



American National Standard/
American Dental Association
Standard No. 164

Dental Furnace, Part 2: Test Method for Evaluation of Furnace Program via Firing Glaze

Identical adoption of ISO 13078-2:2016 *Dentistry — Dental furnace - Part 2:
Test method for evaluation of furnace programme via firing glaze*

ADA American
Dental
Association®

Standards Committee on Dental Products

2018

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**AMERICAN NATIONAL STANDARD/AMERICAN DENTAL ASSOCIATION
STANDARD NO. 164 FOR DENTAL FURNACE, PART 2: TEST METHOD FOR
EVALUATION OF FURNACE PROGRAM VIA FIRING GLAZE**

The ADA Standards Committee on Dental Products (SCDP) has approved ANSI/ADA Standard No. 164 for ANSI/ADA Standard No. 164 for Dental Furnace, Part 2: Test Method for Evaluation of Furnace Program via Firing Glaze. This and other standards for dental materials, instruments and equipment are being formulated by working groups of the ADA SCDP. The Committee has representation from all interests in the United States in the standardization of materials, instruments and equipment in dentistry. The Committee has adopted the standards, showing professional recognition of their usefulness in dentistry, and has forwarded them to the American National Standards Institute with a recommendation that the standards be approved as American National Standards. The American National Standards Institute granted approval of ADA Standard No. 164 as an American National Standard on May 18, 2018.

The ADA Standards Committee on Dental Products thanks the members of Working Group 2.20 on Porcelain and Metal-Ceramic Systems, and the organizations with which they were affiliated at the time the standard was developed:

Russell Giordano (chairman), Boston University, MA;

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AMERICAN NATIONAL STANDARD/AMERICAN DENTAL ASSOCIATION STANDARD NO. 164 FOR DENTAL FURNACE, PART 2: TEST METHOD FOR EVALUATION OF FURNACE PROGRAM VIA FIRING GLAZE

FOREWORD

(This Foreword does not form a part of ANSI/ADA Standard No. 164 for Dental Furnace, Part 2: Test Method for Evaluation of Furnace Program via Firing Glaze).

This standard is an identical adoption of ISO 13078-2:2016, Dentistry – Dental Furnace - Part 2: Test method for evaluation of furnace programme via firing glaze. ADA SCDP Working Group No. 2.20 on Porcelain and Metal-Ceramic Systems examined the international standard and found it acceptable for identical adoption as ANSI/ADA Standard No. 164.

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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 1 000 °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., color and transparency), but also deviations that cannot be detected by the 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.

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GLAZE

1 Scope

This document 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 documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 2768-1, *General tolerances — Part 1: Tolerances for linear and angular dimensions without individual tolerance indications*

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

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

(ISO standards are available from the American National Standards Institute, <http://www.ansi.org>)

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.

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

— ISO Online browsing platform: available at <http://www.iso.org/obp>

— IEC Electropedia: available at <http://www.electropedia.org/>

3.1 degree of firing

surface or edge 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, color, surface quality (roughness or smoothness), as well as shrinkage and edge stability of the test specimen

Note 1 to entry: The degree of firing of dental ceramics is differentiated into under-fired, correctly fired and over-fired.

3.2 under-fired dental ceramic

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

Note 1 to entry: No transparency or inadequate color impression can, however, also result in smooth surfaces as a result of residual porosities inside the specimen.