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Australian Standard 2614—1983

COPPER AND COPPER ALLOYS

SAMPLING FOR CHEMICAL ANALYSIS AND ELECTRICAL RESISTIVITY

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Australian Lead Development Association
Australian Mineral Development Laboratories
Australian Tin Information Centre
Australian Zinc Development Association
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
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Department of Defence
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PREFACE

This standard was prepared by a subcommittee of the Association's Committee on the Analysis of Metals under the direction of the Chemical Standards Board. The method of taking the sample and preparing it for analysis is an important preliminary to the analytical procedure.

Copper and copper alloys are manufactured in a number of different forms and a different sampling procedure is required for each form. A procedure for the sampling of copper cathode for *impurity* analysis is currently the subject of a great deal of discussion within the international copper industry. Samples taken by the procedures in this standard are not recommended for use for the determination of impurities.

This standard sets out methods for the selection and preparation of samples of copper refinery shapes, and copper and copper alloys that have been cast or reduced to their final form by mechanical working. It comprises two Parts as follows:

Part 1—Sampling of Refined Copper Shapes

Part 2—Sampling of Wrought Copper and Copper Alloys and Cast Copper Alloys for Chemical Analysis.

An appendix sets out the general theory for the sampling of non-ferrous metals. This provides details of the most accurate methods of sampling which, however, may not be practical in all situations.

Other appendices deal with the sampling of molten metal for general control purposes, and suggested procedures for cathode sampling.

CONTENTS

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
for
COPPER AND COPPER ALLOYS—SAMPLING FOR CHEMICAL ANALYSIS AND ELECTRICAL RESISTIVITY

PART 1. SAMPLING OF REFINED COPPER SHAPES

1.1 SCOPE OF PART. This Part of the standard sets out the method for the selection and preparation of samples of copper refinery shapes to determine compliance with the chemical composition and electrical resistivity requirements of AS 1279. The prescribed refinery shapes are cathodes, horizontally cast wirebars and vertically cast cakes and billets. The cathode sampling method is not recommended for any purpose other than direct determination of copper and determination of electrical resistivity for compliance with AS 1279.

1.2 REFERENCED DOCUMENT. The following standard is referred to in this Part:

AS 1279 Copper Refinery Shapes

1.3 DEFINITIONS. For the purpose of this Part, the following definitions apply:

1.3.1 Lot—for the purpose of sampling, one of the following:

(a) A discrete quantity of cathodes of generally uniform quality. Normally, the lot is a contract unit or sub-unit.

(b) The production from any discrete 8 h period for a continuous melting furnace, provided that casting conditions remained substantially constant.

(c) A single furnace charge for a reverberatory furnace.

NOTES:

1. By agreement between supplier and purchaser, the lot may be of some other quantity or form.
2. Different shapes, shapes of different sizes, and shapes cast from different furnaces are considered as separate lots.

1.3.2 Primary sample—the total amount of material withdrawn from the cathodes or cast shapes comprising the lot.

1.3.3 Laboratory sample—the part (or whole) of the pieces considered to represent the primary sample.

NOTE: For internal control purposes, and possibly through agreement with consumers, sampling from molten metal may be appropriate. Appendix B contains information on this. Sampling from molten metal is not within the scope of this Part of the standard.

1.3.4 Test sample—a suitable part of the laboratory sample containing the same constituents in the same proportions as they occur in the primary sample, and sufficiently divided to permit laboratory analysis and preparation for resistivity testing, as required.

1.4 SELECTION OF PRIMARY SAMPLE.

1.4.1 Cathodes. Advice on selection of a primary sample for determination of copper content and electrical resistivity is given in Appendix C.

1.4.2 Cast Shapes. For cast refinery shapes, the primary sample shall comprise not less than the following:

(a) One lot of cast refinery shapes from a single furnace charge shall be represented by three sample shapes taken near the beginning, middle and end of the casting period.

(b) One lot of production from a continuous melting furnace shall be represented by one sample shape for each 2 h of casting, with sampling to be carried out at 2-hourly intervals.

NOTE: Another primary sample may be specified by agreement between supplier and purchaser.

1.5 PREPARATION OF LABORATORY SAMPLES.

1.5.1 Cathodes. Advice is given in Appendix C on methods for the preparation of laboratory samples from cathodes for determination of copper content and electrical resistivity.

1.5.2 Wire Bars. A central cross-sectional piece shall be sawn from the bar. The piece shall be from 10 mm to 50 mm in thickness. Loose dirt shall be buffed from the outer surface.