PPH
ED.

AS 1050.32—1984
UDC 669.1:543:546

Australian Standard 1050.32—1984

METHODS FOR THE ANALYSIS OF IRON AND STEEL

Part 32—DETERMINATION OF CARBON CONTENT (INFRARED METHOD)

STANDARDS ASSOCIATION OF AUSTRALIA
- 2 MAY 1994
MELBOURNE LIBRARY

AS/NZS 1050.32—1994
Determination of carbon content—Infrared method
5pp C
Specifies an infrared method for the determination of carbon in iron and steel after combustion in oxygen using high frequency induction heating. The method is applicable to all types of iron and steel with carbon content in the range 0.002 percent to 4.5 percent carbon.
(CH/10): Supersedes AS 1050.32—1984: Publication date 1994-08-15.

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

Incorporated by Royal Charter

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 2 February 1984 and published on 6 April 1984.

The following interests are represented on Committee CH/10:

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

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 SAA publications will be found in the Annual List of Australian Standards; this information is supplemented each month by SAA's journal '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which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn standards.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 the Association, 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.

First published 1984

This standard was issued in draft form for comment as DR 83094.

ISBN 0 7262 3367 6

PREFACE

This standard was prepared by the Association's Committee on the Analysis of Metals under the direction of the Chemical Standards Board as a further part of AS 1050.

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 Pty Ltd, Port Kembla
Commonwealth Steel Co. Ltd
John Lysaght (Australia) Limited
The Broken Hill Proprietary Co. Ltd, Melbourne
The Broken Hill Proprietary Co. Ltd, Newcastle
The Broken Hill Proprietary Co. Ltd, Whyalla

©Copyright — STANDARDS ASSOCIATION OF AUSTRALIA 1984
Users of standards are reminded that copyright subsists in all SAA publications. No part of this publication may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing of the Standards Association of Australia.

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

METHODS FOR THE ANALYSIS OF IRON AND STEEL

PART 32—DETERMINATION OF CARBON CONTENT (INFRARED METHOD)

1 SCOPE. This standard sets out an infrared method for the determination of carbon in iron and steel after combustion in oxygen using high frequency induction heating.

2 APPLICATION. The method is applicable to all types of iron and steel with carbon content in the range 0.002 percent to 4.5 percent carbon.

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

AS 1213 Iron and Steel—Methods of Sampling

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

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

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

TABLE 1

PRECISION DATA FOR CARBON DETERMINATIONS

Sample	Carbon certificate value percent	Mean carbon content found percent	Components of standard deviation		Reproducibility index
			s_b	s_w	$2s$
SAA 81/1 Low carbon steel		0.0021	0.0005	0.0006	0.0016
SAA 81/2 Low carbon steel		0.012	0.0009	0.0003	0.0019
SRM 170A Basic open-hearth mild steel	0.052	0.051	0.003	0.002	0.007
SAA 81/3 Carbon steel		0.100	0.004	0.002	0.009
SAA 81/5 Valve steel Cr 21, Mn 9, Ni 4		0.526	0.002	0.005	0.011
SAA 81/6 Tool steel Cr 12, Mo 1, V 1		1.499	0.015	0.014	0.041
SRM 6F Cast iron	2.91	2.90	0.022	0.028	0.072
JSS 110/6 Pig iron	4.15	4.10	0.037	0.097	0.207

5 PRINCIPLE. Combustion of the test portion at a high temperature in a stream of oxygen, converting the carbon to carbon dioxide. Removal of dust and water vapour from the combustion gas stream in traps. Catalytic oxidation of sulphur dioxide to sulphur trioxide and adsorption on cellulose cotton. Measurement of the carbon dioxide content by a non-dispersive infrared absorption technique.

COPYRIGHT