

Australian Standard[®]

Coal and coke—Analysis and testing

Part 6.1: Higher rank coal and coke—Ultimate analysis—Carbon and hydrogen

This Australian Standard was prepared by Committee MN/1, Coal and Coke. It was approved on behalf of the Council of Standards Australia on 17 January 1997 and published on 5 April 1997.

The following interests are represented on Committee MN/1:

ACIRL

Australasian Institute of Mining and Metallurgy

Australian Coal Association

Australian Coal Preparation Society

Australian Institute of Energy

Bureau of Steel Manufacturers of Australia

Coalfield Geology Council of New South Wales

CSIRO, Division of Coal and Energy Technology

Department of Mines and Energy, Queensland

Electricity Supply Association of Australia

Institution of Engineers, Australia

Minerals Council of Australia

Queensland Coal Board

Royal Australian Chemical Institute

University of Newcastle

University of New South Wales

University of Queensland

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 Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine '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which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.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 Standards Australia, 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.

This Standard was issued in draft form for comment as DR 96060.

Australian Standard[®]

Coal and coke—Analysis and testing

Part 6.1: Higher rank coal and coke—Ultimate analysis—Carbon and hydrogen

Originated as part of AS CK2.3—1949.
Previous editions AS 1038.6.1—1986 and part of AS 1038.7—1981.
Revised, amalgamated and redesignated in part as AS 1038.6.1—1997.

PREFACE

This Standard was prepared by the Standards Australia Subcommittee on Coal Evaluation under the direction of the Committee on Coal and Coke as a revision of AS 1038.6.1—1986, *Methods for the analysis and testing of coal and coke*, Part 6.1: *Ultimate analysis of higher rank coal—Determination of carbon and hydrogen*, and (in part) of AS 1038.7—1981, *Methods for the analysis and testing of coal and coke*, Part 7: *Ultimate analysis of coke*.

Major differences from the previous edition are as follows:

- (a) The Standard has been modified to incorporate the determination of carbon and hydrogen in coke.
- (b) Inclusion of a clause covering safety aspects.

CONTENTS

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

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

FOREWORD

The ultimate analysis of coal and coke comprises the determination of the elements carbon, hydrogen, nitrogen and sulfur. Determination of the total amounts of these elements, regardless of their origin, is described. Carbon includes that present in the mineral carbonates and hydrogen includes that present both in the moisture (for which a correction is made in the calculation) and in water of constitution in the mineral matter. All nitrogen is assumed to be present in the coal and coke substance. Sulfur is normally present in three forms: inorganic sulfides such as iron pyrites (FeS_2), inorganic sulfates associated with the mineral matter and organic sulfur in the coal and coke substance.

An estimate of the percentage of oxygen on an air-dry basis can be obtained by subtracting the sum of the determined percentages of moisture, ash, carbon, hydrogen, nitrogen and sulfur from 100. The value thus obtained should be termed 'oxygen by difference' (see AS 1038.16). A more satisfactory value for oxygen by difference is obtained where the ultimate analysis is expressed on a dry, mineral matter-free basis after making all appropriate corrections.

STANDARDS AUSTRALIA

Australian Standard

Coal and coke—Analysis and testing

Part 6.1: Higher rank coal and coke—Ultimate analysis—
Carbon and hydrogen

1 SCOPE This Standard sets out methods for the gravimetric determination of carbon and hydrogen in higher rank coal and coke using the high temperature combustion method.

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: Ultimate analysis of higher rank coal—Determination of total sulfur (high temperature combustion method)
- 1038.16 Part 16: Assessment and reporting of results
- 2243 Safety in laboratories
- 2418 Coal and coke—Glossary of terms
- 2508 Safe storage and handling information cards for hazardous materials
- 2706 Numerical values—Rounding and interpretation of limiting values
- 4264 Coal and coke—Sampling
- 4264.1 Part 1: Higher rank coal—Sampling procedures
- 4264.2 Part 2: Coke—Sampling procedures

BS

- 1041 Code for temperature measurement

ISO

- 1994 Hard coal—Determination of oxygen content

3 DEFINITIONS For the purpose of this Standard, the definitions given in AS 2418 apply.

4 PRINCIPLE A known mass of sample is burned at a temperature of 1350°C in a rapid current of oxygen, so that all carbon is converted to carbon dioxide and all hydrogen to water. Chlorine and oxides of sulfur are retained in the combustion tube by silver gauze. Schutze reagent is included in the absorption train to ensure complete oxidation of carbon and sulfur oxides. Manganese dioxide is included to ensure complete removal of residual oxides of sulfur. The water formed is absorbed by magnesium perchlorate and the carbon dioxide by sodium hydroxide on an inert base.

The value for hydrogen is corrected for that present as moisture in the sample.

5 SAFETY For information on laboratory safety, reference should be made to the relevant parts of AS 2243 and AS 2508.