Superseded by AS/NZS 1050.8:1994
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Australian Standard 1050, Part 8—1980

METHODS FOR THE ANALYSIS OF IRON AND STEEL

Part 8—DETERMINATION OF MANGANESE IN IRON AND STEEL

(Spectrophotometric Method)

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

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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 on 26 February 1980, and was published on 1 June 1980.

First published (as AS K1, Part 8).....1956
AS 1050, Part 8 first published 1980

This standard was issued in draft form for public review as DR 78179.

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PREFACE

This standard replaces AS K1, Part 8—Determination of Manganese in Iron and Steel (Absorptiometric Method), which was BS 1121: Part 23: 1951: endorsed without amendment but which was withdrawn when BS 1121: Part 23 was revised. Preparation of this standard 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 responsible committee organized an inter-laboratory test program to obtain information on the repeatability and reproducibility of the method. The following laboratories 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
McPhersons Research and Development

The 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 2166	One-mark Pipettes
AS 2167	Straight Pipettes
AS 2243	Code of Practice for Safety in Laboratories Part 2—Chemical
AS CK19	Code of Recommended Practice for the Chemical Analysis of Materials by Ultraviolet/Visible Spectrophotometry
BS 3875	Optical Spectrophotometric Cells
BS 4237	Report on Reproducibility of Methods of Chemical Analysis Used in the Iron and Steel Industry.

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard
METHODS FOR
THE ANALYSIS OF IRON AND STEEL

PART 8—DETERMINATION OF MANGANESE IN IRON AND STEEL
(Spectrophotometric Method)

1 SCOPE. This standard sets out a spectrophotometric 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 0.01 percent to 2 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 equation:

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

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 six analysts, each from a different laboratory. Five tests were carried out by each analyst on each of nine samples.

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

4 PRINCIPLE. The sample is dissolved in a sulphuric acid-phosphoric acid mixture (see Note). After the mixture is fumed with perchloric acid, the manganese is oxidized to the permanganate ion by sodium periodate and determined spectrophotometrically.

NOTE: For some steels, the addition of hydrochloric and nitric acids is necessary.

5 REAGENTS.

5.1 General Requirements. During the analysis, only reagents of recognized analytical reagent grade and only distilled water or water of an