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ICS 81.060.30

ADVANCED TECHNICAL CERAMICS - CERAMIC COMPOSITES. METHODS OF TEST FOR REINFORCEMENTS - PART 7: DETERMINATION OF THE DISTRIBUTION OF TENSILE STRENGTH AND OF TENSILE STRAIN TO FAILURE OF FILAMENTS WITHIN A MULTIFILAMENT TOW AT HIGH TEMPERATURE

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English Version

Advanced technical ceramics - Ceramic composites. Methods of test for reinforcements - Part 7: Determination of the distribution of tensile strength and of tensile strain to failure of filaments within a multifilament tow at high temperature

Céramiques techniques avancées - Céramiques composites - Méthodes d'essai pour renforts - Partie 7 : Détermination de la distribution de la résistance en traction et de la déformation de traction à la rupture des filaments dans un fil à haute température

Hochleistungskeramik - Keramische Verbundwerkstoffe - Verfahren zur Prüfung von Verstärkungen - Teil 7: Bestimmung der Verteilung von Zugfestigkeit und Zugdehnung von Fasern im Faserbündel bei hoher Temperatur

This Technical Specification (CEN/TS) was approved by CEN on 17 July 2006 for provisional application.

The period of validity of this CEN/TS is limited initially to three years. After two years the members of CEN will be requested to submit their comments, particularly on the question whether the CEN/TS can be converted into a European Standard.

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Foreword

This document (CEN/TS 1007-7:2006) has been prepared by Technical Committee CEN/TC 184 “Advanced technical ceramics”, the secretariat of which is held by BSI.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to announce this Technical Specification: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

EN 1007 *Advanced technical ceramics — Ceramic composites. Methods of test for reinforcements* has been prepared in 7 parts:

Part 1: *Determination of size content*

Part 2: *Determination of linear density*

Part 3: *Determination of filament diameter and cross-section area*

Part 4: *Determination of tensile properties of filaments at ambient temperature*

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

Part 6: *Determination of tensile properties of filaments at high temperature*

Part 7: *Determination of the distribution of tensile strength and tensile strain to failure of filaments within a multifilament tow at high temperature*

At the time of publication of this Technical Specification, Part 6 was available as a European Prestandard.

1 Scope

This Technical Specification specifies the conditions, apparatus and procedure for determining the distribution of tensile strength and tensile strain to failure of ceramic filaments in multifilament tows at high temperature in air, vacuum or a controlled inert atmosphere.

This Technical Specification applies to tows of continuous ceramic filaments, which are assumed to act freely and independently under loading and behave linearly elastic up to failure.

Two methods are proposed depending on the temperature of the ends of the tow:

a) hot end method;

NOTE 1 The application of the hot end method is restricted by ceramic glues with sufficient shear strengths at the test temperature. Current experience with this technique is limited to 1 300 °C, because of the maximum application temperature of ceramic glues.

b) cold end method.

NOTE 2 The cold-end method is limited to 1 700 °C in air and 2 000 °C in inert atmosphere because of the limits of furnaces.

Both methods allow for a failure rate in the determination of distribution of tensile strain and tensile strength.

2 Normative references

This Technical Specification 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 Technical Specification only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies (including amendments).

ENV 843-5, *Advanced technical ceramics — Monolithic ceramics. Mechanical tests at room temperature — Statistical analysis*

EN 1007-2, *Advanced technical ceramics — Ceramic composites — Methods of test for reinforcement — Part 2: Determination of linear density*

EN 60584-1, *Thermocouples — Part 1: reference tables (IEC 60584-1:1995)*

EN 60584-2, *Thermocouples — Part 2: tolerances (IEC 60584-2:1982 + A1:1989)*

EN ISO 7500-1, *Metallic materials — Verification of static uniaxial testing machines — Part 1: Tension compression testing machines — Verification and calibration of the force-measuring system (ISO 7500-1:2004)*

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

ISO 10119, *Carbon fibre — Determination of density*