
**Fine ceramics (advanced ceramics,
advanced technical ceramics) — Test
method for interfacial bond strength of
ceramic materials**

*Céramiques techniques — Méthode d'essai pour la résistance de
l'interface des matériaux céramiques*





COPYRIGHT PROTECTED DOCUMENT

© ISO 2011

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Symbols and abbreviated terms	3
5 Principle.....	3
6 Apparatus	5
6.1 Testing machine	5
6.2 Data acquisition	5
6.3 Dimension-measuring device	5
6.4 Testing fixture.....	5
7 Test pieces	7
7.1 Test-piece size	7
7.2 Test-piece preparation	7
8 Test procedure.....	8
8.1 Test mode and rate.....	8
8.2 Preparation of test pieces.....	8
8.3 Measurements of the tensile bond strength.....	8
8.4 Measurements of the shear bond strength.....	9
8.5 Measurement of the cross-bonded area	10
8.6 Post test.....	10
9 Calculation of results	10
9.1 Interfacial tensile bond strength.....	10
9.2 Interfacial shear bond strength.....	11
10 Test report.....	12
Bibliography.....	13

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 13124 was prepared by Technical Committee ISO/TC 206, *Fine ceramics*.

Fine ceramics (advanced ceramics, advanced technical ceramics) — Test method for interfacial bond strength of ceramic materials

1 Scope

This International Standard specifies a test method for determining the interfacial tensile and shear bond strength of ceramic-ceramic, ceramic-metal, and ceramic-glass joining at ambient temperature by compression tests on cross-bonded test pieces. Methods for test-piece preparation, test modes and rates (load rate or displacement rate), data collection and reporting procedures are addressed.

This International Standard applies primarily to ceramic materials, including monolithic fine ceramics and whisker-, fibre- or particulate-reinforced ceramic composites. This test method can be used for materials research, quality control, and characterization and design data generation purposes.

2 Normative references

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

ISO 3611:2010, *Geometrical product specifications (GPS) — Dimensional measuring equipment: Micrometers for external measurements — Design and metrological characteristics*

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

ISO 14704:2008, *Fine ceramics (advanced ceramics, advanced technical ceramics) — Test method for flexural strength of monolithic ceramics at room temperature*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

fine ceramic (advanced ceramic, advanced technical ceramic)

highly engineered, high-performance predominately non-metallic, inorganic, ceramic material having specific functional attributes

3.2
cross-bonded sample
test sample in the form of a symmetrical cross, which is prepared by joining two rectangular bars with the same shape and size

NOTE 1 See Figure 1.

NOTE 2 The two bars joined to form the cross-bonded sample may be the same or different materials.

NOTE 3 The approach used for joining can be any chemical or physical bonding.

NOTE 4 The two bars should be joined perpendicularly and symmetrically within $\pm 1^\circ$ ($\alpha = 90^\circ \pm 1^\circ$).

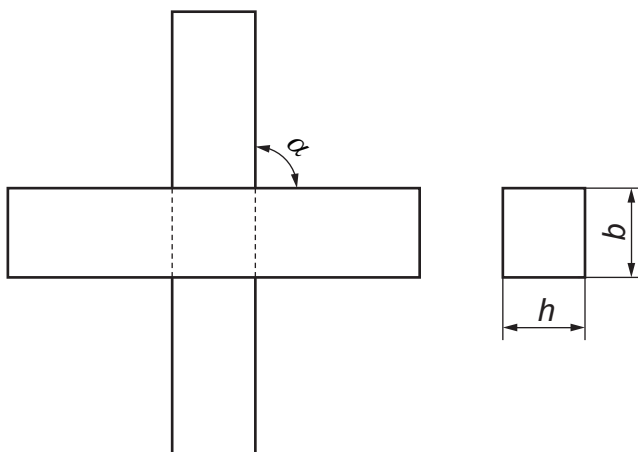


Figure 1 — Schematic diagram of the cross-bonded samples

3.3
tensile failure load
maximum tensile load applied to the interface during a tensile bond strength test

3.4
tensile bond strength
maximum mean tensile stress applied to the interface during a bond strength test

NOTE The tensile bond strength is calculated using the tensile failure load and the bonded area.

3.5
shear failure load
maximum shear load applied to the interface during a shear test of the cross-bonded sample

3.6
shear bond strength
maximum mean shear stress applied to the interface during a shear bond strength test

NOTE The shear bond strength is calculated using the shear failure load and the shear loaded area.