



Revised American National Standard/
American Dental Association
Standard No. 96

Dental Water-based Cements

Modified adoption of ISO 9917-1:2007, Dentistry — *Water-based cements - Part 1: Powder/liquid acid-base cements* and ISO 9917-2:2010, Dentistry – *Water-based cements - Part 2: Resin-modified cements*.

ADA American
Dental
Association®
Council on
Scientific Affairs

2012

This is a preview. [Click here to purchase the full publication.](#)

These materials are subject to copyright claims of ISO, ANSI, and ADA. No part of this publication may be reproduced in any form, including electronic retrieval system, without the prior permission of ADA. All requests pertaining to ANSI/ADA Standard No. 96 should be submitted to ADA.

[This is a preview. Click here to purchase the full publication.](#)

REVISED AMERICAN NATIONAL STANDARD/AMERICAN DENTAL ASSOCIATION STANDARD NO. 96 FOR DENTAL WATER-BASED CEMENTS

The Council on Scientific Affairs of the American Dental Association has approved revised American Dental Association Standard No. 96 for Dental Water-Based Cements. This and other standards for dental materials, instruments and equipment are being formulated by working groups of the ADA Standards Committee on Dental Products (formerly Accredited Standards Committee MD156 for Dental Materials, Instruments and Equipment). The Committee has representation from all interests in the United States in the standardization of materials, instruments and equipment in dentistry. The Council 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 revised ADA Standard No. 96 as an American National Standard on November 26, 2012.

The ADA Standards Committee on Dental Products thanks the members of Working Group 1.4 and the organizations with which they were affiliated at the time the standard was developed:

John Powers (chairman), Dental Consultants, Inc., Ann Arbor, MI;
Scott Erickson, 3M ESPE, St. Paul, MN; and
Sheng Lin-Gibson, NIST, Gaithersburg, MD.

REVISED AMERICAN NATIONAL STANDARD/AMERICAN DENTAL ASSOCIATION STANDARD NO. 96 FOR DENTAL WATER-BASED CEMENTS

FOREWORD

(This Foreword does not form a part of revised ANSI/ADA Standard No. 96 for Dental Water-based Cements).

This revised standard is an adoption of ISO 9917-1:2007, Dentistry — Water-based cements - Part 1: Powder/liquid acid-base cements and ISO 9917-2:2010, Dentistry – Water-based cements - Part 2: Resin-modified cements. ADA SCDP Working Group No. 1.4 on Dental Water-based Cements examined the international standards and found them acceptable as a modified adoption for revised ANSI/ADA Standard No. 96. This standard cancels and replaces ANSI/ADA Standard No. 96 – 2005, which was a modified adoption of ISO 9917:1991, Dental water-based cements.

The modifications made to ISO 9917-1:2007 and ISO 9917-2:2010 consist of combining them to form revised ANSI/ADA Standard No. 96 and the revision of certain terms and definitions to bring them into conformance with ISO 1942:2009, *Dentistry-Vocabulary* and ISO 8601, *Data elements and interchange formats-information interchange-representation of dates and times*. Revised were:

- the definition of "working time";
- the replacement of term "immediate wrapping" with "primary packaging";
- the replacement of the term "outermost packaging" and "outer container" with "secondary container" in Part 1 and "outer pack" with "secondary container" in Part 2; and
- the replacement of the term "expiry date" with "use by date."

The statement "The net mass in each container/capsule" in the Manufacturer's Instruction Leaflet was changed from mandatory to optional. This information is already required on the Secondary Container of capsules, which was deemed sufficient.

This standard is presented in two parts: 1). Powder/liquid acid-base cements; and 2). Resin-modified cements.

Specific qualitative and quantitative requirements for freedom from biological hazard are not included in this standard. In assessing possible biological or toxicological hazards, reference should be made to ANSI/ADA Standard No. 41, ISO 7405 and ISO 10993-1.

REVISED AMERICAN NATIONAL STANDARD/AMERICAN DENTAL ASSOCIATION STANDARD NO. 96 FOR
DENTAL WATER-BASED CEMENTS

1	Scope	4
2	Normative references	4
3	Terms and definitions.....	4
4	Classification	5
5	Material	5
6	Preparation of test specimens	5
7	Sampling	6
8	Requirements.....	6
9	Packaging, marking and information to be supplied by manufacturer	7
	Annex A (normative) Determination of net setting time.....	10
	Annex B (informative) Chemical composition and applications of dental cements	12
	Annex C (normative) Determination of film thickness (luting cements only)	13
	Annex D (normative) Determination of compressive strength.....	15
	Annex E (normative) Determination of acid erosion	18
	Annex F (normative) Determination of optical properties (polyalkenoate restorative cements only).....	21
	Annex G (normative) Determination of acid-soluble arsenic and lead contents	24
	Annex H (normative) Determination of radio-opacity	25
	Bibliography.....	27
10	Scope	28
11	Normative references	28
12	Terms and definitions.....	28
13	Classification and applications.....	29
14	Requirements.....	29
15	Sampling	30
16	Test conditions and preparation of test specimens	30
17	Packaging, marking and information to be supplied by the manufacturer.....	31
	Annex I (normative) Determination of working time and setting time.....	34
	Annex J (normative) Determination of film thickness — Luting materials only.....	36
	Annex K (normative) Determination of flexural strength	37
	Annex L (normative) Determination of radio-opacity	41
	Annex M (normative) Determination of shade and color stability — Restorative and luting materials only	44
	Bibliography	45

REVISED AMERICAN NATIONAL STANDARD/AMERICAN DENTAL ASSOCIATION STANDARD NO. 96 FOR DENTAL WATER-BASED CEMENTS

PART 1: POWDER/LIQUID ACID-BASE CEMENTS

1 Scope

Part 1 of ADA Standard No. 96 specifies requirements and test methods for powder/liquid acid-base dental cements intended for permanent cementation, lining and restoration. Part 1 is applicable to both hand-mixed and capsulated cements for mechanical mixing. Part 1 specifies limits for each of the properties according to whether the cement is intended for use as a luting agent, a base or liner or as a restorative material. Part 1 of this standard is not intended to address resin-modified water-based cements, which are addressed in Part 2.

2 Normative references

The following referenced documents are indispensable for the application 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 2590, *General method for the determination of arsenic — Silver diethyldithiocarbamate photometric method*

ISO 3665:1996, *Photography — Intra-oral dental radiographic film — Standard*

ISO 3696:1987, *Water for analytical laboratory use — Standard and test methods*

ISO 7491, *Dental materials — Determination of color stability*

(ISO standards for dentistry are available from the American Dental Association, Department of Standards, 211 E. Chicago Ave., Chicago, IL 60611 or <http://catalog.ada.org>. ISO standards are available from the American National Standards Institute, 25 W. 43rd St., New York, NY 10036 or www.ansi.org).

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

mixing time

that part of the working time required in order to obtain a satisfactory mix of the components

3.2

working time

period of time, measured from the commencement of mixing components or otherwise activating the chemistry of the material and ending before the material has developed properties that will prevent it from being manipulated as required to achieve its purpose in a subsequent procedure or in its intended function
[derived from ISO 1942:2009, Dentistry-Vocabulary]

3.3

net setting time

period of time, measured from the end of mixing, until the material has set according to the criteria and conditions specified in Annex A

NOTE For the purposes of this part of ADA Standard No. 96, in view of the wide variation in mixing times of cements, the net setting time is determined from the end of mixing.