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**ISO**

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

**ISO RECOMMENDATION**

**R 1889**

TEXTILE GLASS

**DETERMINATION OF THE LINEAR DENSITY OF TEXTILE GLASS  
CONTINUOUS FILAMENT YARNS, STAPLE FIBRE YARNS AND ROVINGS  
IN THE FORM OF PACKAGES**

1st EDITION

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## BRIEF HISTORY

The ISO Recommendation R 1889, *Textile glass – Determination of the linear density of textile glass continuous filament yarns, staple fibre yarns and rovings in the form of packages*, was drawn up by Technical Committee ISO/TC 61, *Plastics*, the Secretariat of which is held by the American National Standards Institute (ANSI).

Work on this question led to the adoption of Draft ISO Recommendation No. 1889, which was circulated to all the ISO Member Bodies for enquiry in October 1969. It was approved, subject to a few modifications of an editorial nature, by the following Member Bodies :

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

No Member Body opposed the approval of the Draft.

This Draft ISO Recommendation was then submitted by correspondence to the ISO Council, which decided to accept it as an ISO RECOMMENDATION.

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## TEXTILE GLASS

**DETERMINATION OF THE LINEAR DENSITY OF TEXTILE GLASS  
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**1. SCOPE**

This ISO Recommendation describes a method for determining the actual linear density\* of textile glass continuous filament yarns, staple fibre yarns and rovings in the form of packages. It may be used for the inspection of a package or of a batch or consignment consisting of several packages\*\*.

The linear density as determined is the linear density of the desized oven-dried textile product.

**2. DEFINITIONS**

2.1 *Linear density* of a textile glass yarn or roving. The mass per unit length of desized oven-dried glass yarn or roving expressed in the Tex System\*\*\*.

Distinction is made between the following types of linear density :

- *the actual linear density* : linear density obtained by following the procedure of this ISO Recommendation;
- *the nominal linear density of strand* : linear density as stated in the designation of all types of yarns or rovings;
- *the nominal theoretical linear density*, which is equal to the product of the sum of the nominal linear densities of the strands or slivers constituting the product and a coefficient *D* which makes allowance for the variation in length due to the twist.

This coefficient is expressed by the following formula :

$$D = \frac{100}{100 - K}$$

where *K* is the coefficient of twist contraction (see clause 2.2).

2.2 *Coefficient of twist contraction, K*. The change in length of a yarn due to the twist, expressed as a percentage of the length of the untwisted yarn. This coefficient *K* is obtained by measuring the change in length which occurs as a twisted yarn is untwisted in a twist-testing apparatus such as described in ISO Recommendation R 1890, *Textile glass – Determination of the twist in textile glass continuous filament yarns and staple fibre yarns*.

\* In French, "titre" is a (deprecated) synonym for linear density ("masse linéique").

\*\* However, the procedure is also valid in the case of one single package.

\*\*\* The definition of the Tex System will be found in ISO Recommendation R 1144, *Textiles – Universal system for designating linear density (Tex System)* (replacing ISO Recommendations R 138 and R 271).

2.3 *Pre-tension.* The tension applied to a yarn or roving before determining the linear density or the twist.

Value of yarn pre-tension, applied with a tolerance of  $\pm 10\%$  :

- *of textile glass continuous filament yarns :*

The following formula expresses the standard pre-tension of a yarn :

$$F \text{ (in newtons *)} = \frac{A \text{ (in tex)}}{200} = \frac{A \text{ (in decitex)}}{2000}$$

where *A* is the sum of the nominal linear densities of the strands constituting the yarn or the total linear density of the roving.

- *of textile glass staple fibre yarns :*

The standard pre-tension of a yarn is expressed in newtons according to the following table :

Linear density		Pre-tension in newtons
in tex	in decitex	
125	1 250	0.4
190	1 900	0.5
340	3 400	0.75
680	6 800	1.00
2 000	20 000	2.00

For intermediate linear densities, calculate the normal pre-tension by interpolation.

NOTE. - It is possible to apply to glass staple fibres the same formula to calculate pre-tension as for continuous filament, but if this is done, it must be noted in the test report.

### 3. PRINCIPE

Establishing the mass per unit length in grammes per kilometre after desizing, by calcination to constant mass at a standard temperature of  $625 \pm 20^\circ\text{C}$ , of test specimens of known length selected in accordance with a prescribed procedure.

NOTE. - For glass products which are unstable at the above-mentioned temperature, a temperature between  $500$  and  $600^\circ\text{C}$  may be chosen according to the glass specification or upon agreement. The chosen temperature must be kept constant to  $\pm 20^\circ\text{C}$ .

### 4. APPARATUS

- 4.1 *Muffle furnace* capable of maintaining the standard temperature of  $625 \pm 20^\circ\text{C}$ , or the chosen temperature.
- 4.2 *Desiccator* containing a suitable drying agent (for example : silica gel, calcium chloride, phosphorus pentoxide).
- 4.3 *Specimen holder.*
- 4.4 *Stainless steel tongs.*
- 4.5 *Balance*, accurate to 0.1 mg.
- 4.6 *Wrap reel* for the unwinding of the yarn, the perimeter preferably being equal to 1 m, equipped with a revolution counter working from a set value to zero or vice versa.

\* The SI unit is the newton (N); 1 kgf is approximately equal to 9.8 N, so approximates within 2 % to 10 N.