

Australian Standard™

Coal and coke—Analysis and testing

**Part 25: Coal—Durham cone
handleability test**

This Australian Standard was prepared by Committee MN-001, Coal and Coke. It was approved on behalf of the Council of Standards Australia on 14 July 2002 and published on 25 July 2002.

The following are represented on Committee MN-001:

Australasian Institute of Mining and Metallurgy
Australian Coal Association
Australian Coal Preparation Society
Australian Institute of Energy
Bureau of Steel Manufacturers of Australia
CSIRO, Energy Technology
Coalfield Geology Council of New South Wales
Department of Mines and Energy, Queensland
Electricity Supply Association of Australia
Institution of Engineers, Australia
Minerals Council of Australia
University of Newcastle
University of New South Wales
University of Queensland

Keeping Standards up-to-date

Standards are living documents which reflect progress in science, technology and systems. To maintain their currency, all Standards are periodically reviewed, and new editions are published. Between editions, amendments may be issued. Standards may also be withdrawn. It is important that readers assure themselves they are using a current Standard, which should include any amendments which may have been published since the Standard was purchased.

Detailed information about Standards can be found by visiting the Standards Australia web site at www.standards.com.au and looking up the relevant Standard in the on-line catalogue.

Alternatively, the printed Catalogue provides information current at 1 January each year, and the monthly magazine, *The Australian Standard*, has a full listing of revisions and amendments published each month.

We also welcome suggestions for improvement in our Standards, and especially encourage readers to notify us immediately of any apparent inaccuracies or ambiguities. Contact us via email at mail@standards.com.au, or write to the Chief Executive, Standards Australia International Ltd, GPO Box 5420, Sydney, NSW 2001.

Australian Standard™

Coal and coke—Analysis and testing

**Part 25: Coal—Durham cone
handleability test**

First published as AS 1038.25—2002.

COPYRIGHT

© Standards Australia International

All rights are reserved. No part of this work may be reproduced or copied in any form or by any means, electronic or mechanical, including photocopying, without the written permission of the publisher.

Published by Standards Australia International Ltd
GPO Box 5420, Sydney, NSW 2001, Australia

ISBN 0 7337 4739 6

PREFACE

This Standard was prepared by the Standards Australia Committee MN-001, Coal and Coke, as part of the AS 1038, *Coal and coke—Analysis and testing* series.

This Standard has been based on a procedure originally prepared by the Queensland electricity supply industry and subsequently adopted by a number of laboratories in Queensland and New South Wales.

The objective of this Standard is to provide the users of the Durham cone apparatus with a procedure that will allow a determination of the specific flow time of a coal. The specific flow time of coal allows comparison of the relative handleability of different coals or a coal at a range of moisture content. It does not provide information on how a particular coal will perform in a given physical flow situation.

The Standard on bin flow of coal provides a more rigorous relationship between coal properties and bin design parameters. It enables evaluation of how a particular coal will perform in a given bin configuration.

The term 'informative' has been used in this Standard to define the application of the appendix to which it applies. An 'informative' appendix is only for information and guidance.

CONTENTS

	<i>Page</i>
FOREWORD	4
1 SCOPE.....	5
2 REFERENCED DOCUMENTS	5
3 DEFINITIONS	5
4 PRINCIPLE	5
5 SAFETY	5
6 APPARATUS	6
7 SAMPLE.....	6
8 PROCEDURE.....	7
9 CALCULATION	8
10 REPORTING OF RESULTS.....	8
11 PRECISION	8
12 TEST REPORT	8
APPENDICES	
A EXAMPLE CALCULATIONS OF SPECIFIC FLOW TIME AS A FUNCTION OF MOISTURE CONTENT	9
B INTERPRETATION OF RESULTS	12

FOREWORD

The flow or handleability characteristics of a given coal are dependent on a number of variables, including:

- (a) Coal properties such as—
 - (i) size distribution, and in particular the proportion of fines (<4 mm material);
 - (ii) particle shape;
 - (iii) bulk density;
 - (iv) moisture content, and in particular free moisture content;
 - (v) proportion and type of minerals present, and in particular clay minerals; and
 - (vi) chemistry at the coal surface.
- (b) The configuration of the handling system.

The Durham cone apparatus was developed in the United Kingdom as an empirical method for assessing the flow properties of coals, and in particular, the effects of fines and moisture content [1].

The test (refer to references [2],[3],[4]) has been used in Australia as a means of—

- (i) comparing the flow behaviour of coals;
- (ii) assessing the effect of free moisture on the handleability of a particular coal; and
- (iii) assessing the effects of type and proportion of clays present on coal handleability.

Because of the empirical nature of the test, particular attention should be given to the following operations in order to minimize testing errors:

- (A) Subdivision of the bulk coal sample into an appropriate number of test portions.
- (B) Conditioning of the test portions after either stage drying or wetting.
- (C) Avoidance of spillage of sample throughout the testing process.

It is also emphasized that the Durham cone test is intended for testing of –37.5 mm size fraction of the test coal. In many cases, samples prepared from bore cores of less than 100 mm diameter are unsuitable for testing because of a tendency for some coals to produce elongated coal particles atypical of the normal particle shapes of broken coal.

REFERENCES

- [1] HALL, D. A. and CUTRESS, J. O. *The effect of fines content, moisture and added oil on the handling of small coal*. J Inst. Fuel. v33. 1960. pp 63-72.
- [2] LePAGE, A. J. and CRISAFULLI, P. *Walloon coal study*. NERDDP Project No. 82/2109, December 1985, 120 pp.
- [3] MIKKA, M. and SMITHAM, J. *Coal handleability assessment*. Proc. 3rd Australian Coal Preparation Conference, Wollongong, 1985, pp 12 – 27.
- [4] SPERO, C. *Walloon coals: Their properties and power station performance*. Queensland Government Mining Journal, March 1998, pp 26 – 38.