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Dentistry — Test methods for tensile bond strength to tooth structure

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National foreword

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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.

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).

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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 1, *Filling and restorative materials*.

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.

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Introduction

Adhesion in restorative dentistry is an important topic. It is the intention of this document to describe various laboratory procedures of tensile bond strength tests whereby the effect or quality of a bond between a dental material and tooth structure can be substantiated.

Adhesive materials are used in many types of restorative and preventive treatments. Even if the stress on the bond in most circumstances can be defined as either tensile, shear or a combination of these, there are no specific laboratory tests which can be valid for all the various clinical applications of adhesive materials.

The relative performance of materials that are claimed to bond to tooth structure is usually evaluated by laboratory assessment of bond strengths. While bond strengths are unable to predict clinical behaviour or performance, they are useful for comparing adhesive materials.

ISO 29022[1] prescribes the notched-edge shear bond strength test.

Annex A lists several published laboratory methods for tensile bond strength measurement.

Tensile bond strength testing is also common in general materials science, and a publication listing many test methods is provided for information in Reference [2].

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Dentistry — Test methods for tensile bond strength to tooth structure

1 Scope

This document gives guidance on substrate selection, storage and handling as well as essential characteristics of tensile bond strength test methods for quality testing of the adhesive bond between restorative dental materials and tooth structure, i.e. enamel and dentine. Some specific test methods for tensile bond strength measurements are given in Annex A.

This document does not include requirements for components of adhesive materials and their performance.

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 1942, *Dentistry — Vocabulary*

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

ISO 6344-3, *Coated abrasives — Determination and designation of grain size distribution — Part 3: Microgrit sizes P240 to P5000*

3 Terms and definitions

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

ISO and IEC maintain terminology 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/

3.1
adhere
to be in a state of *adhesion* (3.3)

3.2
adherend
body that is held or intended to be held to another body by an *adhesive* (3.4)

3.3
adhesion
state in which two surfaces are held together by chemical and/or physical forces with the aid of an *adhesive* (3.4)

3.4
adhesive
substance capable of holding materials together

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