

DRAFT INTERNATIONAL STANDARD

ISO/DIS 13078-2

ISO/TC 106/SC 2

Secretariat: ANSI

Voting begins on:
2015-09-03

Voting terminates on:
2015-12-03

Dentistry — Dental furnace —

Part 2:

Test method for evaluation of furnace programme via firing glaze

Médecine bucco-dentaire — Four dentaire

ICS: 11.060.01

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/f3df46c-7ea6-47e9-bab3-63be2cf83a74/iso-13078-2-2016>

ISO/CEN PARALLEL PROCESSING

This draft has been developed within the International Organization for Standardization (ISO), and processed under the **ISO lead** mode of collaboration as defined in the Vienna Agreement.

This draft is hereby submitted to the ISO member bodies and to the CEN member bodies for a parallel five month enquiry.

Should this draft be accepted, a final draft, established on the basis of comments received, will be submitted to a parallel two-month approval vote in ISO and formal vote in CEN.

To expedite distribution, this document is circulated as received from the committee secretariat. ISO Central Secretariat work of editing and text composition will be undertaken at publication stage.

THIS DOCUMENT IS A DRAFT CIRCULATED FOR COMMENT AND APPROVAL. IT IS THEREFORE SUBJECT TO CHANGE AND MAY NOT BE REFERRED TO AS AN INTERNATIONAL STANDARD UNTIL PUBLISHED AS SUCH.

IN ADDITION TO THEIR EVALUATION AS BEING ACCEPTABLE FOR INDUSTRIAL, TECHNOLOGICAL, COMMERCIAL AND USER PURPOSES, DRAFT INTERNATIONAL STANDARDS MAY ON OCCASION HAVE TO BE CONSIDERED IN THE LIGHT OF THEIR POTENTIAL TO BECOME STANDARDS TO WHICH REFERENCE MAY BE MADE IN NATIONAL REGULATIONS.

RECIPIENTS OF THIS DRAFT ARE INVITED TO SUBMIT, WITH THEIR COMMENTS, NOTIFICATION OF ANY RELEVANT PATENT RIGHTS OF WHICH THEY ARE AWARE AND TO PROVIDE SUPPORTING DOCUMENTATION.



Reference number
ISO/DIS 13078-2:2015(E)

© ISO 2015

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/f3df46c-7ea6-47e9-bab3-63be2cf83a74/iso-13078-2-2016>



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	iv
Introduction.....	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Test method	2
4.1 Materials	2
4.2 Devices	3
4.3 Preparation of the test specimens.....	4
4.4 Firing.....	5
4.4.1 Implementation	5
4.4.2 Firing data of the dental ceramic manufacturer.....	6
4.5 Evaluation of the firing results.....	6
4.6 Correction.....	8
5 Test report.....	8

Figures

Figure 1 — Device for preparation of the test specimens	4
Figure 2 — Positioning of the test specimen on the firing tray.....	5
Figure 3 — Comparison of the test specimens.....	7
Figure 4 — Determination and correction of the firing degree	7

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 13078-2 was prepared by Technical Committee ISO/TC 106, *Dentistry*, Subcommittee SC 2, *Prosthetic materials*.

ISO 13078-2 consists of the following parts, under the general title *Dentistry* — *Dental furnace*:

- *Part 1: Dynamic test method for temperature measurement with separate thermocouple*
- *Part 2: Test method for evaluation of furnace programme via firing glaze*

Introduction

Dental furnaces are suitable for the manufacturing of metal-ceramic and partly also all-ceramic restorations for use in dentistry. Dental furnaces are particularly used for firing or sintering, respectively, of dental opaques, dentine and enamel materials to the respective compatible substructure materials. According to the current state of the art, the temperature of this process lies between 600 °C and 1000 °C.

The different calibration processes applied by the manufacturers of dental furnaces as well as the varying construction types of the dental furnaces currently on the market influence the firing result.

Despite the fact that different dental furnaces can have identical digital external displays, different results regarding the degree of firing can be identified when processing the same ceramics under otherwise similar conditions.

A different degree of firing not only causes differences that can be judged directly by the human eye (e. g. colour and transparency), but also deviations that cannot be detected by eye. These are, for instance, the linear coefficient of thermal expansion, the bonding strength, the strength values and the acid solubility. Such changes may result in clinical failures (e. g. fractures) as well as changed aesthetics of the dental ceramic restoration.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/f3df4d77-7ea6-47e9-bab3-63be2cf83a74/iso-13078-2-2016>

iTeh STANDARD PREVIEW
(standards.iteh.ai)

Full standard:
<https://standards.iteh.ai/catalog/standards/sist/f3df46c-7ea6-47e9-bab3-63be2cf83a74/iso-13078-2-2016>

Dentistry — Dental furnace — Part 2: Test method for evaluation of furnace programme via firing glaze

1 Scope

This International Standard determines a degree of firing to be implemented by the user. It represents a test method for adapting the firing program of a dental furnace by determining the degree of firing of fired test specimens for a dental ceramic.

The test method is suitable for powdered dental ceramics according to ISO 6872, Type I.

The test method enables monitoring of the temperature control in the dental furnace by evaluating the firing degree of a dental ceramic. The test method is also suitable for evaluating the reproducibility of the firings in a dental furnace or for comparing several dental furnaces.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition to which reference is made is applicable. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 1942, *Dentistry — Vocabulary*

ISO 6872, *Dentistry — Ceramic materials*

ISO 9693-1, *Dentistry — Compatibility testing — Part 1: Metal-ceramic systems*

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

ISO 2768-1, *General tolerances — Tolerances for linear and angular dimensions without individual tolerance indications*

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, ISO 6872, ISO 9693-1 and ISO 13078 and the following apply.

3.1

degree of firing

surface or joint state of a dental ceramic, which has been treated thermally (i.e. fired, sintered) according to definite firing instructions and which enables statements concerning the physical properties to be evaluated with the eye, such as transparency, colour, surface quality (roughness or smoothness) as well as shrinkage and edge stability of the test specimen

NOTE The degree of firing of dental ceramics is differentiated into under-fired, correctly fired and over-fired.

3.1.1
under-fired dental ceramic

dental ceramic with significant porosities, observable inadequate translucence and still indistinct colour, whose appearance is milky and grey-white opaque and with a surface that is rough and without lustre

NOTE 1 No transparency or inadequate colour impression can, however, also result on smooth surfaces as a result of residual porosities inside the specimen.

NOTE 2 The best evaluation of under-fired dental ceramics is possible in the case of very transparent colour-intensive dental ceramics.

NOTE 3 Although test specimens that are heated too quickly up to the maximum firing temperature exhibit a highly lustrous surface, the inside is milky opaque. These specimens are also under-fired inside.

3.1.2
correctly fired dental ceramic

dental ceramic without porosities, whose surface does not exhibit any opaqueness, and with slightly rounded edges

NOTE Colour and transparency correspond to a standard specimen or the reference sample of the relevant manufacturer.

3.1.3
over-fired dental ceramic

dental ceramic without porosities, whose surface exhibits a high lustre and whose edges are significantly rounded

3.2
reference sample

correctly fired comparison sample of a dental ceramic

4 Test method

4.1 Materials

4.1.1 Dental ceramic material, powdered, transparent and possibly coloured (e.g. blue), from the existing range for visual comparison with a specimen specified as standard or a reference sample;

4.1.2 Liquid, e.g. alcohol, water according to ISO 3696, grade 3, mixing liquid;

4.1.3 Firing tray;

4.1.4 Firing pins about 12 mm long;

4.1.5 Firing underlay, e.g. **firing cotton** about 20 mm × 20 mm × 3 mm or **platinum foil** about 20 mm × 20 mm × 0.03 mm or similar firing underlay;

4.1.6 Only when using the platinum foil in 4.1.5: For the coating of the platinum foil: **Aluminium oxide powder (Al₂O₃ powder)**, e. g. Bikorit¹);

4.1.7 Reference sample.

4.2 Devices

4.2.1 Dental furnace;

4.2.2 Device for preparation of the test specimens, e.g. according to Figure 1, consisting of

- Impact cylinder (1) made from a copper-zinc alloy, Ø 30 mm, 30 mm long;
- Impact stamp (2): Metal stamp made from stainless austenitic steel (e.g. V2A steel), length 70 mm, Ø 18 mm with a working end Ø 16 mm;
- Plastic mould (3): e.g. made from Miramit, Ertacetal or Polyacetal¹⁾, Ø 50 mm, 20 mm thick, with cylindrical continuous bore (Ø 16 mm);
- Removal stamp: Metal stamp made from stainless austenitic steel (e.g. V2A steel), length 70 mm, Ø 15.9 mm;
- Metal base 150 mm × 75 mm × 20 mm (e.g. mixing plate for cements).

NOTE Other suitable devices for preparation of the test specimens can also be used.

iTeh STANDARD PREVIEW
(standards.iteh.ai)
Full standard:
<https://standards.iteh.ai/catalog/standards/sist/f3df46c-7ea6-47e9-bab3-63be2cf83a74/iso-13078-2-2016>

1) Bikorit, Miramit, Ertacetal and Polyacetal are examples of a suitable standard product. This data serves only to inform the user about this International Standard and does not signify any recognition of these products by ISO.