Australian Standard®

COPPER AND COPPER ALLOYS—COMPOSITIONS AND DESIGNATIONS

Part 3—CAST PRODUCTS

This Australian standard was prepared by Committee MT/2, Copper and Copper Alloys. It was approved on behalf of the Council of the Standards Association of Australia on 28 August 1984 and published on 9 November 1984.

The following interests are represented on Committee MT/2:

Australian Foundry Institute
Australian Welding Institute
Confederation of Australian Industry
Copper Development Association of Australia Limited
Coppermetals Extruders Council of Australia
Department of Defence
Metropolitan Water Sewerage and Drainage Board, N.S.W.
Telecom Australia
Universities

This standard was issued in draft form for comment as DR 83069.

Australian Standard®

COPPER AND COPPER ALLOYS—COMPOSITIONS AND DESIGNATIONS

Part 3—CAST PRODUCTS

First published 1984

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7262 3526 1

PREFACE

This standard was prepared under the direction of the Association's Committee on Copper and Copper Alloys by its subcommittee on castings. It specifies a system for designating cast copper and copper alloys in general use in Australia, and adopts the Unified Numbering System (UNS) developed in the United States of America. Chemical composition limits are specified and guidance is given on the expression of these limits. Information on the assignment of new designations is included in the Foreword, while Appendix A relates Australian copper and copper alloys with their overseas counterparts.

In the past, in Australia, copper and copper alloy cast products have been designated by a three-digit-plus-letter nomenclature which was developed in the USA, and formerly used in North America and elsewhere. The change to the UNS in North America prompted the Australian subcommittee to review a possible alternative system, particularly in the light of the following:

1. Uncertainty on the future of BS 1400, Copper Alloy Ingots and Copper and Copper Alloy Castings (on which the Australian standard is based); viz whether or not it would be based on ISO 1338, Cast Copper Alloys — Composition and Mechanical Properties.
2. The initiation of a proposed 'International Numbering System for Metals' (INSM) by the International Organization for Standardization (ISO). The INSM is to be a 6-digit alphanumeric system similar to the UNS.

The subcommittee considered it would be in Australia's best interest to adopt the UNS at this time, as it would enable Australian alloys to be registered under this system. Liaison with the Copper Development Association, Inc. (U.S.) was established, and designations and chemistry subsequently finalized.

There are three standards in this series, the others being as follows:

Part 1— Refinery Products

Part 2— Wrought Products

CONTENTS

Page

FOREWORD 3

SPECIFICATION

1 Scope 4
2 Designation System 4
3 Chemical Composition 4

TABLES

1 Convention for Expressing Chemical Composition Limits 4
2 Coppers and High Copper Alloys 5
3 Brasses 6
4 Bronzes 7
5 Copper-nickels 9

APPENDIX A. RELATED COMPOSITION SPECIFICATIONS 10

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
COPPER AND COPPER ALLOYS—COMPOSITIONS AND DESIGNATIONS

PART 3—CAST PRODUCTS

FOREWORD

New designations are assigned as new coppers and copper alloys come into commercial use, and designations are discontinued when an alloy composition ceases to be used commercially.

Anyone may request changes in the list.

New designations are assigned if a copper or copper alloy meets three criteria, as follows:

1. The complete chemical composition is disclosed.
2. The copper or copper alloy is in commercial use.
3. The chemical composition does not fall within the limits of any designated composition already in the list.

Requests for new members or deletion of existing ones should be sent to:

Director—Technical
Standards Association of Australia
PO Box 1055
STRATHFIELD NSW 2135

These, in turn, will be considered by the Association's Metals Standards Board, and if approved, ratification will be sought from the Copper Development Association, Inc. (U.S.).

SPECIFICATION

1 SCOPE. This standard designates and specifies chemical composition limits for cast copper and copper alloys.

NOTE: Information on the assignment of new designations is given in the Foreword, and related composition specifications are included as Appendix A.

2 DESIGNATION SYSTEM.

2.1 General. The designations for cast copper and copper alloys, which are listed in Tables 2 to 5 inclusive, are given by the numbers C80000 to C99999 inclusive.

Within this category, the chemical compositions are grouped into coppers and copper alloys as given in Clauses 2.2 to 2.6.

2.2 Coppers (C80100 to C81200). Coppers are defined as metal which has a minimum copper content of 99.3 percent.

2.3 High copper alloys (C81300 to C82900). High copper alloys are alloys with a copper content in excess of 94 percent, to which silver may be added for special properties.

2.4 Brasses (C83000 to C87900). Brasses are alloys containing zinc as the principal alloying element with or without other alloying elements such as iron, aluminium, nickel and silicon, and comprise three main groups, as follows:

(a) Copper-tin-zinc alloys (red, semi-red and yellow brasses) (C83000 to C85900).

(b) Manganese bronze alloys (high strength yellow brasses) and leaded manganese bronze alloys (leaded high strength yellow brasses) (C86000 to C86900).

(c) Copper-zinc-silicon alloys (silicon brasses and bronzes) (C87000 to C87900).

2.5 Bronzes (C90000 to C95900). Bronzes are alloys in which the major alloying element is one other than zinc or nickel, and comprise four main groups, as follow:

(a) Copper-tin alloys (tin bronzes)(C90000 to C91900).

(b) Copper-tin-lead alloys (leaded tin bronzes and high-leaded tin bronzes)(C92000 to C94500).

(c) Copper-tin-nickel alloys (nickel-tin bronzes) (C94600 to C94900).

(d) Copper-aluminium alloys (aluminium bronzes)(C95000 to C95900).

2.6 Copper-nickels (C96000 to C96900). The copper-nickels are alloys with nickel as the principal alloying element, with or without other alloying elements present.

3 CHEMICAL COMPOSITION.

3.1 General. The chemical composition of the cast coppers and copper alloys shall conform to Tables 2 to 5 inclusive.

3.2 Specific limits. Specific limits in Table 2 to 5 shall be any numerical values, whether maximum only, minimum only, or ranges, and shall be expressed in accordance with Table 1.

NOTE: Percentage content of elements shown as 'REM' (remainder) is normally calculated by difference.

3.3 Unnamed elements. The specific limits contained in Tables 2 to 5 do not preclude the possible presence of other unnamed elements. However, analysis shall regularly be made only for the minor elements listed in the tables, plus all major elements except one. The major element which is not analysed shall be determined by difference between the sum of those elements analysed and 100 percent.

NOTE: By agreement between the purchaser and the supplier, analysis may be required and limits established for elements not specified.

TABLE 1
CONVENTION FOR EXPRESSING CHEMICAL COMPOSITION LIMITS

Alloy designation	Constituent	Convention for expressing limits
C80000 to C81199 inclusive	Copper	XX.XX
	Alloying elements and impurities	
	0.1 and over	.XX
	0.01 and less than 0.1	.0XX
	0.001 and less than 0.01	.00X
	Less than 0.001	.000X
C81300 to C99999 inclusive	Copper	XX.X
	Alloying elements and impurities	
	0.6 and over	.X,X.X,XX.X
	0.1 and less than 0.6	.XX
	0.01 and less than 0.1	.0X
	0.001 and less than 0.01	.00X
	Less than 0.001	.000X