside and, similarly, the confidence interval corresponding to the mean of the values found on the inside of the packages.

**8 TEST REPORT**

The test report shall include the following particulars :

- a) reference to this International Standard;
- b) complete designation of the yarn in accordance with ISO 2078;
- c) sampling procedure applied;
- d) results for each component of the yarn;
- e) variation in results from the inside to the outside of the package;
- f) table of the mean twist in each package and the standard deviation of these measurements for each component of the yarn;
- g) table of confidence intervals for each component of the yarn.

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