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Australian Standard 1038, Part 12.1—1979

METHODS FOR THE ANALYSIS AND TESTING OF COAL AND COKE

Part 12.1— DETERMINATION OF CRUCIBLE SWELLING NUMBER OF COAL

STANDARDS ASSOCIATION OF AUSTRALIA
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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 and Development

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 CH/15, Coal and Coke, was approved by the Chemical Standards Board on behalf of the Council of the Standards Association of Australia on 12 April 1979, and was published on 1 August 1979.

In order to keep abreast of progress in industry, Australian standards are regularly reviewed. Suggestions for improvements to published standards, addressed to the head office of the Association, are welcomed.

This standard was issued in draft form for public review as DR 78103.

AUSTRALIAN STANDARD

METHODS FOR THE ANALYSIS AND TESTING OF COAL AND COKE

Part 12.1 DETERMINATION OF CRUCIBLE SWELLING NUMBER OF COAL

AS 1038, Part 12.1—1979

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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. It is a part revision and metrication of AS K152, Part 12—1965, Caking and Swelling Properties of Coal, which it supersedes. AS K152, Part 12, was the endorsement of BS 1016, Part 12—1959, and this revised Australian standard is based on the draft revision of BS 1016, Part 12, and on ASTM D 720, Free Swelling Index of Coal. Consideration was also given to ISO 501, Coal—Determination of the Crucible Swelling Number.

Whereas AS K152, Part 12, contained methods for the determination of both the crucible swelling number and the caking power of a coal, the methods have been separated during this revision. The method which follows describes a procedure for determining only the crucible swelling number of coal.

Other sections of Part 12 are—

Part 12.2 Assessment of Caking Power of Hard Coal. Gray-King Coke Type Test*

Part 12.3 Determination of Dilatometer Index of Coal*

The method differs from ISO 501, in respect of the following:

(a) The Australian standard does not specify a procedure for heating the crucible in an electrically heated furnace. It does however permit this method of heating if it can be shown to give the same results as the gas heating method.

(b) The Australian standard specifies a particular procedure for grinding the samples.

(c) The Australian standard does not permit the use of the Teclu burner as this is used specifically with coal gas.

(d) The Australian standard requires the use of liquefied petroleum gas only.

This standard requires reference to the following standards:

AS 1152	Test Sieves
BS 1016	Methods for the Analysis and Testing of Coal and Coke Part 12—Caking and Swelling Properties of Coal
ASTM D 720	Free Swelling Index of Coal

*In course of preparation.

STANDARDS ASSOCIATION OF AUSTRALIA

Australian Standard

METHODS FOR THE ANALYSIS AND TESTING OF COAL AND COKE

PART 12.1—DETERMINATION OF CRUCIBLE SWELLING NUMBER OF COAL

1 SCOPE. This standard describes a method for determining the crucible swelling number of a coal, which is a measure of its swelling properties, when the coal is heated in a covered crucible.

2 DEFINITION. For the purpose of this standard, the following definition applies:

Crucible swelling number—a number which defines, by reference to a series of standard profiles, the size and shape of the residue produced when a suitably prepared sample of coal is heated under standard conditions. It is used in some classification systems as a measure of caking properties. The standard abbreviation is CSN.

3 PRINCIPLE. The coal is heated in a covered crucible under standard conditions and the coke button obtained is classified by comparison with the outlines of a standard set of profiles.

The number of the profile most closely corresponding to the maximum profile of the coke button obtained is the crucible swelling number.

Gas heating equipment is specified. Electrical heating apparatus may be used only if it can be shown that the swelling numbers obtained agree to within a ½ unit of those obtained with the gas heating method.

NOTE: Details of an electrical furnace and procedure are described in ASTM D 720 and BS 1016, Part 12.

4 PREPARATION OF COAL SAMPLE. The coal used for the determination of the swelling number is prepared in accordance with Appendix A so that more than 95 percent of the sample passes a 212 μm test sieve conforming to AS 1152. The test should be carried out as soon as possible, and no later than 24 h, after the sample has been prepared. The sample should be thoroughly mixed before the determination is carried out.

NOTE: Very fine grinding of the coal and undue exposure of the coal to the air are liable to produce erroneous results and should be avoided.

5 APPARATUS. The following apparatus is required:

(a) *Crucible and lid* (See Fig. 1). The crucible shall be made of translucent silica, and shall have a silica lid. The crucible shall be of a squat form and the lower surface of the crucible lid shall be flat.