

This document is a preview generated by EVS

Dentistry — Ceramic materials

Médecine bucco-dentaire — Matériaux céramiques



This document is a preview generated by EMS



COPYRIGHT PROTECTED DOCUMENT

© ISO 2015, Published in Switzerland

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
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
3.1 Material.....	1
3.2 Processing.....	3
3.3 Properties.....	4
4 Types, classes, and their identification	4
5 Requirements	6
5.1 Uniformity.....	6
5.2 Freedom from extraneous materials.....	6
5.3 Mixing and condensation properties of type I ceramics.....	6
5.4 Physical and chemical properties.....	6
5.5 Biocompatibility.....	6
5.6 Shrinkage factor.....	6
6 Sampling	6
6.1 Type I ceramics.....	6
6.2 Type II ceramics.....	7
7 Test methods	7
7.1 Preparation of test specimens.....	7
7.1.1 Components of test specimens (type I ceramics).....	7
7.1.2 Apparatus for mixing.....	7
7.1.3 Method of mixing.....	7
7.1.4 Procedure for specimen fabrication.....	7
7.1.5 Firing.....	8
7.2 Radioactivity of dental ceramic.....	8
7.2.1 Preparation of samples.....	8
7.2.2 Counting procedure.....	8
7.2.3 Assessment of results.....	8
7.3 Flexural strength.....	8
7.3.1 Three-point and four-point bending tests.....	8
7.3.2 Biaxial flexure test (piston-on-three-ball test).....	12
7.4 Linear thermal expansion coefficient.....	14
7.4.1 Apparatus.....	14
7.4.2 Preparing of test specimens (type I and type II ceramics).....	14
7.4.3 Dilatometric measurement.....	14
7.4.4 Assessment of results.....	14
7.5 Glass transition temperature.....	14
7.5.1 Operating procedure.....	14
7.5.2 Assessment of results.....	15
7.6 Chemical solubility.....	15
7.6.1 Reagent.....	15
7.6.2 Apparatus.....	15
7.6.3 Preparation of test specimens.....	16
7.6.4 Procedure.....	16
7.6.5 Calculation and assessment of results.....	16
8 Information and instructions	16
8.1 Information.....	16
8.1.1 General.....	16
8.1.2 Type I Ceramics.....	16

8.1.3	Type II ceramics	16
8.2	Instructions for use	17
9	Packaging, marking, and labelling	17
9.1	Packaging	17
9.2	Marking and labelling	17
Annex A	(informative) Fracture toughness	19
Annex B	(informative) Weibull statistics	26
Bibliography	28

Preview document is a preview generated by EVS

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 (see 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 (see 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.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: [Foreword - Supplementary information](#)

The committee responsible for this document is ISO/TC 106, *Dentistry*, Subcommittee SC 2, *Prosthetic materials*.

This fourth edition cancels and replaces the third edition (ISO 6872:2008), which has been technically revised with the following changes:

- new edition of ISO 23146:2012 for fracture toughness by SEVNB has been added as an alternative in [Annex A](#). It has a rigorous procedure developed by ISO/TC 206, *Fine ceramics*;
- a restriction on the use of the SEVNB method for fracture toughness determination for 3Y-TZP has been added. In most cases, the notch cannot be made sharp enough with a razor blade;
- maximum chamfer size on bend bars has been reduced for the case of the thin specimens;
- recommendations to grind lengthwise were added to the bend bar preparation step in [7.3.1.2.2](#);
- the Y equations for SEVNB fracture toughness in 3-point have been refined and expanded to cover more configurations;
- modification to [Table 1](#) changing “aesthetic” to “monolithic”.

Introduction

Specific qualitative and quantitative requirements for freedom from biological hazard are not included in this International Standard, but it is recommended that in assessing possible biological or toxicological hazards, reference be made to ISO 10993-1 and ISO 7405.

This document is a preview generated by EVS

Dentistry — Ceramic materials

1 Scope

This International Standard specifies the requirements and the corresponding test methods for dental ceramic materials for fixed all-ceramic and metal-ceramic restorations and prostheses.

2 Normative references

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 3696, *Water for analytical laboratory use — Specification and test methods*

ISO 1942, *Dentistry — Vocabulary*

ISO 13078, *Dentistry — Dental furnace — Test method for temperature measurement with separate thermocouple*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 1942 and the following apply.

3.1 Material

3.1.1

addition ceramic

add-on ceramic

correction ceramic

dental ceramic material which is fired at a reduced temperature and is normally applied to restore contact areas on a dental restoration or prosthesis

3.1.2

aesthetic ceramic

dental porcelain (3.1.5) or *glass ceramic* (3.1.10) having appropriate translucency and colour used to mimic the optical properties of natural teeth

3.1.3

chromatic dentin ceramic

dentine ceramic having a high strength or saturation of the hue (color)

3.1.4

dental ceramic

inorganic, non-metallic material which is specifically formulated for use when processed according to the manufacturers' instructions to form the whole or part of a dental restoration or prosthesis

3.1.5

dental porcelain

predominantly, glassy *dental ceramic* (3.1.4) material used mainly for aesthetics in a dental restoration or prosthesis

3.1.6

dentine ceramic

dental ceramic (3.1.4) material used to form the overall shape and basic colour of a dental restoration or prosthesis simulating the natural tooth dentine