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Australian Standard 1038, Part 10—1980

METHODS FOR THE ANALYSIS AND TESTING OF COAL AND COKE

PART 10—ARSENIC IN COAL AND COKE

STANDARDS ASSOCIATION OF AUSTRALIA
Incorporated by Royal Charter

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

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AUSTRALIAN STANDARD

METHODS FOR THE ANALYSIS AND TESTING OF COAL AND COKE

Part 10 ARSENIC IN COAL AND COKE

AS 1038, Part 10—1980

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PREFACE

This standard was prepared by the Association's Committee on Coal and Coke under the direction of the Chemical Standards Board as part of the process of revision and metrication of standards for the analysis and testing of coal and coke. It replaces AS K152, Part 10—1965 which was the endorsement of BS 1016: Part 10: 1960 but which was withdrawn when BS 1016: Part 10: 1957 was revised in 1977. The major alteration from AS K152, Part 10 is the deletion of the 'paper stain' method.

The wet oxidation procedure and the subsequent procedure for the determination of arsenic are technically equivalent to that specified in ISO R 601. However, the dry oxidation procedure differs from that specified in ISO R 601 in the oxidants used and the maximum temperature reached.

This standard requires reference to the following standards:

AS 1038	Methods for the Analysis and Testing of Coal and Coke Part 16—Reporting of Results
AS 1152	Test Sieves
AS 1676	Methods for the Sampling of Hard Coal
AS 1898	Methods for the Sampling of Coke
AS 2165	Burettes and Bulb Burettes
AS 2166	One-mark Pipettes
BS 3875	Optical Spectrophotometric Cells
AS	Interchangeable Conical Ground Joints*
ISO R 601	Determination of Arsenic in Coal and Coke

*In course of preparation.

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STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

METHODS FOR THE ANALYSIS AND TESTING OF COAL AND COKE

PART 10—ARSENIC IN COAL AND COKE

1 SCOPE. This standard sets out two procedures for the determination of the arsenic content of coal and coke.

2 SAMPLE. The coal and coke used for the determination of arsenic shall be the analysis sample ground to pass a 212 μm test sieve complying with AS 1152, taken and prepared according to AS 1674 or AS 1898, as appropriate. Coal samples shall be brought into equilibrium with the laboratory atmosphere by exposure in a thin layer on a tray. All samples, whether coal or coke, shall be thoroughly mixed, preferably by mechanical means, immediately before the determination.

3 WET OXIDATION METHOD.

3.1 Principle. The carbonaceous material is removed from a known mass of the sample and the arsenic is taken into solution by repeated oxidation with nitric acid in the presence of sulphuric acid. The arsenic in solution is reduced to the trivalent state and evolved as arsine by the action of zinc. The arsine is absorbed and oxidized to arsenic acid in a dilute iodine solution. Treatment with ammonium molybdate solution and reduction with hydrazinium sulphate produces a molybdenum blue coloration, the absorbance of which is proportional to the amount of arsenic present in the sample. The arsenic content is determined by reference to a calibration graph.

3.2 Reagents.

3.2.1 *General.* Unless otherwise specified, all reagents shall be of analytical reagent quality or AsT grade* (arsenic test grade), as appropriate. Distilled or deionized water shall be used throughout.

3.2.2 *Special reagents.*

3.2.2.1 Hydrochloric acid, concentrated (ρ_{20} 1180 kg/m^3).

3.2.2.2 Nitric acid, concentrated (ρ_{20} 1420 kg/m^3, AsT grade).

3.2.2.3 Sulphuric acid, concentrated (ρ_{20} 1840 kg/m^3, AsT grade).

3.2.2.4 Sulphuric acid (approximately 3 mol/L). Carefully add 10 mL of sulphuric acid (3.2.2.3) to 50 mL of water.

*AsT grades complying with the British Pharmacopoeia are suitable.