(R. TAS FEBRUARY 1994)

AS 1050.20—1983
UDC 669.1:543:546.17

1994 ED.



# Australian Standard 1050.20—1983

## METHODS FOR THE ANALYSIS OF IRON AND STEEL

## Part 20—DETERMINATION OF MAGNESIUM IN IRON AND STEEL (FLAME ATOMIC ABSORPTION SPECTROMETRIC METHOD)



PUBLISHED BY THE STANDARDS ASSOCIATION OF AUSTRALIA
STANDARDS HOUSE, 80 ARTHUR ST, NORTH SYDNEY, N.S.W. 2060

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This Australian standard was prepared by Committee CH/10, Analysis of Metals. It was approved on behalf of the Council of the Standards Association of Australia on 30 September 1982 and published on 10 January 1983.

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The following interests were represented on the committee responsible for 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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First published (as AS K1, Part 20)..... 1964
AS 1050, Part 20 first published..... 1983

*This standard was issued in draft form for comment as DR 81084.*

ISBN 0 7262 2741 2

STANDARDS ASSOCIATION OF AUSTRALIA
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# Amendment No 1
# to
# AS 1050, Part 20—1983
# METHODS FOR THE ANALYSIS OF IRON AND STEEL— DETERMINATION OF MAGNESIUM IN IRON AND STEEL
## (Flame Atomic Absorption Spectrometric Method)

**CORRECTION**

*SUMMARY:* This amendment applies to Clause 10.2.

Published on 7 March 1983.

**Page 6. Clause 10.2.**

*Add* between first and second sentences:

'Correct the absorbance values by subtracting the absorbance of the standard containing no magnesium.'

AMDT
No 1
MAR.
1983

# PREFACE

This standard was prepared by the Association's Committee on the Analysis of Metals under the direction of the Chemical Standards Board. It supersedes AS K1, Part 20—1964. This revision differs from the previous edition in that a nitrous oxide/acetylene flame is used to overcome interference effects inherent with the air/acetylene flame.

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 Iron and Steel, Port Kembla
Australian Mineral Development Laboratories
State Electricity Commission, Victoria
State Rail Authority, N.S.W.
The Broken Hill Proprietary Co. Ltd, Newcastle

STANDARDS ASSOCIATION OF AUSTRALIA

# Australian Standard
# METHODS FOR THE ANALYSIS OF IRON AND STEEL

## PART 20—DETERMINATION OF MAGNESIUM IN IRON AND STEEL (FLAME ATOMIC ABSORPTION SPECTROMETRIC METHOD)

**1 SCOPE.** This standard sets out a flame atomic absorption spectrometric method for the determination of the magnesium content of iron and steel.

**2 APPLICATION.** The method covers the range 0.010 percent to 0.25 percent magnesium and is applicable to all grades of iron and steel.

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

AS 1213 Methods for the Sampling of Iron and Steel

AS 2134 Code of Practice for the Chemical Analysis of Materials by Flame Atomic Absorption Spectroscopy

AS 2164 One-mark Volumetric Flasks

BS 4237 Report on Reproducibility of Methods of Chemical Analysis Used in the Iron and Steel Industry.

**4 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

$s_b$ = 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 four samples.

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

**TABLE 1**

**REPRODUCIBILITY DATA FOR MAGNESIUM DETERMINATIONS**

| Sample | Mean magnesium content percent | Components of standard deviation | | Reproducibility index $2s$ |
|---|---|---|---|---|
| | | $s_w$ | $s_b$ | |
| SAA 117 Cast iron Cr 0.04; Cu 0.4; P 0.05; Si 2.91 | 0.0315 | 0.0008 | 0.0008 | 0.0023 |
| Euro-Norm 481-1* | 0.0498 | 0.0007 | 0.0013 | 0.0029 |
| SAA 116 Nickel mond cast iron Ni 2 | 0.0683 | 0.0016 | 0.0016 | 0.0045 |
| SAA 118 Cobalt steel Cr 12.5; Co 2.75; C 1.25; Mo 1.5 | 0.236 | 0.0042 | 0.0047 | 0.013 |

*Certificate value 0.051 percent Mg.