National Standards Authority of Ireland

IRISH STANDARD

I.S. EN 623-1:2006

ICS 81.060

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ADVANCED TECHNICAL CERAMICS - MONOLITHIC CERAMICS - GENERAL AND TEXTURAL PROPERTIES - PART 1: DETERMINATION OF THE PRESENCE OF DEFECTS BY DYE PENETRATION

This Irish Standard was published under the authority of the National Standards Authority of Ireland and comes into effect on:

5 July 2006

Price Code E

Údarás um Chaighdeáin Náisiúnta na hÉireann

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 623-1

April 2006

ICS 81.060

Supersedes EN 623-1:1995

English Version

Advanced technical ceramics - Monolithic ceramics - General and textural properties - Part 1: Determination of the presence of defects by dye penetration

Céramiques techniques avancées - Céramiques monolithiques - Propriétés générales et texturales - Partie 1: Détermination de la présence de défauts à l'aide d'essai de ressuage

Hochleistungskeramik - Monolithische Keramik - Allgemeine und strukturelle Eigenschaften - Teil 1: Prüfung auf Anwesenheit von Oberflächenfehlern durch Farbstoffeindringtests

This European Standard was approved by CEN on 6 March 2006.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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 Central Secretariat has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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Ref. No. EN 623-1:2006: E

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Foreword

This European Standard (EN 623-1:2006) 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 October 2006, and conflicting national standards shall be withdrawn at the latest by October 2006.

This European Standard supersedes EN 623-1:1995, which was prepared under a mandate given to CEN by the European Commission and the European Free Trade Association.

EN 623 *Advanced technical ceramics — Monolithic ceramics - General and textural properties* consists of five parts:

Part 1: *Determination of the presence of defects by dye penetration tests*

Part 2: *Determination of density and porosity*

Part 3: *Determination of grain size and size distribution (characterized by the linear intercept method)*

Part 4: *Determination of surface roughness*

Part 5: *Determination of phase volume fraction by evaluation of micrographs*[1]

The main changes in the new edition are:

— addition of normative reference to EN ISO 17025;

— modifications to the apparatus specification and test procedures;

— modifications to the test report requirements.

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, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

[1] At the time of publication of this European Standard, Part 5 was a European Pre-standard.

1 Scope

This part of EN 623 specifies qualitative methods for determination of the presence of defects in advanced technical ceramics by dye penetration tests. The results are reported as visual observations of dye penetration.

Three methods are described:

Method A: A fuchsine dye test which is suitable for white or pale-coloured ceramic products, performed using an evacuation test.

Method B: A fluorescent dye test which is suitable particularly for those products where the purple fuchsine has insufficient visual contrast with the ceramic material, performed using a proprietary test kit.

Method C: A fuchsine dye test which is performed by simple immersion in or spraying with a dye solution, suitable for routine testing for major defects.

2 Normative references

The following referenced documents are indispensable for the application of this European Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ENV 1006, *Advanced technical ceramics — Monolithic ceramics — Guidance on the selection of test pieces for the evaluation of properties*

EN ISO/IEC 17025, *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:2005)*

3 Apparatus

3.1 ***For method A, evacuating equipment***, capable of reducing the pressure to a value not greater than 2 500 Pa, having a means of measuring the pressure.

3.2 ***Drying oven***, capable of maintaining a temperature of 120 °C ± 5 °C.

3.3 ***Open mesh container***, fabricated from ceramic or other non-metallic material, and of size appropriate to the test piece or test pieces (see Clause 4).

3.4 ***For method B, source of ultraviolet light***.

3.5 ***For method A, air-tight vessel***.

3.6 ***Hand lens or low-power microscope***, of magnification up to about 50X.

4 Test pieces

Materials for testing shall be sampled in accordance with the guidance given in ENV 1006. Test pieces should be whole items, or, where this is not possible, fragments of ceramic products in which broken surfaces are exposed. Where required, test pieces should be conditioned to remove absorbed organic material, such as grinding coolant. This may be done by firing in an oxidizing atmosphere to 600 °C ± 50 °C, maintaining this temperature for 2 h. If this treatment leads to annealing or oxidation