



National Standards Authority of Ireland

IRISH STANDARD

**I.S. EN 1071-2:2002**

ICS 81.060.30

**ADVANCED TECHNICAL CERAMICS -  
METHODS OF TEST FOR CERAMIC  
COATINGS - PART 2: DETERMINATION OF  
COATING THICKNESS BY THE CRATER  
GRINDING METHOD**

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English version

**Advanced technical ceramics - Methods of test for ceramic coatings - Part 2: Determination of coating thickness by the crater grinding method**

Céramiques techniques avancées - Méthodes d'essai pour revêtements céramiques - Partie 2: Détermination de l'épaisseur du revêtement par la méthode d'abrasion d'une calotte sphérique

Hochleistungskeramik - Verfahren zur Prüfung keramischer Schichten - Teil 2: Bestimmung der Schichtdicke mit dem Kalottenschleifverfahren

This European Standard was approved by CEN on 10 August 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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## Foreword

This document (EN 1071-2:2002) 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of an identical text or by endorsement, at the latest by May 2003, and conflicting national standards shall be withdrawn at the latest by May 2003.

Annex A is informative.

This document supersedes ENV 1071-2:1993.

EN 1071 '*Advanced technical ceramics – Methods of test for ceramic coatings*' consists of seven parts:

*Part 1: Determination of coating thickness by contact probe profilometer*

*Part 2: Determination of coating thickness by the crater grinding method*

*Part 3: Determination of adhesion and other mechanical failure modes by a scratch test*

*Part 4: Determination of chemical composition*

*Part 5: Determination of porosity*

*Part 6: Determination of the abrasion resistance of coatings by a micro-abrasion wear test*

*Part 7: Determination of hardness and Young's modulus by instrumented indentation test*

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.

## EN 1071-2:2002 (E)

### 1 Scope

This part of this European Standard specifies a method for the determination of the thickness of ceramic coatings by a crater grinding method which includes the grinding of a spherical cavity and subsequent microscopic examination of the crater.

NOTE An alternative measurement of thickness, using a contact probe profilometer, is specified in EN 1071-1.

### 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 ISO/IEC 17025      *General requirements for the competence of testing and calibration laboratories (ISO/IEC 17025:1999)*

ISO 3290              *Rolling bearings – Balls – Dimensions and tolerances.*

### 3 Significance and use

The coating thickness often plays a major role in the performance of coated tools and machine parts. Many different techniques have been developed for assessing the coating thickness. Among these, the crater grinding method and the step height method (see EN 1071-1) are methods that are easy to perform and applicable to most coated systems.

The method is simple and straightforward. A crater is ground into the coated part by means of a rotating ball wetted by an abrasive slurry. The thickness of the coating is derived from the ball and crater dimensional characteristics. Contrast between the different materials constituting the coating and substrate is a prerequisite for the method to enable the detection of the interface between the coating and the surface.

NOTE Test specimens should be either flat or cylindrical. Flatness can be considered as sufficient if the local specimen radius of curvature,  $R_s$ , satisfies the relation  $R_s > 100 \times R$  (for error  $\leq 1\%$ ).

### 4 Sampling

A representative test specimen of the product under test shall be used. Test pieces shall be coated original items, or where this is not possible, made in the same way as the batch to be tested. For large parts, separate manufacturing of the test piece may be necessary.

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