Australian Standard®

Coal and coke—Analysis and testing

Part 6.3.1: Higher rank coal and coke—Ultimate analysis—Total sulfur—Eschka method

This Australian Standard was prepared by Committee MN/1, Coal and Coke. It was approved on behalf of the Council of Standards Australia on 12 September 1997 and published on 5 December 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

This Standard was issued in draft form for comment as DR 96270.

Australian Standard®

Coal and coke—Analysis and testing

Part 6.3.1: Higher rank coal and coke—Ultimate analysis—Total sulfur—Eschka method

Originated in part as part of AS CK2.3—1949.
Previous editions AS 1038.6.3.1—1986 and AS 1038.7—1981.
AS 1038.6.3.1—1986 and part of AS 1038.7—1981 revised, amalgamated and designated AS 1038.6.3.1—1997.

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140

ISBN 0 7337 1510 9

PREFACE

This Standard was prepared by the Standards Australia Subcommittee MN/1/1 on Coal Evaluation under the supervision of the Committee on Coal and Coke, as a revision of AS 1038.6.3.1—1986, *Methods for the analysis and testing of coal and coke*, Part 6.3.1: *Ultimate analysis of higher rank coal—Determination of total sulfur (Eschka method)* and a partial revision of AS 1038.7—1981, *Methods for the analysis and testing of coal and coke* Part 7: *Ultimate analysis of coke*.

The major differences from the previous editions are as follows:

(a) The Standard has been modified to incorporate the determination of total sulfur in coke, allowing the withdrawal of AS 1038.7.

(b) Inclusion of clauses covering definitions and safety.

The objective of this revision is to combine the methods from AS 1038.6.3.1 for coal and AS 1038.7 for coke.

CONTENTS

Page

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 which is present in the mineral carbonates and hydrogen includes that which is present both in moisture (for which a correction is made in the calculation) and in the water of constitution of the argillaceous constituents of the mineral matter. All nitrogen is assumed to be present in the carbonaceous substance. Sulfur is normally present in three forms: inorganic sulfides such as pyrite (FeS_2), inorganic sulfates associated with the mineral matter and organic sulfur in the carbonaceous 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 when 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 6.3.1: Higher rank coal and coke—Ultimate analysis—Total sulfur—Eschka method

1 SCOPE This Standard sets out a method for the determination of total sulfur in the analysis sample of higher rank coal and coke by the Eschka 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
1038.16	Part 16: Assessment and reporting of results
2167	Straight pipettes
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 procedure
4264.2	Part 2: Coke—Sampling procedures
ASTM	
D3177	Total sulfur in the analysis sample of coal and coke

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

3.1 Repeatability (*r*)—the value at or below which the absolute difference between two single test results obtained with the same method on identical test material under the same conditions (same operator, same apparatus, same laboratory and the minimum practical time consistent with separate tests) may be expected to lie with the specified probability. In the absence of other specifications, the probability is 95%.

4 PRINCIPLE A known mass of the sample is ignited in intimate contact with Eschka mixture in an oxidizing atmosphere at 800°C to decompose organic material and to convert all sulfur to sulfate. The sulfate is then dissolved in dilute hydrochloric acid and determined gravimetrically by precipitation with barium chloride.

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