

Australian Standard[®]

**Coal and coke — Analysis and
testing**

**Part 1: Higher rank coal — Total
moisture**

This Australian Standard was prepared by Committee MN/1, Coal and Coke. It was approved on behalf of the Council of Standards Australia on 3 February 1992 and published on 15 June 1992.

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 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which subscribing members receive, and which gives details of new publications, new editions and amendments, and of withdrawn Standards.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.

Australian Standard[®]

Coal and coke — Analysis and testing

Part 1: Higher rank coal — Total moisture

First published as part of AS CK2.3–1949.
Revised and redesignated in part as AS K152.1–1965
(endorsement of BS 1016.1–1957 with amendment).
AS K152.1–1965 withdrawn 1978.
AS K152.1–1965 revised and redesignated AS 1038.1–1980.
Second edition 1992.
Incorporating:
Amdt 1–1993

PREFACE

This Standard was prepared by the Standards Australia Subcommittee on Coal Evaluation, under the supervision of the Committee on Coal and Coke, as a revision of AS 1038.1–1980, *Methods for the analysis and testing of coal and coke*, Part 1: *Total moisture in hard coal*.

The Standard contains a method for determination of free moisture and three methods for the determination of the residual moisture content of higher rank coal, viz. direct volumetric method (Method A), drying in nitrogen (Method B), and drying in air (Method C).

Basically, there is little difference between the methods specified in the 1980 edition and those in this revised edition. However, the 1980 edition specified a maximum particle size of 3 mm for Methods A and B and a maximum of approximately 20 mm for Method C. Maximum particle sizes specified in this Standard are 4 mm for Methods A and B and 11.2 mm for Method C. These sizes conform with recognized international sieve apertures.

This Standard is not technically equivalent to ISO 589:1981, *Hard coal – Determination of total moisture*.

© 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.

CONTENTS

	<i>Page</i>
SECTION 1 SCOPE AND GENERAL	
1.1 SCOPE	4
1.2 REFERENCED DOCUMENTS	4
1.3 DEFINITIONS	4
1.4 SAFETY	4
1.5 SAMPLES	4
1.6 CALCULATION OF TOTAL MOISTURE	5
1.7 PRECISION	5
1.8 REPORTING OF RESULT	5
1.9 TEST REPORT	5
SECTION 2 DETERMINATION OF FREE MOISTURE	
2.1 SCOPE	6
2.2 PRINCIPLE	6
2.3 APPARATUS	6
2.4 DRYING TIME	6
2.5 PROCEDURE	6
2.6 CALCULATION OF RESULT	6
SECTION 3 DETERMINATION OF MOISTURE IN THE AIR-DRY SAMPLE (RESIDUAL MOISTURE)	
3.1 SCOPE	7
3.2 DISTILLATION (METHOD A)	7
3.3 DRYING IN NITROGEN (METHOD B)	8
3.4 DRYING IN AIR (METHOD C)	8
APPENDIX A PREFERRED SCHEME FOR DETERMINATION OF TOTAL MOISTURE	12

STANDARDS AUSTRALIA

Australian Standard

Coal and coke – Analysis and testing

Part 1: Higher rank coal – Total moisture

SECTION 1 SCOPE AND GENERAL

1.1 SCOPE This Standard sets out methods for the determination of total moisture, free moisture and residual moisture in higher rank coal. The methods are as follows:

- (a) Drying in air, for free moisture.
- (b) Distillation (Method A), for residual moisture.
- (c) Drying in nitrogen (Method B), for residual moisture.
- (d) Drying in air (Method C), for residual moisture.

Methods A and B are applicable to all higher rank coals. Method C is applicable only to higher rank coals that are known not to be susceptible to significant oxidation.

Where the sample is visibly wet, determination of residual moisture by Method A, B or C is generally preceded by the determination of free moisture, unless the sample is suitable for the direct determination of total moisture using Method C.

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
- 2096 Classification and coding systems for Australian coals
- 2243 Safety in laboratories
- 2508 Safe storage and handling information cards for hazardous materials
- 2646 Sampling of solid mineral fuels
- 2706 Numerical values – Rounding and interpretation of limiting values

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

1.3.1 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.

1.3.2 Total moisture – the moisture in the coal as sampled or as received (M_{as}).

1.3.3 Free moisture – the moisture that is lost by the coal sample in attaining equilibrium with the air to which it is exposed (M_f).

1.3.4 Moisture in the air-dry sample (residual moisture) – the moisture remaining (subject to ambient conditions) in the coal sample after it has attained equilibrium with the air to which it is exposed (M_r).

1.3.5 Gross sample – a sample formed when all the increments collected from a lot or sampling unit are combined for reduction to a laboratory sample.

1.3.6 Common sample – a gross sample from which the laboratory samples for total moisture and for general analysis are prepared.

1.3.7 Moisture sample – a sample to be used exclusively for the determination of total moisture.

1.4 SAFETY For information on laboratory safety, reference should be made to the relevant parts of AS 2243 and AS 2508.

1.5 SAMPLES

1.5.1 General Sampling and sample preparation procedures for total moisture determination are described in AS 2646.

NOTE: The preferred sampling scheme for determination of total moisture is presented in Appendix A.

1.5.2 Types of samples to be tested The sample to be tested will be either –

- (a) a common sample; or
- (b) a moisture sample.

The procedure for extraction of a moisture sample from the bulk sample is described in AS 2646.