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# Australian Standard

## 2691—1984

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### DENTAL MATERIALS

# BASE METAL CASTING ALLOYS FOR REMOVABLE DENTAL APPLIANCES

The Tariffs, Instruments, Materials and Equipment Committee of the Australian Dental Association has adopted this standard for use in connection with its program for certification of dental products, lists of which are published periodically. Enquiries regarding this program should be addressed to the Australian Dental Association. When used in connection with the program, the standard is known as Australian Dental Standard (ADS) 2691—1984.



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The following interests are represented on Committee DN/3:

- Australian Dental Association
  - Australian Dental Standards Laboratory
  - Australian Dental Trade Association
  - Confederation of Australian Industry
  - Dental Hospitals
  - Dental Schools
  - Department of Defence
  - Prosthetic Laboratory Owners Association of Victoria
  - Technical Consultants
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## PREFACE

This standard was prepared by the Association's Committee on Casting Alloys, under the direction of the Dental Materials and Equipment Standards Committee. It supersedes AS T28—1964, Dental Cobalt Chromium Casting Alloy. It is one of a series intended for use in assessing the quality of dental materials used in Australia. The standard is very similar to ISO/DIS 6871 for dental base metal casting alloys. The essential differences between this standard and the superseded AS T28 are as follows:

- (a) There is now no restriction on chromium content.
- (b) The beryllium content limit has been increased to 2 percent.
- (c) The method of assessment of minimum requirements for proof stress and elongation has been changed. The minimum proof stress is now 500 MPa for 0.2 percent stress (non-proportional elongation).
- (d) A castability test piece has been introduced.

The Australian Dental Standards Laboratory, 240 Langridge Street, Abbotsford, Victoria, 3067, has facilities for the testing of materials for compliance with this standard.

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## STANDARDS ASSOCIATION OF AUSTRALIA

## Australian Standard

for

## DENTAL MATERIALS—BASE METAL CASTING ALLOYS FOR REMOVABLE DENTAL APPLIANCES

**1 SCOPE.** This standard specifies requirements for those base metal casting alloys which are used for removable denture bases. It does not apply to those alloys used for ceramo-metal restoration or surgical implants.

**2 REFERENCED DOCUMENTS.** The following standards are referred to in this standard:

- AS 1391 Methods for Tensile Testing of Metals  
AS 2193 Methods for Calibration and Grading of Force-measuring Systems of Testing Machines

**3 DEFINITIONS.** For the purpose of this standard, the following definitions apply:

**3.1 Gauge length**—the prescribed part of the cylindrical or prismatic portion of the test piece on which elongation is measured at any moment during the test.

**3.2 Percentage elongation after fracture**—permanent elongation of the gauge length after fracture expressed as a percentage of the original gauge length.

**3.3 Stress ('nominal stress')**—at any moment during the test, load divided by the original cross-sectional area of the test piece.

**3.4 Proof stress (0.2 percent non-proportional elongation)**—the stress at which a permanent elongation of 0.2 percent occurs.

**4 SAMPLE.** A pack of at least 250 g shall be taken at random and supplied complete with adequate instructions for melting and casting of the alloy.

### 5 COMPOSITION.

**5.1 General.** The alloy shall contain not less than 85 percent by mass of chromium, cobalt and nickel, or may be of any other composition which has been specifically demonstrated to comply satisfactorily with the requirements of Clause 6. For alloys less than 85 percent by mass of chromium, cobalt and nickel, the manufacturer shall supply, on demand, all relevant information on the tests which have been carried out to establish compliance with Clause 6. If beryllium is a constituent of the alloy, it shall not exceed 2 percent by mass.

**5.2 Hazardous constituents\*.** The presence of any constituents that may present a health hazard to the patient, dentist or technician shall be clearly indicated by the manufacturer who shall also supply information with regard to the safe handling of the alloy (see Appendix C).

**6 CORROSION AND HARMFUL EFFECTS.** Appliances made of the alloy shall neither yield substances in sufficient quantities to produce harmful effects to the wearer, nor exhibit visible signs of corrosion after use in the mouth.

**7 MECHANICAL PROPERTIES.** When the alloy is tested for proof stress and elongation in accordance with Appendix A, it shall comply with the criteria specified therein and Table 1.

TABLE 1  
MECHANICAL PROPERTIES

Property	Value
Proof stress (0.2 percent non-proportional elongation) (MPa)	500 (minimum)
Elongation (percent)	1.5 (minimum)

**8 CASTABILITY.** When tested in accordance with Appendix B, the alloy shall completely fill the mould cavity without voids or rounded edges.

**9 INFORMATION TO BE SUPPLIED BY THE MANUFACTURER.** The manufacturer shall make available in the accompanying literature in the English language, the following information:

- Adequate instructions for the melting and casting, including recommended casting temperature, of the alloy.
- The melting range, stating both the liquidus and solidus temperatures for the alloy.
- When the alloy contains beryllium, nickel or other known hazardous elements, a clear statement of this in prominent lettering giving adequately detailed instructions regarding precautions which should be taken when casting and finishing the alloy (see Appendix C).
- Detailed instructions for the processing of the alloy, including the auxiliary materials and equipment required, permitted remelt proportion and finishing methods.
- Soldering, welding, heat treatment and repair procedures, if applicable.
- Recommendations for the cleaning of the appliances made from the alloy.
- The nominal composition in mass percent.

### 10 PACKAGING AND LABELLING.

**10.1 Packaging.** The alloy shall be packed in containers which do not contaminate or allow contamination of the alloy, and which are sufficiently robust to withstand normal handling and storage.

**10.2 Labelling.** Each pack shall be labelled with the following information:

- Manufacturer's name or registered trade name or mark, and name and address of the Australian distributor where applicable.
- Product identification.

\*For example, beryllium.