Australian Standard®

Coal and coke—Analysis and testing

Part 12.3: Higher rank coal—Caking and coking properties—Dilatation

This Australian Standard was prepared by Committee MN/1, Coal and Coke. It was approved on behalf of the Council of Standards Australia on 10 September 1993 and published on 13 December 1993.

The following interests are represented on Committee MN/1:

Australasian Institute of Mining and Metallurgy
Australian Chamber of Commerce and Industry
Australian Coal Association
Australian Coal Industry Research Laboratories
Australian Coal Preparation Society
Australian Institute of Energy
Australian Mining Industry Council
Bureau of Steel Manufacturers of Australia
CSIRO, Division of Coal and Energy Technology
Department of Resource Industries, Queensland
Electricity Supply Association of Australia
Institution of Engineers, Australia
National Association of Testing Authorities, Australia
Queensland Coal Board
Royal Australian Chemical Institute
Standing Committee on Coalfield Geology of New South Wales
University of Newcastle
University of New South Wales
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PREFACE

This Standard was prepared by the Standards Australia Subcommittee on Coal Evaluation, under the supervision of the Committee on Coal and Coke and the direction of the Multitechnics Standards Policy Board, as a revision of AS 1038.12.3—1984, *Methods for the analysis and testing of coal and coke*, Part 12.3: *Determination of the dilatometer characteristics of higher rank coal*. It describes procedures for determining the dilatometer characteristics of higher rank coal using a metal-core furnace. It is based on ISO 8264:1989, *Hard coal—Determination of the swelling properties using a dilatometer* and BS 1016, *Methods for analysis and testing of coal and coke*, Section 107.3:1990, *Determination of swelling properties using a dilatometer*, both of which are Ruhr dilatometer methods. Solid core furnaces are specified in all these standard methods.

This Standard is one of a series of Standards for assessing physical properties of coal. The other parts of this series are as follows:

Part 12.1: Crucible swelling number
Part 12.2: Gray-King coke type
Part 12.4: Plasticity—Gieseler method

The precision data reported in Clause 10 have been taken directly from ISO 8264.

The changes from the previous edition of this Standard are as follows:

(a) Deletion of use of an air-core furnace, due to inherent problems in achieving the designated temperature characteristics of the furnace.

(b) Inclusion of a measuring device for checking mould dimensions.

(c) Addition of checking for wear on the retorts.

(d) Alignment of precision with that given in ISO 8264.

The term ‘normative’ has been used in this Standard to define the application of the appendix to which it applies. A ‘normative’ appendix is an integral part of a Standard.

CONTENTS

STANDARDS AUSTRALIA

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1 SCOPE This Standard sets out a method for obtaining a quantitative measure of the dilatation of higher rank coal.

2 REFERENCED DOCUMENTS The following documents are referred to in this Standard:

AS
1038 Coal and coke—Analysis and testing
1038.16 Part 16: Acceptance and reporting of results
1152 Test sieves
2096 Classification and coding systems for Australian coals
2243 Safety in laboratories
2418 Glossary of terms relating to solid mineral fuels
2508 Safe storage and handling information cards for hazardous materials
2646 Sampling of solid mineral fuels
2646.6 Part 6: Hard coal—Preparation of samples

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

3.1 Duplicate dilatation tests—tests carried out at different times on two coal pencils prepared before each heating cycle from a single coal sample and treated in the same retort in the same furnace in independent heating cycles by the same operator.

3.2 Higher rank coal (as defined in AS 2096)—coal having a gross specific energy of 21.00 MJ/kg or greater on an ash-free, moist basis *and* a gross specific energy of 27.00 MJ/kg or greater on a dry, ash-free basis.

3.3 Maximum contraction—the maximum downward movement of the dilatometer piston, measured from the zero point and expressed as a percentage of the initial pencil length (see Figure 1(c)). However, if the final trace of the curve is not truly horizontal but slopes downward, the maximum contraction is the value observed at 500°C (see Figure 1(d)).

3.4 Maximum dilatation—the maximum upward movement of the dilatometer piston after contraction, measured from the zero point and expressed as a percentage of the initial pencil length. The value can be either positive or negative (see Figure 1).

3.5 Temperature of initial contraction—the temperature at which the downward movement of the dilatometer piston is 0.5 mm (see T_1 in Figure 1).

3.6 Reference retort and piston—a retort and piston assembly used less than 25 times.

3.7 Parallel dilatation tests—tests carried out simultaneously on two coal pencils prepared at the same time from a single coal sample and treated in two retorts in the same furnace during a single heating cycle.