

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
Department of Resource Industries, Queensland
Electricity Supply Association of Australia
Institution of Engineers, Australia
Joint Coal Board
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
University of Queensland

Review of Australian Standards. To keep abreast of progress in industry, Australian Standards are subject to periodic review and are kept up to date by the issue of amendments or new editions as necessary. It is important therefore that Standards users ensure that they are in possession of the latest edition, and any amendments thereto.

Full details of all Australian Standards and related publications will be found in the Standards Australia Catalogue of Publications; this information is supplemented each month by the magazine 'The Australian Standard', which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.

Suggestions for improvements to Australian Standards, addressed to the head office of Standards Australia, are welcomed. Notification of any inaccuracy or ambiguity found in an Australian Standard should be made without delay in order that the matter may be investigated and appropriate action taken.

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

Australian Standard[®]

Coal and coke—Analysis and testing

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

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

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*.

CONTENTS

	<i>Page</i>
1 SCOPE	3
2 REFERENCED DOCUMENTS	3
3 DEFINITIONS	3
4 PRINCIPLE	3
5 SAFETY	3
6 APPARATUS	3
7 SAMPLE	4
8 IMMERSION METHOD (COAL)	4
9 PARAFFIN WAX FILM METHOD (COAL)	4
10 DRAINAGE METHOD (COKE)	4
11 REPORTING OF RESULT	5
12 PRECISION	5
13 TEST REPORT	5

© Copyright — STANDARDS AUSTRALIA

Users of Standards are reminded that copyright subsists in all Standards Australia publications and software. Except where the Copyright Act allows and except where provided for below no publications or software produced by Standards Australia may be reproduced, stored in a retrieval system in any form or transmitted by any means without prior permission in writing from Standards Australia. Permission may be conditional on an appropriate royalty payment. Requests for permission and information on commercial software royalties should be directed to the head office of Standards Australia.

Standards Australia will permit up to 10 percent of the technical content pages of a Standard to be copied for use exclusively in-house by purchasers of the Standard without payment of a royalty or advice to Standards Australia.

Standards Australia will also permit the inclusion of its copyright material in computer software programs for no royalty payment provided such programs are used exclusively in-house by the creators of the programs.

Care should be taken to ensure that material used is from the current edition of the Standard and that it is updated whenever the Standard is amended or revised. The number and date of the Standard should therefore be clearly identified.

The use of material in print form or in computer software programs to be used commercially, with or without payment, or in commercial contracts is subject to the payment of a royalty. This policy may be varied by Standards Australia at any time.

STANDARDS AUSTRALIA

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) exclusive 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 m³ 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 m³ 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 m³ 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.