Australian Standard®

Coal and coke—Analysis and testing

Part 21.2: Higher rank coal and coke—Relative density—Lump sample

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 August 1992 and published on 14 December 1992.

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

Bureau of Steel Manufacturers of Australia

CSIRO, Division of Coal and Energy Technology

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This Standard was issued in draft form for comment as DR 91170.

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First published as part of AS 1038.21—1983.
Revised and redesignated in part as AS 1038.21.2—1992.

PUBLISHED BY STANDARDS AUSTRALIA
(STANDARDS ASSOCIATION OF AUSTRALIA)
1 THE CRESCENT, HOMEBUSH, NSW 2140
ISBN 0 7262 7799 1

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 part revision of AS 1038.21, *Methods for the analysis and testing of coal and coke*, Part 21: *Determination of the relative density and apparent relative density of hard coal.* The major differences from the 1983 edition are as follows:

(a) The division of AS 1038.21 into a two part Standard.

(b) The inclusion of the density methods from AS 1038.13, *Methods for the analysis and testing of coal and coke*, Part 13: *Tests specific to coke.* These methods have been excluded from the revised version of that Standard.

(c) Deletion of apparent relative density in favour of relative density of lump sample.

The following parts of the Standard now apply:

Part 21.1: *Higher rank coal and coke—Relative density—Analysis sample.*

Part 21.2: *Higher rank coal and coke—Relative density—Lump sample.*

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Australian Standard

Coal and coke—Analysis and testing

Part 21.2: Higher rank coal and coke—Relative density—Lump sample

1 SCOPE This Standard sets out two methods for the determination of the relative density of bulk samples of coal, and one method for coke.

The methods are as follows:

(a) *Coal*

(i) *Immersion method* This method is applicable to porous coals and single-lump samples that do not break down in water, and for coals that do not absorb water to a significant extent under the conditions of the test.

(ii) *Paraffin wax film method* This method is applicable to single-lump samples or samples containing a relatively small number of lumps, each of which may be hand-coated with an impervious wax film.

(b) *Coke* The drainage method is used to take into account the difficulties in the determination of the relative density of coke due to water draining out of large pores after immersion in water. This may be overcome by limiting the drainage period to 10 s.

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

AS
2096 Classification and coding systems for Australian coals

2243 Safety in laboratories

2508 Safe storage and handling information cards for hazardous materials

2706 Numerical values—Rounding and interpretation of limiting values

3 DEFINITIONS For the purpose of this Standard, the definitions below apply.

3.1 Relative density of lump sample—the ratio of the mass of a volume of a sample, to the mass of an equal volume of water (at the same temperature), inclusive of any voids within the lumps subjected to the test.

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

3.3 Higher rank coal (as defined in AS 2096)—coal having a gross specific energy of 21 MJ/kg or greater on an ash-free, moist basis *and* a gross specific energy of 27 MJ/kg or greater on a dry, ash-free basis.

4 PRINCIPLE The mass of water displaced by the lump coal is determined by weighing the sample in air and in water.

5 SAFETY For information on laboratory safety, reference should be made to the relevant parts of AS 243 and AS 2508.

6 APPARATUS The following apparatus is required (a suitable arrangement is shown in Figure 1):

(a) *Cage*—

(i) *Coal*—cage of 0.01 m^3 capacity made from galvanized steel wire netting of 1 mm mesh, fitted with a lid of the same material.

(ii) *Coke*—cage of 0.03 m^3 capacity, made from galvanized steel wire netting of 13 mm mesh, fitted with a lid of the same material and a fastening device.

In either case, variations in capacity and netting mesh size are permitted, depending on, respectively, the mass of sample to be tested and the particle size to be retained.

(b) *Tank*—of approximately 0.3 m^3 capacity, fitted with a tap for emptying. Other tank capacities are permitted to accommodate different cage capacities. The tank should be constructed from transparent material so that the sample can be observed during the test.

(c) *Drying oven*—capable of containing the cage.