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ADVANCED TECHNICAL CERAMICS - CERAMIC COMPOSITES - METHODS OF TEST FOR REINFORCEMENT - PART 4: DETERMINATION OF TENSILE PROPERTIES OF FILAMENTS AT AMBIENT TEMPERATURE

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Hochleistungskeramik - Keramische Verbundwerkstoffe - Verfahren zur Prüfung der Faserverstärkungen - Teil 4: Bestimmung der Zugeigenschaften von Fasern bei Raumtemperatur

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Contents

Foreword

This document (EN 1007-4:2004) 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of an identical text or by endorsement, at the latest by November 2004, and conflicting national standards shall be withdrawn at the latest by November 2004.

This document supersedes ENV 1007-4:1994.

This document includes a Bibliography.

EN 1007 'Advanced technical ceramics – Ceramic composites – Methods of test for reinforcements' has six 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 filament 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 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, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

1 Scope

This part of EN 1007 specifies the conditions for determination of tensile strength and elongation at fracture of single filaments of ceramic fibre such as tensile strength, Young's modulus and stress-strain curve. The method applies to continuous ceramic filaments taken from tows, yarns, braids and knittings, which have strain to fracture less than or equal to 5 %.

The method does not apply to checking the homogeneity of strength properties of fibres, nor to assessing the effects of volume under stress. Statistical aspects of filament failure are not included.

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).

EN 1007-1, *Advanced technical ceramics – Ceramic composites – Methods of test for reinforcement – Part 1 Determination of size content.*

EN 1007-3, *Advanced technical ceramics - Ceramic composites - Methods of test for reinforcement - Part 3: Determination of filament diameter and cross-section area*.

ENV 13233:1998; *Advanced technical ceramics - Ceramic composites - Notations and symbols.*

EN ISO 7500-1; *Metallic materials - Verification of static uniaxial testing machines - Part 1: Tension/compression testing machines (ISO 7500-1:1999).*

3 Principle

A ceramic filament is loaded in tension. The test is performed at constant displacement rate up to failure. Force and cross-head displacement are measured and recorded simultaneously. When required, the longitudinal deformation is derived from the cross-head displacement using a compliance correction.

4 Terms, definitions and symbols

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

4.1
lengths

4.1.1
gauge length, L_0
initial distance between two reference points on the filament

4.1.2
test specimen length, L_f
initial distance between the gripped ends of the filament

4.2
initial cross section area A_0
initial cross section area of the filament within the gauge length