Under Revision See DR 93332
Superseded by AS 1038.14.1-1995

AS 1038, Part 14.1—1981
UDC ~~662.74: 662.613: 543.42~~
[662.66; 662.74]: 620.16

Australian Standard 1038, Part 14.1—1981

METHODS FOR THE ANALYSIS AND TESTING OF COAL AND COKE

Part 14.1— ANALYSIS OF COAL ASH, COKE ASH AND MINERAL MATTER

(Borate Fusion—Flame Atomic Absorption Spectrometric Method)

STANDARDS ASSOCIATION OF AUSTRALIA

Incorporated by Royal Charter

d

THE FOLLOWING INDUSTRIAL, SCIENTIFIC AND GOVERNMENTAL organizations and departments were officially represented on the committee entrusted with the preparation of this standard:

Australian Coal Association

Australian Institute of Energy

Australasian Institute of Mining and Metallurgy

Bureau of Steel Manufacturers of Australia

Coal Preparation Societies of NSW and Queensland

Confederation of Australian Industry

Department of Minerals and Energy, Victoria

Department of Mineral Resources, N.S.W.

Department of National Development

Electricity Supply Association of Australia

Institution of Engineers, Australia

Joint Coal Board

Queensland Coal Board

Royal Australian Chemical Institute

Universities

This standard, prepared under the direction of Committee MN/1, Coal and Coke, was approved by the Minerals Standards Committee on behalf of the Council of the Standards Association of Australia on 31 March 1981, and was published on 1 June 1981.

This standard was issued in draft form for public review as DR 79160.

AUSTRALIAN STANDARD

METHODS FOR THE ANALYSIS AND TESTING OF COAL AND COKE

Part 14.1
ANALYSIS OF COAL ASH, COKE ASH AND MINERAL MATTER

(BORATE FUSION—FLAME ATOMIC ABSORPTION SPECTROMETRIC METHOD)

AS 1038, Part 14.1—1981

First published (as AS K152.14) 1967
AS 1038, Part 14.1 first published 1981

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

ISBN 0 7262 2241 0

PREFACE

This standard was prepared by the Association's Committee on Coal and Coke to supersede AS K152, Part 14—1967, which was the endorsement of BS 1016: Part 14: 1963. The purpose of this standard is to formalize and standardize existing atomic absorption spectrometric procedures for the analysis of ash and mineral matter which are being routinely used in many laboratories and which have largely replaced the tedious chemical methods specified in AS K152, Part 14. It is applicable to black coal ash, brown coal ash, coke ash, and mineral matter.

Atomic absorption spectrometry has been chosen for this standard since the instrumentation is relatively inexpensive and is available in most chemical laboratories. A flame atomic absorption method using a hydrofluoric acid digestion procedure is being prepared, and preparation of a method utilizing X-ray fluorescence spectrometry for the analysis of ash and mineral matter is under consideration.

Methods for the determination of phosphorus and sulphur in coal are not included in this standard as they may be found in other parts of AS 1038, viz:

Sulphur—Part 6, Ultimate Analysis of Coal

Phosphorus—Part 9, Phosphorus in Coal and Coke.

The committee responsible for the preparation of this standard 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 5 and Appendix A:

Australian Coal Industry Research Laboratories Ltd
Department of Mineral Resources, N.S.W.
State Electricity Commission, Victoria
The Broken Hill Proprietary Co. Ltd, Central Research Laboratories
The Broken Hill Proprietary Co. Ltd, Newcastle Works Laboratory.

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

AS 1038	Methods for the Analysis and Testing of Coal and Coke Part 3—Proximate Analysis of Hard Coal Part 4—Proximate Analysis of Coke
AS 2134	Chemical Analysis of Materials by Flame Atomic Absorption Spectroscopy
AS 2135	Glossary of Terms Used in Flame Atomic Absorption Spectroscopy
BS 4237	Report on Reproducibility of Methods of Chemical Analysis used in the Iron and Steel Industry

CONTENTS

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

METHODS FOR THE ANALYSIS AND TESTING OF COAL AND COKE

PART 14.1—ANALYSIS OF COAL ASH, COKE ASH AND MINERAL MATTER (BORATE FUSION—FLAME ATOMIC ABSORPTION SPECTROMETRIC METHOD)

1 SCOPE. This standard sets out a flame atomic absorption spectrometric method for the determination of aluminium, barium, calcium, iron, magnesium, manganese, potassium, silicon, sodium, strontium, titanium, and zinc in black and brown coal ash, coke ash and mineral matter.

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

TABLE 1

CONCENTRATION RANGES

Element	Reported as oxide	Range percent
Aluminium	Al_2O_3	1.0 - 70
Barium	BaO	0.01 - 2.5
Calcium	CaO	0.05 - 40
Iron	Fe_2O_3	0.05 - 40
Magnesium	MgO	0.05 - 40
Manganese	Mn_3O_4	0.005 - 1
Potassium	K_2O	0.01 - 6
Silicon	SiO_2	1.0 - 85
Sodium	Na_2O	0.05 - 10
Strontium	SrO	0.01 - 0.5
Titanium	TiO_2	0.01 - 12.5
Zinc	ZnO	0.01 - 0.5

NOTE: Table 1 has been devised to accommodate any type of coal ash, coke ash or mineral matter which is likely to arise from Australian coals. The results contained in Table 5 have been obtained from test work carried out on the available samples. Even though the values contained in Table 5 do not always cover the range of coals likely to exist, it is expected that the methods will be applicable to the ranges specified in Table 1 because they have been tested using the calibration standards.