AS 1515.3—1989
Reconfirmed 2016

Australian Standard®

Copper Alloys

Part 3: Determination of silver content—Flame atomic absorption spectrometric methods

This Australian Standard was prepared by Committee CH/10, Analysis of Metals, under the direction of the Chemical Standard Board. It was approved on behalf of the Council of Standards Australia on 3 July 1989 and published on 11 December 1989.

The following interests are represented on Committee CH/10:

Aluminium Development Council
Australian Lead Development Association
Bureau of Steel Manufacturers of Australia
Confederation of Australian Industry
Copper Technical Data Centre
National Association of Testing Authorities
Railways of Australia Committee
Royal Australian Chemical Institute

Review of Australian Standards. *To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.*

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

STANDARDS AUSTRALIA

RECONFIRMATION
OF
AS 1515.3—1989
Copper alloys
Part 3: Determination of silver content—Flame atomic absorption spectrometric methods

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

AS 1515.3—1989

Australian Standard®

Copper Alloys

Part 3: Determination of silver content—Flame atomic absorption spectrometric methods

First published as AS 1515.3—1973.
Second edition 1989.

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

ISBN 0 7262 5881 4

PREFACE

This Standard was prepared by the Standards Australia's Committee on the Analysis of Metals under the direction of the Chemical Standards Board to supersede AS 1515—1973, *Methods for the Analysis of Copper Alloys,* Part 3: *Silver in Copper Alloys (Atomic Absorption Spectrometric Method).*

This Standard differs from the previous edition in the following ways:

(a) New formatting.

(b) Change in the lower end of the application range from 0.001% to 0.002%.

(c) Inclusion of a blank test

(d) Inclusion of new precision data to cover the application range.

CONTENTS

Page

STANDARDS AUSTRALIA

Australian Standard
Copper alloys

Part 3: Determination of silver content—Flame atomic absorption spectrometric method

1 SCOPE. This Standard sets out a flame atomic absorption spectrometric method for the determination of silver in copper alloys. This method is applicable to the determination of silver in copper alloys in the range 0.002% to 0.15%

2 REFERENCED DOCUMENTS. The following documents are referred to in this Standard:

AS	
2134	Recommended practice for the chemical analysis by atomic absorption spectrometry
2134.1	Part 1: Flame atomic absorption spectrometry
2162	Code of practice for the use of volumetric glassware
2164	One-mark volumetric flasks
2165	Burettes and bulb burettes
2166	One-mark pipettes
2614	Copper and copper alloys—Sampling for chemical analysis and electrical resistivity
2850	Chemical analysis—Interlaboratory test programs—For determining precision of analytical method(s)—Guide to the planning and conduct

3 PRINCIPLE. The sample is dissolved in nitric acid and, after the addition of mercury(II) nitrate solution to prevent interference by chloride ions, the silver content of the solution is determined by flame atomic absorption spectrometry.

4 REAGENTS.

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

4.2 Solid.

4.2.1 *High purity copper.* The copper shall contain not more than 0.0001% silver.

4.3 Solutions.

4.3.1 *Nitric acid (1 + 1).* Add 500 mL of nitric acid (ρ_{20} 1.42 g/mL) to 500 mL of water and mix.

4.3.2 *Mercury(II) nitrate solution (10 g/L).* Dissolve 1.00 g of mercury(II) nitrate dihydrate ($Hg(NO_3)_2.2H_2O$) in water. If the resultant solution is turbid, add 2 mL of nitric acid (4.3.1). Dilute to 100 mL.

4.4 Standard solutions.

4.4.1 *Standard silver solution (1 mL ≡ 1 mg Ag).* Dissolve 1.000 g of silver (purity greater than 99.99%) in 10 mL of nitric acid (4.3.1). Cool, transfer to a 1 L volumetric flask and dilute to volume. This solution should be freshly prepared before use.

4.4.2 *Standard silver solution (1 mL ≡ 0.1 mg Ag).* Pipette 50 mL of standard silver solution (4.4.1) into a 500 mL volumetric flask, add 5 mL of nitric acid (4.3.1) and dilute to volume. This solution should be freshly prepared before use.

5 APPARATUS.

5.1 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.

5.2 Atomic absorption spectrometer.

5.2.1 *General.* The instrument and practice shall comply with AS 2134.1.

5.2.2 *Operating parameters.* Suitable operating parameters for this test are as follows:

Wavelength . . . . . 328.1 nm

Flame . . . . A slightly lean air/acetylene flame (50 mm or 100 mm slot burner).

5.2.3 *Performance criteria.* Prior to the test, it shall be established that the following performance criteria are met:

(i) *Minimum sensitivity.* The absorbance of the calibration solution of highest silver content shall be not less than 0.4.

(ii) *Curve linearity.* The slope of the calibration curve covering the top 20% concentration range (expressed as a change in absorbance) shall be not less than 0.7 of the value of the slope of the bottom 20% concentration range determined in the same way.

(iii) *Minimum stability.* The standard deviation of the absorbance of the most concentrated calibration solution and that of the zero calibration solution, each calculated from at least 10 repetitive measurements, shall be less than 1.5% and 0.5% respectively of the mean value of the absorbance of the most concentrated solution.

6 SAMPLING. Samples shall be taken in accordance with AS 2614.

7 PROCEDURE.

7.1 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 the reagents used in the determination.