



# SLOVENSKI STANDARD SIST EN ISO 14544:2016

01-junij-2016

Nadomešča:

SIST EN 12290:2005

SIST EN 12291:2004

---

**Fina keramika (sodobna keramika, sodobna tehnična keramika) - Mehanske lastnosti keramičnih kompozitov pri visoki temperaturi - Ugotavljanje lastnosti pri stiskanju (ISO 14544:2013)**

Fine ceramics (advanced ceramics, advanced technical ceramics) - Mechanical properties of ceramic composites at high temperature - Determination of compression properties (ISO 14544:2013)

(standards.iteh.ai)

Hochleistungskeramik - Mechanische Eigenschaften von keramischen Verbundwerkstoffen bei hoher Temperatur - Bestimmung der Eigenschaften unter Druck (ISO 14544:2013)

Céramiques techniques - Propriétés mécaniques des céramiques composites à haute température - Détermination des caractéristiques en compression (ISO 14544:2013)

**Ta slovenski standard je istoveten z: EN ISO 14544:2016**

---

**ICS:**

81.060.30      Sodobna keramika      Advanced ceramics

**SIST EN ISO 14544:2016**      en

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN ISO 14544:2016

<https://standards.iteh.ai/catalog/standards/sist/09f0dfff-cadb-4bba-87e7-288fc23883b7/sist-en-iso-14544-2016>

EUROPEAN STANDARD

EN ISO 14544

NORME EUROPÉENNE

EUROPÄISCHE NORM

April 2016

ICS 81.060.30

Supersedes EN 12290:2005, EN 12291:2003

English Version

Fine ceramics (advanced ceramics, advanced technical ceramics) - Mechanical properties of ceramic composites at high temperature - Determination of compression properties (ISO 14544:2013)

Céramiques techniques - Propriétés mécaniques des céramiques composites à haute température - Détermination des caractéristiques en compression (ISO 14544:2013)

Hochleistungskeramik - Mechanische Eigenschaften von keramischen Verbundwerkstoffen bei hoher Temperatur - Bestimmung der Eigenschaften unter Druck (ISO 14544:2013)

This European Standard was approved by CEN on 18 March 2016.

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 CEN-CENELEC Management Centre 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 CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



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

CEN-CENELEC Management Centre: Avenue Marnix 17, B-1000 Brussels

<b>Contents</b>	<b>Page</b>
<b>European foreword.....</b>	<b>3</b>

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN ISO 14544:2016](https://standards.iteh.ai/catalog/standards/sist/09f0dfff-cadb-4bba-87e7-288fc23883b7/sist-en-iso-14544-2016)  
<https://standards.iteh.ai/catalog/standards/sist/09f0dfff-cadb-4bba-87e7-288fc23883b7/sist-en-iso-14544-2016>

## European foreword

The text of ISO 14544:2013 has been prepared by Technical Committee ISO/TC 206 “Fine ceramics” of the International Organization for Standardization (ISO) and has been taken over as EN ISO 14544:2016 by Technical Committee CEN/TC 184 “Advanced technical ceramics” the secretariat of which is held by DIN.

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 2016, and conflicting national standards shall be withdrawn at the latest by October 2016.

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

This document supersedes EN 12291:2003, EN 12290:2005.

According to the CEN-CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, Former Yugoslav Republic of Macedonia, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

(standards.iteh.ai)

### Endorsement notice

SIST EN ISO 14544:2016

The text of ISO 14544:2013 has been approved by CEN as EN ISO 14544:2016 without any modification.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

SIST EN ISO 14544:2016

<https://standards.iteh.ai/catalog/standards/sist/09f0dfff-cadb-4bba-87e7-288fc23883b7/sist-en-iso-14544-2016>

INTERNATIONAL  
STANDARD

ISO  
14544

First edition  
2013-07-01

---

---

**Fine ceramics (advanced ceramics,  
advanced technical ceramics) —  
Mechanical properties of ceramic  
composites at high temperature —  
Determination of compression  
properties**

iTeh STANDARD PREVIEW

*Céramiques techniques — Propriétés mécaniques des céramiques  
composites à haute température — Détermination des  
caractéristiques en compression*

SIST EN ISO 14544:2016

<https://standards.iteh.ai/catalog/standards/sist/09f0dfff-cadb-4bba-87e7-288fc23883b7/sist-en-iso-14544-2016>



Reference number  
ISO 14544:2013(E)

© ISO 2013

## iTeh STANDARD PREVIEW (standards.iteh.ai)

SIST EN ISO 14544:2016

<https://standards.iteh.ai/catalog/standards/sist/09f0dfff-cadb-4bba-87e7-288fc23883b7/sist-en-iso-14544-2016>



### **COPYRIGHT PROTECTED DOCUMENT**

© ISO 2013

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested 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](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland



# Contents

Page

<b>Foreword</b> .....	<b>iv</b>
<b>1 Scope</b> .....	<b>1</b>
<b>2 Normative references</b> .....	<b>1</b>
<b>3 Terms and definitions</b> .....	<b>1</b>
<b>4 Principle</b> .....	<b>3</b>
<b>5 Apparatus</b> .....	<b>4</b>
5.1 Test machine.....	4
5.2 Load train.....	4
5.3 Gastight test chamber.....	4
5.4 Set-up for heating.....	5
5.5 Extensometer.....	5
5.6 Temperature measurement.....	5
5.7 Data recording system.....	5
5.8 Micrometers.....	6
<b>6 Test specimens</b> .....	<b>6</b>
6.1 General.....	6
6.2 Compression between platens.....	6
6.3 Test specimen used with grips.....	7
<b>7 Test specimen preparation</b> .....	<b>10</b>
7.1 Machining and preparation.....	10
7.2 Number of test specimens.....	10
<b>8 Test procedures</b> .....	<b>11</b>
8.1 Test set-up: temperature considerations.....	11
8.2 Test set-up: other considerations.....	11
8.3 Testing technique.....	12
8.4 Test validity.....	13
<b>9 Calculation of results</b> .....	<b>13</b>
9.1 Test specimen origin.....	13
9.2 Compression strength.....	13
9.3 Strain at maximum compression force.....	14
9.4 Proportionality ratio or pseudo-elastic modulus, elastic modulus.....	14
<b>10 Test report</b> .....	<b>16</b>
<b>Annex A (normative) Buckling: How to proceed when buckling is suspected</b> .....	<b>17</b>
<b>Bibliography</b> .....	<b>18</b>

**ISO 14544:2013(E)****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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. [www.iso.org/directives](http://www.iso.org/directives)

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. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received. [www.iso.org/patents](http://www.iso.org/patents)

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

The committee responsible for this document is ISO/TC 206, *Fine ceramics*.

**iTeh STANDARD PREVIEW**  
**(standards.iteh.ai)**

[SIST EN ISO 14544:2016](https://standards.iteh.ai/catalog/standards/sist/09f0dfff-cadb-4bba-87e7-288fc23883b7/sist-en-iso-14544-2016)

<https://standards.iteh.ai/catalog/standards/sist/09f0dfff-cadb-4bba-87e7-288fc23883b7/sist-en-iso-14544-2016>

# Fine ceramics (advanced ceramics, advanced technical ceramics) — Mechanical properties of ceramic composites at high temperature — Determination of compression properties

## 1 Scope

This International Standard specifies the conditions for determination of compression properties of ceramic matrix composite materials with continuous fibre reinforcement for temperatures up to 2 000 °C.

This International Standard applies to all ceramic matrix composites with a continuous fibre reinforcement, unidirectional (1D), bidirectional (2D), and tridirectional (xD, with  $2 < x \leq 3$ ), loaded along one principal axis of reinforcement.

Two types of compression are distinguished:

- a) compression between platens;
- b) compression using grips.

iTeh STANDARD PREVIEW

## 2 Normative references (standards.iteh.ai)

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

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

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

EN 10002-4, *Metallic materials — Tensile test — Part 4: Verification of extensometers used in uniaxial testing*

CEN/TS 15867:2009, *Advanced technical ceramics — Ceramic composites — Guide to the determination of the degree of misalignment in uniaxial mechanical tests*

IEC 60584-1:1995, *Thermocouples — Part 1: Reference tables*

IEC 60584-2:1982, *Thermocouples — Part 2: Tolerances*

IEC 60584-2:1982, *Amendment 1:1989*

## 3 Terms and definitions

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

### 3.1

#### test temperature

*T*

temperature of the test piece at the centre of the gauge length