



SLOVENSKI STANDARD
oSIST prEN ISO 13078-3:2022
01-junij-2022

Zobozdravstvo - Dentalne peči - 3. del: Preskusna metoda za vrednotenje meritev v visokotemperaturni peči za sintranje z ločenim termočlenom (ISO/DIS 13078-3:2022)

Dentistry - Dental furnace - Part 3: Test method for evaluation of high temperature sintering furnace measurement with separate thermocouple (ISO/DIS 13078-3:2022)

Zahnheilkunde – Sinterofen – Teil 3: Prüfverfahren für die Bewertung der Hochtemperatur-Sinterofen-Messung mit separatem Thermoelement (ISO/DIS 13078-3:2022)

iTeh STANDARD
PREVIEW
(standards.iteh.ai)

Médecine bucco-dentaire - Fours dentaires - Partie 3: Méthode d'essai pour l'évaluation du mesurage des hautes températures de frittage au moyen d'un thermocouple externe (ISO/DIS 13078-3:2022): <https://standards.iteh.ai/catalog/standards/sist/53e64b24-f138-454a-9058-d2349c3a6214/osist-pren-iso-13078-3-2022>

Ta slovenski standard je istoveten z: ²⁰²² prEN ISO 13078-3

ICS:

11.060.20 Zobotehnična oprema Dental equipment

oSIST prEN ISO 13078-3:2022 **en,fr,de**

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

oSIST prEN ISO 13078-3:2022

<https://standards.iteh.ai/catalog/standards/sist/53e64b24-f138-454a-9058-d2349c3a6214/osist-pren-iso-13078-3-2022>

DRAFT INTERNATIONAL STANDARD

ISO/DIS 13078-3

ISO/TC 106/SC 2

Secretariat: ANSI

Voting begins on:
2022-04-18

Voting terminates on:
2022-07-11

Dentistry — Dental furnace —

Part 3:

Test method for evaluation of high temperature sintering furnace measurement with separate thermocouple

ICS: 11.060.01

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

[oSIST prEN ISO 13078-3:2022](https://standards.iteh.ai/catalog/standards/sist/53e64b24-f138-454a-9058-d2349c3a6214/osist-pren-iso-13078-3-2022)

<https://standards.iteh.ai/catalog/standards/sist/53e64b24-f138-454a-9058-d2349c3a6214/osist-pren-iso-13078-3-2022>

This document is circulated as received from the committee secretariat.

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.

ISO/CEN PARALLEL PROCESSING



Reference number
ISO/DIS 13078-3:2022(E)

© ISO 2022

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

[oSIST prEN ISO 13078-3:2022](https://standards.iteh.ai/catalog/standards/sist/53e64b24-f138-454a-9058-d2349c3a6214/osist-pren-iso-13078-3-2022)

<https://standards.iteh.ai/catalog/standards/sist/53e64b24-f138-454a-9058-d2349c3a6214/osist-pren-iso-13078-3-2022>



COPYRIGHT PROTECTED DOCUMENT

© ISO 2022

All rights reserved. Unless otherwise specified, or required in the context of its implementation, 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
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

Contents

	Page
Foreword.....	iv
Introduction.....	v
1 Scope.....	1
2 Normative references.....	1
3 Terms and definitions.....	1
4 Measurement and test method.....	2
4.1 General.....	2
4.2 Test devices and test equipment.....	2
4.2.1 Thermocouple fixture.....	2
4.2.2 Thermocouple.....	3
4.2.3 Compensating cable.....	3
4.2.4 Temperature display.....	4
4.2.5 High temperature sintering furnace.....	4
4.3 Implementation.....	4
4.3.1 Layout of the thermocouple.....	4
4.3.2 Heating phase.....	4
4.3.3 Test temperature 1.....	4
4.3.4 Holding time 1.....	4
4.3.5 Performing the first measurement.....	4
4.3.6 Test temperature 2.....	4
4.3.7 Holding time 2.....	4
4.3.8 Performing the second measurement.....	4
4.3.9 Interpretation.....	5
4.3.10 Adjustment.....	5
5 Test report.....	5
Bibliography.....	6

<https://standards.iteh.ai/catalog/standards/sist/53e64b24-f138-454a-9058-d2349c3a6214/osist-pren-iso-13078-3-2022>

<https://standards.iteh.ai/catalog/standards/sist/53e64b24-f138-454a-9058-d2349c3a6214/osist-pren-iso-13078-3-2022>

ISO/DIS 13078-3:2022(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 (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 of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

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

A list of all parts in the ISO 13078 series can be found on the ISO website.
<https://standards.iteh.ai/catalog/standards/sist/53e64b24-6138-451e-9958-13340116614/iso-13078-3>

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

Introduction

In dentistry, sintering furnaces are used for sintering restorations made from oxide ceramics and from sintered metal. Significantly higher temperatures than those for firing dental ceramic masses containing silicates are necessary, e.g. zirconium oxide (ZrO_2) is typically sintered at a temperature of up to 1 700 °C.

The sintering temperature is of vital importance for the properties of the sintered material. Incorrect sintering temperatures can result in low strength, discrepant colouration or low ageing resistance. Furthermore, a poor accuracy of fit owing to excessively low or uneven shrinkage may occur. Too high a sintering temperature generally results in a larger grain size and can lead to a softening and consequently a deformation of the restoration. Too low a sintering temperature results in an inadequate sintering quality and possibly residual porosity.

iTeh STANDARD PREVIEW (standards.iteh.ai)

[oSIST prEN ISO 13078-3:2022](https://standards.iteh.ai/catalog/standards/sist/53e64b24-f138-454a-9058-d2349c3a6214/osist-pren-iso-13078-3-2022)

<https://standards.iteh.ai/catalog/standards/sist/53e64b24-f138-454a-9058-d2349c3a6214/osist-pren-iso-13078-3-2022>

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

[oSIST prEN ISO 13078-3:2022](https://standards.iteh.ai/catalog/standards/sist/53e64b24-f138-454a-9058-d2349c3a6214/osist-pren-iso-13078-3-2022)

<https://standards.iteh.ai/catalog/standards/sist/53e64b24-f138-454a-9058-d2349c3a6214/osist-pren-iso-13078-3-2022>

Dentistry — Dental furnace —

Part 3:

Test method for evaluation of high temperature sintering furnace measurement with separate thermocouple

1 Scope

This document specifies a test method for the calibration of resistance-heated high temperature sintering furnaces that are suitable for the sintering of dental restorations in the temperature range up to 1 700 °C.

NOTE A test method for the calibration of dental furnaces that are suitable for the heat treatment of silica-based dental ceramic restorations in the temperature range between 600 °C and 1 050 °C is specified in ISO 13078:2013.

ISO 13078:2013 does not include the calibration of sintering furnace used for sintering of oxide ceramics (3.4) or sintered metal (3.6), in whose firing chamber restorations are sintered at temperatures of 1 000 °C to 1 700 °C.

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.

IEC 60584-1:2013, *Thermocouples - Part 1: EMF specifications and tolerances*,
<https://standards.iteh.ai/catalog/standards/sist/53e64b24-1138-454a-9058-d2349c5a2149/osist-pr-en-iso-13078-3-2022>

IEC 60584-3, *Thermocouples-Part 3: Extension and compensating cables-Tolerances and identification system*

ISO 1942, *Dentistry — Vocabulary*

ISO 6872, *Dentistry — Ceramic materials*

3 Terms and definitions

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

For the purposes of this document, the terms and definitions given in ISO 1942, ISO 6872 and IEC 60584-1:2013 and the following apply.

3.1

heating rate

rate of temperature increase

Note 1 to entry: The heating rate shall be indicated in degrees Celsius per minute (°C/min).

ISO/DIS 13078-3:2022(E)

3.2

holding time

time span, in which the desired temperature of the sintering furnace is to be retained up to the time specified by the manufacturer, beginning from the time point at which the display on the sintering furnace indicates that the sintering furnace has reached the desired temperature

3.3

high temperature sintering furnace

sintering furnace, in whose firing chamber restorations are sintered at temperatures of 1 000 °C to 1 700 °C

3.4

oxide ceramics

ceramics produced from a crystalline feedstock powder at high temperatures via a sintering process

Note 1 to entry: All ceramics which do not contain SiO₂ and which are exclusively oxidic are referred to as oxide ceramics.

Note 2 to entry: In contrast to this, ceramics containing SiO₂ are referred to as silicate ceramics. If ceramics contain not only oxygen as an electronegative component but also, for example, carbon or nitrogen, they shall be referred to as non-oxide ceramics. Only the oxide ceramics zirconium oxide and aluminium oxide as well as composites of these are common in dental technology at present.

3.5

sintering

permanent consolidation of a moulding body from a compacted powder aggregate material by means of a firing process, in which a decrease in the porosity, an increase in the density and a (sinter) shrinkage occur

Note 1 to entry: The temperature here shall be sufficiently high to cause a solidification, but shall not be so high that a deformation of the moulding body occurs.

3.6

sintered metal

blanks produced from metal powder for milling via CAD/CAM technology for restorations made from base metal alloys, which are sintered in inert gas (argon) at temperatures of 1 200 °C to 1 400 °C

4 Measurement and test method

4.1 General

This document describes the calibration of resistance-heated high temperature sintering furnaces by means of a separate thermocouple. The furnaces shall be calibrated ex works in the same way for all manufacturers at a temperature of 1 500 °C. In addition, the deviation in the actual temperature at 1 000 °C shall be determined and a maximum permissible deviation specified.

4.2 Test devices and test equipment

4.2.1 Thermocouple fixture

The thermocouple fixture shall be made from a lightweight material resistant to high temperatures that is white in colour. The thermocouple shall be set up corresponding to [Figure 1](#).

- 1) Material: polycrystalline ceramic fibres, e.g. Al₂O₃: 75 % to 85 %; SiO₂: 15 % to 25 %; about 400 kg/m³;
- 2) Height X = (20 ± 2) mm (depending on the furnace chamber);
- 3) Diameter: (40 ± 2) mm (depending on the furnace chamber).