AS 1515.5—1987
Reconfirmed 2016

Australian Standard®

COPPER ALLOYS—DETERMINATION OF CADMIUM—FLAME ATOMIC ABSORPTION SPECTROMETRIC METHOD

This Australian standard was prepared by Committee CH/10—Analysis of Metals under the direction of the Chemical Standards Board. It was approved on behalf of the Council of the Standards Association of Australia on 24 February 1987 and published on 4 May 1987.

The following interests are represented on Committee CH/10:

Aluminium Development Council
Australasian Institute of Mining and Metallurgy
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
Copper Technical Data Centre
Department of Defence
Electricity Supply Association of Australia
Metal Trades Industry Association of Australia
National Association of Testing Authorities
Railways of Australia Committee
Royal Australian Chemical Institute

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STANDARDS AUSTRALIA

RECONFIRMATION

OF
AS 1515.5—1987
Copper alloys—Determination of cadmium—Flame atomic absorption spectrometric method

RECONFIRMATION NOTICE

Technical Committee CH-010 has reviewed the content of this publication and in accordance with Standards Australia procedures for reconfirmation, it has been determined that the publication is still valid and does not require change.

Certain documents referenced in the publication may have been amended since the original date of publication. Users are advised to ensure that they are using the latest versions of such documents as appropriate, unless advised otherwise in this Reconfirmation Notice.

Approved for reconfirmation in accordance with Standards Australia procedures for reconfirmation on 31 July 2016.

The following are represented on Technical Committee CH-010:

Australian Aluminium Council
Bureau of Steel Manufacturers of Australia
International Copper Association Australia
International Precious Metals Institute
National Association of Testing Authorities Australia

NOTES

PREFACE

This standard was prepared by the Association's Committee on the Analysis of Metals under the direction of the Chemical Standards Board as an addition to the AS 1515 series of standards.

The Committee organized an inter-laboratory test program to obtain information on the repeatability and reproducibility of the method. Precision data from this test program are given in Table 2.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

COPPER ALLOYS—DETERMINATION OF CADMIUM—FLAME ATOMIC ABSORPTION SPECTROMETRIC METHOD

1 SCOPE. This standard sets out a flame atomic absorption spectrometric method for the determination of cadmium in copper alloys.

2 APPLICATION. This method is applicable to the determination of cadmium in copper alloys in the range 0.1 to 1.5 percent. This method is suitable for Copper Development Association (C.D.A.) specification C162 for cadmium copper.

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

AS 2134	Code of Practice for the Chemical Analysis of Materials by Flame Atomic Absorption Spectroscopy
AS 2162	Code of Practice for the Use of Volumetric Glassware
AS 2164	One-mark Volumetric Flasks
AS 2165	Burettes and Bulb Burettes
AS 2166	One-mark Pipettes
AS 2614	Copper and Copper Alloys—Sampling for Chemical Analysis and Electrical Resistivity
ISO 5725	Precision of Test Methods—Determination of Repeatability and Reproducibility by Inter-laboratory Tests.

4 PRINCIPLE. After dissolution in a mixture of hydrofluoric acid and nitric acid and addition of boric acid solution, the cadmium content is determined by flame atomic absorption spectrometry.

5 REAGENTS.

5.1 General requirements. Except where otherwise specified, only reagents of recognized analytical grade and only distilled water or water of an equivalent purity shall be used.

5.2 Solids.

5.2.1 *High purity copper.* The copper shall contain not more than 0.0001 percent cadmium.

5.2.2 *High purity cadmium.* At least 99.9 percent pure.

5.3 Solutions.

5.3.1 *Boric acid solution (30 g/L).* Dissolve 30g of boric acid in water and dilute to 1 L.

5.3.2 *Hydrofluoric acid-nitric acid mixture.* Add 90 mL of hydrofluoric acid (ϱ_{20} 1.13 g/mL) to 900 mL of nitric acid (1 + 1).

CAUTION: Even when diluted, hydrofluoric acid is extremely dangerous, harmful to the eyes and skin; rubber gloves and goggles should be worn when using this acid.

5.4 Standard solution.

5.4.1 *Standard cadmium solution (1 mL ≡ 0.001 g* Cd). Dissolve 1.000 g of cadmium metal (5.2.2) in 20 mL of water and 10 mL of nitric acid (1 + 1) and dilute to 1 L in a volumetric flask.

6 APPARATUS.

6.1 Glassware. Grade A volumetric glassware shall be used throughout. Volumetric flasks shall comply with AS 2164, burettes shall comply with AS 2165, and pipettes shall comply with AS 2166. Use of volumetric glassware shall comply with AS 2162.

6.2 Reaction vessels. Plastics beakers are required for dissolution of the sample. Polyethylene is satisfactory, but polypropylene or polytetrafluoroethylene is recommended.

6.3 Atomic absorption spectrometer. The spectrometer shall be used in accordance with AS 2134, shall be capable of isolating the 228.8 nm wavelength and shall have deuterium arc or other background correction facility.

6.4 Gases.

6.4.1 *Air.* Filtered, dry and compressed.

6.4.2 *Acetylene.*

7 SAMPLING. Sampling shall be in accordance with AS 2614.

8 PROCEDURE.

8.1 Blank test. A blank test shall be carried out in parallel with the analysis using the same procedure as for the analysis and the same quantities of all reagents used in the determination and containing 1.000 g of high purity copper (5.2.1) or the appropriate masses of pure metals, totalling 1.000 g, in accordance with the basic composition of the test sample.

8.2 Check test. In each run, one analysis of a certified reference material or reference material of the same type of metal should be carried out in parallel with the analysis of the test sample and under the same conditions. However, in cases of dispute, an analysis of a reference material *shall* be carried out in parallel with a duplicate analysis of the test sample.

When the analysis is carried out on several samples of the same type of metal at the same time, the analytical value of one reference material may be used.

NOTES:

1. The reference material should be of the same type as the sample to be analysed and the properties of the two materials should be sufficiently similar to ensure that in either case no significant changes in the analytical procedure would become necessary.
2. The reference material is used only to validate the performance of the analytical procedure and expressly not to adjust analytical results.