Australian Standard®

Methods for the analysis and testing of coal and coke

Part 13: Tests specific to coke

This Australian Standard was prepared by Committee MN/1, Coal and Coke. It was approved on behalf of the Council of Standards Australia on 21 September 1989 and published on 19 January 1990.

The following interests are represented on Committee MN/1:

Australasian Institute of Mining and Metallurgy

Australian Coal Association

Australian Coal Industry Research Laboratories

Australian Coal Preparation Society

Australian Institute of Energy

Bureau of Steel Manufacturers of Australia

Confederation of Australian Industry

CSIRO, Division of Coal Technology

Department of Minerals and Energy, N.S.W.

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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 Minerals Standards Board to supersede AS 1038.13–1976, *Methods for the analysis and testing of coal and coke*, Part 13: *Tests special to coke*, and to include newer tests now relevant to coke testing.

This Standard is now divided into the following tests:

(a) Determination of mechanical strength:

  (i) Micum and IRSID tests.

  (ii) ASTM test.

  (iii) JIS tests.

  (iv) Shatter test.

(b) Determination of coke reactivity index and coke strength after reaction.

Other tests included in the 1976 edition will be relocated in other Standards.

Determination of bulk density is now included in a new Standard on the bulk density of higher rank coal and coke, and determination of relative density and apparent relative density will be included in AS 1038.21, *Methods for the analysis and testing of coal and coke*, Part 21: *Determination of the relative density of higher rank coal and coke*.

CONTENTS

Page

STANDARDS AUSTRALIA

Australian Standard

Methods for the analysis and testing of coal and coke

Part 13: Tests specific to coke

SECTION 1. SCOPE AND GENERAL

1.1 SCOPE. This Standard sets out procedures for the determination of properties which are specific to coke. The various Sections cover the determination of mechanical strength, reactivity and post-reaction strength.

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

AS
1038 Methods for the analysis and testing of coal and coke
1038.16 Part 16: Acceptance and reporting of results
1038.18 Part 18: Size analysis of coke
1152 Test sieves
2243 Safety in laboratories
2418 Glossary of terms relating to solid mineral fuels
2646 Sampling of solid mineral fuels
2646.3 Part 3: Coke—Sampling from moving streams
2646.5 Part 5: Coke—Sampling from stationary situations
2646.7 Part 7: Coke—Preparation of samples
2706 Numerical values—Rounding and interpretation of limiting values

ISO
556 Coke (greater than 20 mm in size)—Determination of mechanical strength

ASTM
D 3402 Method for tumbler test for coke

BS
1016 Methods for analysis and testing of coal and coke
Part 13: Tests special to coke

JIS
K2151 Testing methods for testing of coke

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

1.3.1 Coke—the agglomerated product of coal carbonization, generally at a temperature in excess of 900°C.

1.3.2 Micum indices—the percentages of a specially prepared sample of coke remaining on a 40 mm round-hole test sieve and passing a 10 mm round-hole test sieve (denoted M_{40} and M_{10} respectively) after the sample has been subjected to 100 revolutions by a specified procedure in a specified rotating drum.

NOTE: Other indices, e.g. M_{30} and M_{20}, may be reported if required.

1.3.3 IRSID indices—the percentages of a specially prepared sample of coke remaining on a 20 mm round-hole sieve and passing a 10 mm round-hole sieve (denoted I_{20} and I_{10} respectively) after the sample has been subjected to 500 revolutions in a specified rotating drum.

1.3.4 ASTM coke strength factors—the percentage of a specially prepared sample of coke remaining on a square-hole sieve of 25 mm (stability factor) or of 6.3 mm (hardness factor) after 1400 revolutions in a specified rotating drum.

1.3.5 JIS indices—the percentages of a specially prepared sample of coke remaining on a 15 mm square-hole sieve after 30 revolutions or 150 revolutions in a specified rotating drum (designated at DI_{50}^{30} and DI_{50}^{150} respectively).

NOTE: Other indices, e.g. DI_{50}^{30} and DI_{50}^{150}, may be reported if required.

1.3.6 Shatter indices—the percentages of a specially prepared sample of coke remaining on square-hole test sieves after the sample has been subjected to a specified dropping procedure.

1.3.7 Coke reactivity index (*CRI*)—the percentage of a specially prepared sample of coke which reacts with carbon dioxide under specified conditions.

1.3.8 Coke strength after reduction (*CSR*) (post-reaction strength)—the percentage of a specially prepared sample of coke which, after reacting with carbon dioxide, remains on a 10 mm square-mesh sieve after rotating for 600 revolutions in a special tumbler.

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

1.5 SAMPLE. Sampling procedures are described in AS 2646.3 and AS 2646.5.