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AS 1050, Part 14—1981
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STANDARDS ASSOCIATION

Australian Standard 1050, Part 14—1981

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METHODS FOR THE ANALYSIS OF IRON AND STEEL

Part 14—DETERMINATION OF MANGANESE IN IRON AND STEEL (Titrimetric Method)

AS/NZS 1050
Methods for the analysis of iron
and steel

AS/NZS 1050.14:1994
Determination of manganese
in iron and steel—Titrimetric
method 7pp CC

This method sets out a
titrimetric method, using the
permanganate ion formed by
oxidation, for the determination
of the manganese content of
iron and steel. The method
covers the range 0.50 percent
to 15 percent manganese and is
applicable to all grades of iron
and steel.

(CH/10): Supersedes AS 1050.14—
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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

This standard, prepared under the direction of Committee CH/10, Analysis of Metals, was approved on behalf of the Council of the Standards Association of Australia on 21 July 1981, and was published on 16 November 1981.

To keep abreast of progress in industry, Australian Standards are subject to continuous 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 their standards are up-to-date. Full details of all SAA publications will be found in the Annual List of Australian Standards; these details are supplemented by listings in the SAA monthly journal 'The Australian Standard'. Information on the Annual List and 'The Australian Standard' may be obtained from any sales office of the Association, where details are also available of the current status of individual standards. Suggestions for improvements to published standards, addressed to the head office of the Association, are welcomed.

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February 1982

STANDARDS ASSOCIATION OF AUSTRALIA

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CORRIGENDUM

to

AS 1050, Part 14—1981

**DETERMINATION OF MANGANESE IN IRON AND STEEL
(Titrimetric Method)**

SUMMARY: This correction applies to Clause 5.4.1.

Published on 15 February 1982.

Page 6. Clause 5.4.1.

Line 11—*replace* '... dilute to 100 mL' by '... to the residue add water to make 100 mL'.

PREFACE

This standard was prepared by the Association's Committee on the Analysis of Metals under the direction of the Chemical Standards Board, to supersede AS K1, Part 14—1960. AS K1, Part 14 was based on BS 1121, Part 16, and after several amendements was issued as a self-contained Australian standard method. Revision was undertaken as part of a general review and updating of the series of standards dealing with methods for the analysis of iron and steel.

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

Australian Atomic Energy Commission
Australian Iron and Steel, Port Kembla
The Broken Hill Proprietary Co. Ltd, Newcastle
The Broken Hill Proprietary Co. Ltd, Whyalla
Victorian Railways

This standard requires reference to the following Australian and British standards:

AS 1213	Methods for the Sampling of Iron, Steel, Permanent Magnet Alloys and Ferro-alloys
AS 2164	One-mark Volumetric Flasks
AS 2165	Burettes and Bulb Burettes
AS 2166	One-mark Pipettes
AS 2167	Straight Pipettes
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 IRON AND STEEL

PART 14—DETERMINATION OF MANGANESE IN IRON AND STEEL**(Titrimetric Method)**

1 SCOPE. This standard sets out a titrimetric method, using the permanganate ion formed by oxidation, for the determination of the manganese content of iron and steel.

2 APPLICATION. The method covers the range 0.50 percent to 15 percent manganese and is applicable to all grades of iron and steel.

3 REPRODUCIBILITY. A planned trial of this 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 = between-operator standard deviation

s_w = within-operator standard deviation.

95 percent of the 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 five analysts, each from a different laboratory. Five tests were carried out by each analyst on each of five samples.

From the results obtained, the 95 percent confidence limits ($2s$, Table 1) have been calculated.

4 PRINCIPLE. The sample is dissolved in dilute sulphuric acid, any other acid additions necessary for complete dissolution being removed by fuming after oxidation, and interfering elements removed by precipitation using a zinc oxide suspension. The resultant solution is strongly acidified to prevent interference from cobalt and the manganese is oxidized to the permanganate ion by ammonium persulphate. The permanganate ion is titrated with ammonium iron(II) sulphate and potassium dichromate, using preoxidized sodium diphenylamine sulphonate as indicator.