SLOVENSKI STANDARD
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Advanced technical ceramics - Ceramics composites - Methods of test for reinforcement - Part 2: Determination of linear density

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Hochleistungskeramik - Keramische Verbunwerkstoffe - Verfahren zur Prüfung der Faserverstärkungen - Teil 2: Bestimmung der Feinheit

Céramiques techniques avancées - Céramiques composites - Méthodes d'essai pour renforcements - Partie 2: Détermination de la masse linéique

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This European Standard was approved by CEN on 6 July 2002.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
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Contents

Foreword

This document (EN 1007-2:2002) has been prepared by Technical Committee CEN/TC 184 "Advanced technical ceramics", the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by March 2003, and conflicting national standards shall be withdrawn at the latest by March 2003.

This document supersedes ENV 1007-2:1993.

EN 1007 has six parts:

— EN 1007-1 *Part 1: Determination of size content.*

— EN 1007-2 *Part 2: Determination of linear density.*

— EN 1007-3 *Part 3: Determination of filament diameter and cross-section area.*

— prEN 1007-4 *Part 4: Determination of tensile properties of filament at ambient temperature.*

— prEN 1007-5 *Part 5: Determination of distribution of tensile strength and of tensile strain to failure of filaments within a multifilament tow at ambient temperature.*

— ENV 1007-6 *Part 6: Determination of tensile properties of filament at high temperature.*

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Malta, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This part of the European Standard specifies the conditions for determination of the linear density (mass per unit length) of ceramic multifilament tows, including among others silicon carbide, silicon nitride, silicon carbonitride, alumino-silicate, alumina and silicon oxide fibres.

NOTE 1 When the determination of the linear density is carried out on sized multifilament tow, a correction should be made by calculation based on the size content.

NOTE 2 Carbon fibres are not covered by this European Standard. ISO 1889 should be used for carbon fibres

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text, and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

ENV 13233:1998, *Advanced technical ceramics — Ceramic composites — Notations and symbols.*

EN ISO 291, *Plastics - Standard atmospheres for conditioning and testing (ISO 291:1997)*.

EN ISO 1886, *Reinforcement fibres - Sampling plans applicable to received batches (ISO 1886:1990)*.

3 Principle

Weighing of a defined and accurately cut length of ceramic multifilament tow. Determination of the linear density in tex on the basis of the mass and length of the test specimen.

4 Terms, definitions and symbols

For the purposes of this European Standard, the following terms, definitions and those given in ENV 13233:1998 apply.

4.1
linear density
the ratio of the mass to the yarn length, expressed in tex (g/1 000 m)

4.2
elementary unit
the smallest commercially available unit of a given product

NOTE For fibre, usually this is a spool.

5 Apparatus and accessories

5.1 Cutting device, for cutting test specimens to the required length, to an accuracy of 1 mm, under required pre-tension.

5.2 Balance, with an accuracy of 0,1 mg.

5.3 Cotton or plastic gloves.

5.4 Oven, capable of being maintained at a temperature of (105 ± 5) °C.

5.5 Desiccator containing suitable drying agents.

5.6 Thermometer.

5.7 Hydrometer.

6 Sampling

Sampling of multifilament tows shall be conducted according to EN ISO 1886 to determine the number of elementary units to sample.

At least, three samples shall be taken at random from each elementary unit (spools).

Two separate test specimens shall be tested for each sample.

7 Testing atmosphere

Sampling and testing shall be carried out in a standard atmosphere of (23 ± 2) °C and (50 ± 5) % relative humidity, in accordance with EN ISO 291.

8 Test specimen preparation

Place the ceramic yarn in the cutting device and cut to the defined measured length and then apply a slight pre-tension to straight on the tow. Cut sufficient pieces per individual measurement until a minimum weighed mass of 1 g is achieved.

9 Test procedure

9.1 Dry the specimens for 1,5 h at (105 ± 5) °C. Allow the specimens to cool in a desiccator.

NOTE This drying procedure can be omitted for types of multifilament tow that do not absorb moisture from the atmosphere, by agreement between the interested parties.

9.2 Weigh each specimen to the nearest 1 mg.

10 Calculation of results

Calculate the linear density using the following formula:

$$t = \frac{m}{L} \cdot 10^3$$

where

t is the linear density, expressed in (tex);

m is the mass of test specimen, expressed in gram (g);

L is the total length of yarn constituting the test specimen, expressed in metre (m).

The linear density of each sample is calculated on the basis of the arithmetic mean of all individual measurements.

The linear density of the elementary unit is calculated on the basis of the arithmetic mean of the values of all samples.

11 Test report

The test report shall contain at least the following information:

a) the name and address of the testing establishment;

b) the date of the test, unique identification of report and of each page, signatory, customer name and address;

c) a reference to this European Standard, i.e. “Determined in accordance with EN 1007-2”;

d) the description of the test material : type of fibre, batch number, date of receipt;

e) number and length of test specimen;

f) the linear density of each test specimen;

g) comments about the test and test results;

h) a statement on temperature and humidity.