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Determination of copper content (0.25 percent to 1.25 percent)—Flame atomic absorption spectrometric method 5pp C
Specifies a flame atomic absorption spectrometric method for the determination of copper content in the range 0.25 percent to 1.25 percent copper in special high grade zinc, high grade zinc and diecast zinc alloys containing less than 4.3 percent aluminium, 0.003 percent cadmium, 0.08 percent iron, 0.005 percent lead, 0.08 percent magnesium and 0.001 percent ti.
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METHODS FOR THE ANALYSIS OF ZINC AND ZINC ALLOYS

Part 6—DETERMINATION OF COPPER CONTENT (0.25% to 1.25%)—FLAME ATOMIC ABSORPTION SPECTROMETRIC METHOD

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THE FOLLOWING INDUSTRIAL, SCIENTIFIC AND GOVERNMENTAL organizations and departments were officially represented on the committee entrusted with the preparation of this standard:

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 Producers Association of Australia
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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PREFACE

This standard was prepared by the Association's Committee on the Analysis of Metals under the direction of the Chemical Standards Board.

The committee organized an inter-laboratory test program to obtain information on the repeatability and reproducibility of the method. Laboratories of the following organizations participated in the test program to provide the data given in Table 1:

Broken Hill Associated Smelters Pty Ltd
Copper Refineries Pty Ltd
Electrolytic Refining and Smelting Co. of Australia Ltd
Electrolytic Zinc Co. of Australasia Ltd
State Electricity Commission, Victoria
Sulphide Corporation Pty Ltd

This standard requires reference to the following standards:

AS 2134	Code of Practice for the Chemical Analysis of Materials by Flame Atomic Absorption Spectroscopy
AS 2164	One-mark Volumetric Flasks
AS 2166	One-mark Pipettes
AS 2347	Sampling of Zinc Metal and Zinc Alloys for Chemical Analysis
BS 3630	Methods for the Sampling and Analysis of Zinc and Zinc Alloys Part 8—Lead and Cadmium in Zinc (Grades Zn 1 and Zn 2) and Zinc Alloys (Polarographic Method)
BS 4237	Report on Reproducibility of Methods of Chemical Analysis Used in the Iron and Steel Industry.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

METHODS FOR THE ANALYSIS OF ZINC AND ZINC ALLOYS

PART 6—DETERMINATION OF COPPER CONTENT (0.25% to 1.25%)—FLAME ATOMIC ABSORPTION SPECTROMETRIC METHOD

1 SCOPE. This standard sets out a flame atomic absorption spectrometric method for the determination of the copper content of zinc and zinc alloys.

2 APPLICATION.

2.1 Range of Application. The method is suitable for the determination of copper content in the range 0.25 percent to 1.25 percent.

2.2 Types of Zinc and Zinc Alloys. The method is suitable for the determination of copper in diecast alloys containing a maximum of 4.3 percent aluminium, 0.08 percent magnesium, 0.08 percent iron, 0.005 percent lead, 0.003 percent cadmium and 0.001 percent tin.

3 REPRODUCIBILITY. A planned trial of the method was carried out in accordance with BS 4237.

The reproducibility index 2s is obtained from the following formula:

$$2s = 2\sqrt{(s_b^2 + s_w^2)}$$

where

s_b is the between-operator standard deviation

s_w is the within-operator standard deviation.

95 percent of results obtained by any one analyst should be reproducible to within two standard deviations of the overall mean value derived from all laboratories (i.e. $\bar{x} \pm 2s$).

For further information, see BS 4237.

The planned trial was carried out by six analysts, each from a different laboratory. Five tests were carried out by each analyst on each of four samples. From the results obtained, the 95 percent confidence limits (2s, Table 1) have been calculated.

4 PRINCIPLE. The sample is dissolved in nitric acid and the copper determined by flame atomic absorption spectrometry.

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