

Australian Standard™

Coal and coke—Analysis and testing

**Part 14.1: Higher rank coal ash and
coke ash—Major and minor elements—
Borate fusion/flame atomic absorption
spectrometric method**

This Australian Standard was prepared by Committee MN-001, Coal and Coke. It was approved on behalf of the Council of Standards Australia on 22 September 2003 and published on 14 November 2003.

The following are represented on Committee MN-001:

Australasian Institute of Mining and Metallurgy
Australian Building Codes Board
Australian Coal Association
Australian Coal Preparation Society
Australian Institute of Energy
Coalfield Geology Council of N.S.W
CSIRO, Energy Technology
Department of Natural Resources and Mines, Qld
Electricity Supply Association of Australia
Minerals Council of Australia
University of Newcastle
University of New South Wales
University of Queensland

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about Standards can be found by visiting the Standards Australia web site at www.standards.com.au and looking up the relevant Standard in the on-line catalogue.

Alternatively, the printed Catalogue provides information current at 1 January each year, and the monthly magazine, *The Global Standard*, has a full listing of revisions and amendments published each month.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at mail@standards.com.au, or write to the Chief Executive, Standards Australia International Ltd, GPO Box 5420, Sydney, NSW 2001.

This Standard was issued in draft form for comment as DR 03379.

Australian Standard™

Coal and coke—Analysis and testing

**Part 14.1: Higher rank coal ash and
coke ash—Major and minor elements—
Borate fusion/fusion atomic absorption
spectrometric method**

Originated as AS K152.14—1967.
Previous edition AS 1038.14.1—1995.
Third edition 2003.

COPYRIGHT

© Standards Australia International

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Published by Standards Australia International Ltd
GPO Box 5420, Sydney, NSW 2001, Australia

ISBN 0 7337 5572 0

PREFACE

This Standard was prepared by the Standards Australia Subcommittee MN-001-01, Coal Evaluation, under the supervision of Committee MN-001, Coal and Coke, as a revision of AS 1038.14.1—1995, *Coal and coke—Analysis and testing, Part 14.1: Higher rank coal ash and coke ash—Major and minor elements—Borate fusion/flame atomic absorption spectrometric method*.

This Standard provides an alternative digestion procedure to AS 1038.14.2, *Coal and coke—Analysis and testing, Part 14.2: Higher rank coal ash and coke ash—Major and minor elements—Acid digestion/flame atomic absorption spectrometric method*.

The objective of this Standard is to provide those responsible for the analysis of coal ash and coke ash with a uniform method for the procedure.

This Standard confirms the procedure for determining major and minor elements in higher rank coal ash and coke ash by the borate fusion/flame atomic absorption method and has been editorially updated to the current format.

CONTENTS

	<i>Page</i>
1 SCOPE.....	4
2 REFERENCED DOCUMENTS.....	4
3 DEFINITIONS.....	5
4 PRINCIPLE.....	5
5 SAFETY.....	5
6 REAGENTS.....	5
7 APPARATUS.....	7
8 SAMPLE PREPARATION.....	8
9 PROCEDURE.....	8
10 CALCULATION.....	12
11 REPORTING OF RESULTS.....	13
12 PRECISION.....	13
13 TEST REPORT.....	13

STANDARDS AUSTRALIA

Australian Standard

Coal and coke—Analysis and testing

Part 14.1: Higher rank coal ash and coke ash—Major and minor elements—
Borate fusion/flame atomic absorption spectrometric method

1 SCOPE

This Standard sets out a method for the determination of silicon, aluminium, iron, calcium, magnesium, sodium, potassium, titanium, manganese, barium, strontium and zinc in higher rank coal ash and coke ash by flame atomic absorption spectrometry after borate fusion. A spectrophotometric method for the determination of phosphorus and a method for the determination of sulfur are also referenced.

This method is suitable for the determination of the above elements (expressed as oxides), in the concentration ranges specified in Table 1.

TABLE 1
CONCENTRATION RANGES

Element	Reported as oxide	Concentration range, percent
Silicon	SiO ₂	20 to 85
Aluminium	Al ₂ O ₃	1.0 to 70
Iron	Fe ₂ O ₃	0.05 to 40
Calcium	CaO	0.05 to 40
Magnesium	MgO	0.05 to 40
Sodium	Na ₂ O	0.05 to 10
Potassium	K ₂ O	0.01 to 6
Titanium	TiO ₂	0.01 to 12.5
Manganese	Mn ₃ O ₄	0.005 to 1
Phosphorus	P ₂ O ₅	0.01 to 5
Sulfur	SO ₃	0.1 to 15
Barium	BaO	0.01 to 2.5
Strontium	SrO	0.01 to 0.5
Zinc	ZnO	0.01 to 0.5

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS	
1038	Coal and coke—Analysis and testing
1038.3	Part 3: Proximate analysis of higher rank coal
1038.4	Part 4: Coke—Proximate analysis
1038.6.3.2	Part 6.3.2: Higher rank coal and coke—Ultimate analysis—Total sulfur—High-temperature combustion method