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American National Standard/
American Dental Association
Specification No. 14

Dental Base Metal Casting Alloys

American Dental Association
Council on Scientific Affairs 1982

AMERICAN NATIONAL STANDARD/AMERICAN DENTAL ASSOCIATION SPECIFICATION NO. 14 FOR DENTAL BASE METAL CASTING ALLOYS

American Dental Association Specification No. 14 for Dental Base Metal Casting Alloys has been approved by the Council on Dental Materials, Instruments and Equipment of the American Dental Association. This and other specifications for dental materials, instruments and equipment are being formulated by subcommittees of the American National Standards Committee MD156 for Dental Materials, Instruments and Equipment. The Council Acts as the administrative sponsor of that committee, which has representation from all interests in the United States in the Standardization of materials, instruments and equipment in dentistry. The Council has adopted the specifications, showing professional recognition of their usefulness in dentistry, and has forwarded them to the American National Standards Institute with a recommendation that the Specification No. 14 as an American National Standard was granted by the American National Standards Institute on April 15, 1982.

The Council acknowledges, with thanks, the work of the Subcommittee members who formulated the specification: Edqard Kaufman (chairman), New York University, New York; Karl Leinfelder, University of North Carolina, Chapel Hill; Kamal Asgar, University of Michigan, Ann Arbor; Ronald Dudek, Howmedica, Inc., Chicago; Clyde Ingersoll, Williams Gold Refining Company, Buffalo, New York; Joseph Moffa, U.S. Public Health Center, San Francisco, CA; Nikhil Sarkar, Louisiana State University, New Orleans; John Tesk, National Bureau of Standards, Washington, D.C.; Joseph Tuccillo, J.F. Jelenko & Co., Inc., Armonk, New York; and Frank Young, Medical College of South Carolina, Charleston.

AMERICAN NATIONAL STANDARD/AMERICAN DENTAL ASSOCIATION SPECIFICATION NO. 14 FOR DENTAL BASE METAL CASTING ALLOYS

Foreword

(This foreword does not form a part of ANSI/ADA Specification No. 14 for Dental Base Metal Casting Alloys)

Changes in the revised ANSI/ADA Specification No. 14 for Dental Base Metal Casting Alloys and rationale for these changes are as follows:

1.2

(old) Types have been deleted from the specification. The subcommittee sees no difference in the clinical application of the alloys with a difference in casting temperature.

2.1

Two ANSI/ASTM specifications were added. The subcommittee wished to use established test methods wherever possible.

3.1

(old) The color requirement was deleted. Color is determined by composition. If a customer specified a particular alloy, he must accept the color as is.

3.1

(new) Composition was modified to include alloys other than cobalt chromium which have the potential of fulfilling the requirements of the specification.

3.2

(new) Biological compatibility: ANSC MD156 requires a section on Biological compatibility. Further, it has been deemed appropriate to indicate the limits and presence of hazardous elements.

4.1

The last line of this section was deleted because of the new specimen.

4.4.2

The requirement was changed from 3 of 6 to 4 of 6. With an improved test specimen, more reproducible results should be obtained.

4.4.3

(new) yield strength has been added. This property is clinically significant because it is a

measure of the useful strength of the alloy.

4.4.4

(old) Tensile strength has been deleted: this property has no clinical significance. Permanent deformation without rupture constitutes failure.

4.4.5

(old) Hardness has been deleted from the specification in that it has no significance in this group of alloys. It is the opinion of the subcommittee that mechanical properties would best be described by yield strength and elongation.

4.4.7

(old) Casting temperature has been substituted for fusion temperature in section 3.4.1. Fusion temperature, while reproducible, has no physical significance.

5.2.3

(new) Composition: this paragraph was added to give information to the dentist or laboratory technician with respect to specific composition, as well as to identify any hazardous elements present.

5.3.2

(old) The date of manufacture has been deleted in that partial denture alloys are eminently stable.

5.3.4

(old) This section has been deleted in view of the deletion of types.

Figure 1

The tensile specimen has been revised to conform with a specimen found to be most acceptable to a task group charged with the testing of various proposed designs for specification no. 5, 15 and the porcelain alloy specification.

AMERICAN NATIONAL STANDARD/AMERICAN DENTAL ASSOCIATION SPECIFICATION NO. 14 FOR DENTAL BASE METAL CASTING ALLOYS

1. SCOPE AND CLASSIFICATION

1.1 Scope.

This specification covers dental base metal casting alloys used in the fabrication of removable dental prostheses.

2. APPLICABLE SPECIFICATIONS

2.1 Specification ANSI/ASTM E8-82.

Standard Methods of Tension Testing of Metallic Materials is applicable to 4.4.3.

2.2 Specification ANSI/ASTM E111-82.

Standard Test Method for Young's Modulus at Room Temperature is applicable to 4.4.4.

2.3. ANSI/ADA Document No. 41 for Recommendation Standard Practices.

For Biological Evaluation of Dental Materials is applicable to 3.2. (Copies of ANSI/ADA Specifications may be obtained upon application to the American Dental Association, Dept. of Standards Administration, 211 E. Chicago Avenue, Chicago, IL 60611)

3. REQUIREMENTS

3.1 Composition.

The alloy shall contain a total of no less than 85% of chromium, cobalt, and nickel, or no less than 20 percent of chromium or may be of any other composition which has been specifically demonstrated to comply satisfactorily with the requirements of 3.2.1. For allows in the latter category the supplier shall state the composition - and shall have available a full report on the tests which have been carried out to establish compliance with 3.3.1.

3.2. Biological Compatibility.

The cast alloy shall comply with the applicable requirements of ANSI/ADA Document no. 41 for Recommended Standard Practices for Biological Evaluation of Dental Materials.

3.2.1 Toxicity, Hypersensitivity and Corrosion.

3.2.1.1 General.

Appliance made of the alloy shall neither yield substances having harmful effects to the wearer nor exhibit visible signs of corrosion when exposed to an oral environment for one year.