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COPPER REFINERY SHAPES

STANDARDS ASSOCIATION OF AUSTRALIA
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Australian Foundry Institute

Australian Welding Institute

Confederation of Australian Industry

Copper Development Association of Australia Limited

Coppermetals Extruders Council of Australia

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AUSTRALIAN STANDARD

COPPER REFINERY SHAPES

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PREFACE

This edition of this standard was prepared under the direction of the Association's Committee on Copper and Copper Alloys by its subcommittee on refined copper, to supersede AS 1279-1980. It specifies requirements for refined copper supplied as refinery shapes in the form of cathodes, vertically and continuously cast cakes and billets, and wire bars.

In this edition, the two phosphorus deoxidized copper grades have had their minimum phosphorus content increased slightly to comply with the equivalent wrought grades and those specified by the American Society for Testing and Materials (ASTM).

In this standard, the various grades of copper listed in Table 1.1 are identified in the same manner as that adopted by Technical Committee No 26, Copper and Copper Alloys, of the International Organization for Standardization, and the British Standards Institution in BS 6017, Copper Refinery Shapes. It is also similar to that adopted by ASTM.

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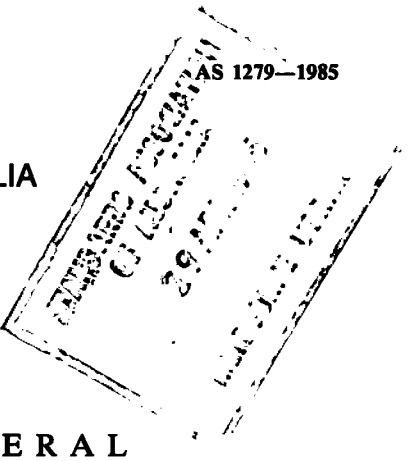

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard for COPPER REFINERY SHAPES

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This standard specifies requirements for grades of copper supplied in the form of refinery shapes, as follows:

(a) Cathodes.

(b) Cakes (vertically or continuously cast).

(c) Billets (vertically or continuously cast).

(d) Wire bars (horizontally cast).

NOTES:

1. Copper with special qualities, e.g. specific oxygen limits, may be supplied by agreement (see Paragraph A3 of Appendix A).
2. Guidelines to purchasers on requirements that must be specified by the purchaser and those that must be agreed at the time of enquiry and/or order are given in Appendix A.

1.2 REFERENCED DOCUMENTS. The following documents are referred to in this standard:

AS 1515	Methods for the Analysis of Copper Alloys Part 3—Silver in Copper Alloys (Atomic Absorption Spectrometric Method)
AS 1696	Methods for the Analysis of Copper Part 1—Phosphorus in Copper (Spectrophotometric Method)
AS 2738	Copper and Copper Alloys—Compositions and Designations, Part 1—Refinery Products
AS K208	Methods for the Analysis of Unalloyed Copper Part 1—Method for the Electrolytic Determination of Copper in Unalloyed Copper Containing not less than 99.85 Percent Copper
ISO 2626	Copper—Hydrogen Embrittlement Test
ISO/R1811	Chemical Analysis of Copper and Copper Alloys—Sampling of Copper Refinery Shapes
ASTM B193	Tests for Resistivity of Electrical Conductor Materials

1.3 DESIGNATION. The designation of the coppers, as given in Table 1.1 and Appendix B, shall be in accordance with AS 2738.1.

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

1.4.1 Terms relating to refinery shapes.

1.4.1.1 *Refinery shapes*—a general term for unwrought products obtained by refining or by refining and casting processes; for example, cathode, cake, billet and wire bar.

1.4.1.2 *Cathode*—a rough flat refinery shape made by electrolytic deposition and normally used for remelting.

1.4.1.3 *Cake*—a cast refinery shape of rectangular cross-section, generally used for rolling into plate, sheet, strip or profiles.

1.4.1.4 *Billet*—a cast refinery shape of circular cross-section, used for the production of tube, rod, bar, profiles or forgings.

1.4.1.5 *Wire bar*—a cast refinery shape, normally of approximately square cross-section, with tapered ends, principally used for rolling into rod or flat products for subsequent processing into wire, strip or profiles.

TABLE 1.1
CHEMICAL COMPOSITION AND ELECTRICAL PROPERTIES

1	2	3	4	5	6	7
Designation*	Chemical composition, percent				Electrical resistivity† Ω.g/m² 20°C	Conductivity %IACS
	Copper (incl. silver)	Phosphorus		Silver		
	min.	min.	max.	min.	max.	min.
Cu-CATH	99.90	—	—	—	0.153 28	100
Cu-ETP	99.90	—	—	—	0.153 28	100
Cu-DLP	99.90	0.004	0.012	—	—	—
Cu-DHP	99.90	0.015	0.040	—	—	—
Cu-Ag	99.90	—	—	‡	0.153. 28	100

* Appendix B gives information on related compositions.
† Appendix C contains notes on resistivity and conductivity relationships.
‡ By agreement (see Paragraph A3.2 of Appendix A).