

This is a preview of "ISO/TS 17988:2020". [Click here to purchase the full version from the ANSI store.](#)

Second edition
2020-03

Dentistry — Corrosion test methods for dental amalgam

*Médecine bucco-dentaire — Essais de corrosion des amalgames
dentaires*



Reference number
ISO/TS 17988:2020(E)

© ISO 2020



COPYRIGHT PROTECTED DOCUMENT

© ISO 2020

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
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

This is a preview of "ISO/TS 17988:2020". Click here to purchase the full version from the ANSI store.

Contents

	Page
Foreword	v
Introduction	vii
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Sampling	3
5 Preparation of dental amalgam test-pieces	4
5.1 General.....	4
5.1.1 Temperature.....	4
5.1.2 Mixing.....	4
5.2 Cylindrical test-pieces for use in the immersion and potentiostatic corrosion test procedures.....	4
5.2.1 Mass of dental amalgam to be mixed.....	4
5.2.2 Apparatus for the preparation of dental amalgam cylindrical test-pieces.....	4
5.2.3 Packing.....	8
5.3 Disc-shaped test-pieces for use in the Hertzian-loading strength-reduction test.....	9
5.3.1 Apparatus for the preparation of dental amalgam disc-shaped test-pieces.....	9
5.3.2 Materials and tolerances for construction of the mould.....	9
5.3.3 Packing the mould, removal of test-piece and inspection for surface defects.....	10
6 Determination of the resistance to corrosion by the immersion procedure	10
6.1 Principle.....	10
6.2 Reagents for the test solution and cleaning the apparatus.....	10
6.3 Apparatus.....	13
6.4 Mercury vapour analyser requirements.....	14
6.5 Cleaning the glassware.....	15
6.6 Assembly of the immersion corrosion test apparatus.....	15
6.7 Test-piece production.....	15
6.8 Preparation of the 0,1 mol/l lactic acid solution.....	16
6.9 Finishing the dental amalgam test-piece.....	16
6.10 Test procedure.....	16
6.10.1 First determination.....	16
6.10.2 Second determination.....	17
6.11 Analysis to determine the metal ion and mercury vapour release.....	18
6.12 Test report.....	18
7 Determination of the corrosion by the potentiostatic procedure	19
7.1 Principle.....	19
7.2 Test-piece preparation.....	19
7.3 Corrosion test cell requirements.....	20
7.3.1 Corrosion cell.....	20
7.3.2 Temperature control.....	20
7.3.3 Volume of the electrolyte.....	20
7.4 Reference electrode probe requirements.....	20
7.4.1 Reference electrode and its control.....	20
7.4.2 Temperature of the reference electrode.....	20
7.4.3 Positioning of the reference electrode.....	20
7.5 Potentiostat requirements.....	21
7.6 Reagents.....	21
7.7 Preparation of the electrolyte.....	21
7.8 Test procedure.....	21
7.9 Data acquisition and processing.....	21
7.9.1 General.....	21
7.9.2 Computer-controlled potentiostat.....	22

This is a preview of "ISO/TS 17988:2020". [Click here to purchase the full version from the ANSI store.](#)

7.9.3	Coulometer	22
7.9.4	Data-logging and integration	22
7.10	Calculation of the total charge transported	22
7.10.1	Test-pieces embedded by casting without masking	22
7.10.2	Test-pieces embedded by casting with masking	22
7.11	Test report	22
8	Determination of the resistance to corrosion by the Hertzian-loading strength-reduction test	23
8.1	Principle	23
8.2	Test solution (artificial saliva)	23
8.2.1	Reagents	23
8.2.2	Stock solutions	24
8.2.3	Test solution (artificial saliva)	24
8.3	Test-piece production and procedure for test-piece conditioning	24
8.3.1	Apparatus	24
8.3.2	Control test-pieces	25
8.3.3	Corrosion test-pieces	25
8.3.4	Replacement test-pieces	26
8.4	Mechanical testing	26
8.4.1	Apparatus for mechanical testing	26
8.4.2	Procedure	26
8.5	Treatment of data	28
8.6	Test report	28
	Bibliography	30

This is a preview of "ISO/TS 17988:2020". [Click here to purchase the full version from the ANSI store.](#)

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 1, *Filling and restorative materials*.

This second edition cancels and replaces the first edition (ISO/TS 17988:2014), which has been technically revised. The main changes to the previous edition are as follows:

- The scope has been extended to include products that are within the scope of ISO 20749.
- [Clause 3](#) includes additional terms and definitions.
- [Clause 4](#): quantities required for the production of test-pieces for each of the three test procedures are given now as the mass of dental amalgam alloy per test-piece, in place of the total mass of dental amalgam alloy for the complete test (i.e. the estimated quantity for all test-pieces including permitted replacements).
- [5.2.2.2](#) and [5.3.2](#): the parameter R_a has replaced R_k to specify surface roughness on steel moulds.
- [5.3.2](#): the surface roughness of the tapered hole in the Hertzian-indentation strength-reduction test-piece mould has been revised.
- [8.3.1.1](#) and [8.3.1.2](#): two additional items have been added to the list of apparatus.
- [8.3.1.4](#): blood dilution vials without protuberances on the interior base surface might not be available. A means by which the required flat surface can be created has been added.
- [8.3.4](#) and [8.4.2.2](#): a technical addition has been made to the procedure. Instructions are given for replacing test-pieces from which invalid results had been produced. Also, advice is given to make the maximum number of permitted replacements at the time that the actual test-pieces are made (to avoid a possible 31-day delay should a result be invalid and a replacement test-piece be required).
- [8.4.2.2](#): instructions are given to inspect the substrate disc and to replace it if damage is observed.

This is a preview of "ISO/TS 17988:2020". [Click here to purchase the full version from the ANSI store.](#)

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.

This is a preview of "ISO/TS 17988:2020". [Click here to purchase the full version from the ANSI store.](#)

Introduction

This document gives the practical details of three test methods for the measurement of the resistance to corrosion of dental amalgam. These corrosion test methods are laboratory procedures for evaluating the relative performances of dental amalgam alloy products. They are designed to produce a measurable effect (and differences between products) within a relatively short time period, a time period appropriate for a comparative laboratory evaluation.

The results of these tests should not be used for any biocompatibility claims, for which their use is inappropriate.

Should other corrosion test procedures emerge in time as suitable for application in comparative evaluations of dental amalgam products, they will be included in future editions of this document.