

Dentistry — Ceramic materials (ISO 6872:2008)

ICS 11.060.10

National foreword

This British Standard is the UK implementation of EN ISO 6872:2008. It supersedes BS EN ISO 6872:1999 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee CH/106/2, Prosthodontic materials.

A list of organizations represented on this committee can be obtained on request to its secretary.

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Foreword

This document (EN ISO 6872:2008) has been prepared by Technical Committee ISO/TC 106 "Dentistry" in collaboration with Technical Committee CEN/TC 55 "Dentistry" 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of an identical text or by endorsement, at the latest by March 2009, and conflicting national standards shall be withdrawn at the latest by March 2009.

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 ISO 6872:1998.

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Endorsement notice

The text of ISO 6872:2008 has been approved by CEN as a EN ISO 6872:2008 without any modification.

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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.

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ISO 6872 was prepared by Technical Committee ISO/TC 106, *Dentistry*, Subcommittee SC 2, *Prosthetic materials*.

This third edition cancels and replaces the second edition (ISO 6872:1995) and Amendment 1:1997 which have been technically revised.

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.

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 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 1942, *Dentistry — Vocabulary*

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

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

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

3.1.2

dental ceramic

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

3.1.3

dental porcelain

predominantly glassy dental ceramic material used mainly for aesthetics in a dental restoration or prosthesis

3.1.4

dentine ceramic

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

3.1.5

enamel ceramic

dental ceramic material used to overlay either partially or wholly the dentine ceramic and also to form the more translucent incisal third of a dental restoration or prosthesis, simulating the natural tooth enamel

3.1.6

flame-sprayed dental ceramic

dental ceramic core or substructure layer formed via the technique of flame spraying

3.1.7

glass-ceramic (dental)

dental ceramic material formed by the action of heat treatment on a glass, in order to cause initiation and growth of a wholly or predominantly crystalline microstructure

3.1.8

glass-infiltrated dental ceramic

dental ceramic core or substructure layer, which is porous and is subsequently densified by the infiltration of specialized glass at elevated temperature

3.1.9

glaze ceramic

dental ceramic material that is overlayed and fired at a reduced temperature compared to dentine or enamel ceramic, to produce a thin coherent sealed surface, the level of gloss being determined by the firing conditions

3.1.10

liner

dental ceramic material used on all-ceramic substructure forming a layer that provides a background colour upon which dentine or opaceous dentine ceramic can be applied to achieve overall aesthetics

3.1.11

modelling fluid

liquid with which a dental ceramic powder is mixed, in order to shape or model it into its required form prior to firing

3.1.12

opaceous dentine ceramic

dental ceramic material having a higher opacity than a dentine ceramic material, but which can still be used to contribute to the overall shape and basic colour of a dental restoration or prosthesis, simulating the natural tooth dentine

3.1.13

opaque dental ceramic

dental ceramic material that, when applied to a metallic substructure in accordance with manufacturer's instructions, acts to bond to the metal surface forming a layer that provides a background colour and interface upon which other dental ceramic materials can be applied to achieve overall aesthetics

3.1.14

shoulder ceramic

dental ceramic material used to form shape and colour at the marginal area of the dental restoration or prosthesis, simulating natural tooth dentine in this area

3.1.15

stain ceramic

dental ceramic powder or paste that is normally intensely coloured and that is formulated to be used either internally or externally, during the build up of a dental restoration or prosthesis, to simulate details within or on the surface as are respectively found in natural teeth

3.1.16

substructure (core) dental ceramic

predominantly polycrystalline dental ceramic material that forms a supporting substructure upon which one or more layers of dental ceramic or dental polymer material are applied, either partially or totally, to form a dental restoration or prosthesis

3.2 Processing

3.2.1

air firing dental ceramic

firing of dental ceramics under ambient atmospheric pressure

3.2.2

CAD/CAM dental ceramic

computer aided design/computer aided manufacture (CAD/CAM) procedures to manufacture a dental restoration or prosthesis normally including the following stages:

- 1) a digital scanning procedure of the model or wax-up to produce a 3D data set
- 2) software manipulation of the 3D data set to design the prosthesis
- 3) a computer directed machine tool that performs the manufacturing process

3.2.3

condensation of dental ceramic

powder process whereby a slurry of dental ceramic powder is vibrated to compact the powder prior to sintering

3.2.4

injectable, castable or pressable dental ceramic

dental ceramic material, normally in the form of a pellet or ingot (often pre-sintered), designed for use in a specialized furnace, which enables the pellet or ingot to be injected/cast/pressed into a mould, prepared via the lost wax technique

3.2.5

sintering of a dental ceramic

process whereby heat and potentially other process parameters (e.g. pressure and atmosphere) are applied to a ceramic powder or powder compact, in order to densify the ceramic into its required form

NOTE “Firing” and “sintering” are used interchangeably in this document (“firing” connotating the application of heat to drive sintering).

3.2.6

vacuum firing dental ceramic

firing of dental ceramics at reduced pressure (i.e. under vacuum) to yield the required density and associated aesthetics, especially the degree of translucency

NOTE Dental ceramics for vacuum firing have a specific particle size distribution to reduce the entrapment of porosity.

3.3 Properties

3.3.1

class of dental ceramic

classification of a dental ceramic material according to its intended function

3.3.2

fracture toughness

conventional fracture mechanics parameter indicating the resistance of a material to crack extension (propagation)

3.3.3

glass transition temperature

approximate mid-point of the temperature range over which a glass transforms between elastic and viscoelastic behaviour, characterized by the onset of a rapid change in its coefficient of thermal expansion