



SLOVENSKI STANDARD
kSIST prEN 1071-9:2009

01-marec-2009

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Advanced technical ceramics - Methods of test for ceramic coatings - Part 9:
Determination of fracture strain

Hochleistungskeramik - Verfahren zur Prüfung keramischer Schichten - Teil 9:
Bestimmung der Bruchdehnung

Céramiques techniques avancées - Méthodes d'essai des revêtements céramiques -
Partie 9 : Détermination de la déformation à la rupture

Ta slovenski standard je istoveten z: prEN 1071-9

ICS:

81.060.30 Sodobna keramika Advanced ceramics

kSIST prEN 1071-9:2009 **en,de**

EUROPEAN STANDARD
NORME EUROPÉENNE
EUROPÄISCHE NORM

FINAL DRAFT
prEN 1071-9

December 2008

ICS 17.040.20; 25.220.99; 81.060.30

Will supersede CEN/TS 1071-9:2004

English Version

Advanced technical ceramics - Methods of test for ceramic coatings - Part 9: Determination of fracture strain

Céramiques techniques avancées - Méthodes d'essai des revêtements céramiques - Partie 9 : Détermination de la déformation à la rupture

Hochleistungskeramik - Verfahren zur Prüfung keramischer Schichten - Teil 9: Bestimmung der Bruchdehnung

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Foreword

This document (prEN 1071-9:2008) has been prepared by Technical Committee CEN/TC 184 “Advanced technical ceramics”, the secretariat of which is held by BSI.

This document is currently submitted to the Unique Acceptance Procedure.

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

- *Part 1: Determination of coating thickness by contact probe filometer*
- *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 by electron probe microanalysis (EPMA)*
- *Part 5: Determination of porosity [withdrawn]*
- *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- *Part 7: Determination of hardness and Young's modulus by instrumented indentation testing [withdrawn]*
- *Part 8: Rockwell indentation test for evaluation of adhesion*
- *Part 9: Determination of fracture strain*
- *Part 10: Determination of coating thickness by cross sectioning*
- *Part 11: Determination of internal stress by the Stoney formula*
- *Part 12: Reciprocating wear test ¹⁾*
- *Part 13: Determination of wear rate by the pin-on-disk method ¹⁾*

Parts 7, 8 and 11 are Technical Specifications. Part 7 was withdrawn shortly after publication of EN ISO 14577-4:2007.

This part of EN 1071 includes a bibliography.

¹⁾ In preparation at the time of publication of this European Standard.

Introduction

The fracture strain of a coating is a critical factor often determining the performance of a coated product. Clearly if stressed either directly or due to thermal effects (thermal expansion coefficient mismatch between the coating and substrate) coating cracking can occur if the critical fracture stress/strain is exceeded, and in many cases the effectiveness of the coating will be reduced. For example, corrosion resistant coatings lose their protective character if cracking occurs, and optical coatings become ineffective when cracked. In many cases cracking is the first stage of a much more serious form of failure in which large areas of the coating can spall.

The extent to which coated components can withstand external applied loads is an important property in the application of any coated system, and usually it is necessary to know the failure stress. For calculation of the stress both the fracture strain and Young's modulus of the coating should be known. EN ISO 14577-4 [1], which replaced Technical Specification CEN/TS 1071-7, can be used to measure the Young's modulus by depth sensing indentation, but there are other methods involving flexure and impact excitation that may also be applied [2], [3].