

Australian Standard™

Coal preparation

**Part 2.1: Higher rank coal—Froth
flotation—Basic 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 1 July 2004. This Standard was published on 13 August 2004.

The following are represented on Committee MN-001:

Australasian Institute of Mining and Metallurgy
Australian Building Codes Board
Australian Coal Association
Australian Coal Preparation Society
Australian Institute of Energy
Coalfield Geology Council of NSW
CSIRO Energy Technology
Department of Natural Resources and Mines (Qld)
Energy Supply Association of Australia
Minerals Council of Australia
The University of New South Wales
The University of Queensland
University of Newcastle

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 Standards may also be withdrawn.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 Web Shop 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 Global Standard*, has a full listing of revisions and amendments published each month.

Australian Standards™ and other products and services developed by Standards Australia are published and distributed under contract by SAI Global, which operates the Standards Web Shop.

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.org.au, or write to the Chief Executive, Standards Australia International Ltd, GPO Box 5420, Sydney, NSW 2001.

Australian Standard™

Coal preparation

Part 2.1: Higher rank coal—Froth flotation—Basic test

Originated as AS 2579.1—1983.
Previous edition AS 4156.2.1—1994.
Second edition 2004.

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 6186 0

PREFACE

This Standard was prepared by the Standards Australia Committee MN-001, Coal and Coke, to supersede AS 4156.2.1—1994, *Coal preparation, Part 2.1: Higher rank coal—Froth flotation—Basic test*.

The objective of this Standard is to provide the coal preparation industry with a basic procedure for the froth flotation testing of fine coal which provides a means of evaluating the flotation characteristics of a coal.

The objective of this revision is to make the Australian Standard completely identical with the International Standard.

This Standard is identical with and has been reproduced from ISO 8858-1:1990, *Hard coal—Froth flotation testing, Part 1: Laboratory procedure* and its Corrigendum 1 (2001). The Corrigendum has been attached at the end of the document. It lists editorial corrections to the Scope and Figure 3.

As this Standard is reproduced from an international Standard, the following applies:

- (a) Its number appears on the cover and title page while the International Standard number appears only on the cover.
- (b) A full point substitutes for a comma when referring to a decimal marker.
- (c) In the source text, ‘this part of ISO 8858’ should read ‘this Australian Standard’.

References to International Standards should be replaced by references to Australian Standards as follows:

| <i>Reference to International Standard</i> | | <i>Australian Standard</i> | |
|--|--|----------------------------|---|
| ISO | | AS | |
| 331 | Coal—Determination of moisture in the analysis sample—Direct gravimetric method | 1038 1038.3 | Coal and coke—Analysis and testing Part 3: Proximate analysis of higher rank coal |
| 565 | Test sieves—Metal wire cloth, perforated metal plate and electroformed sheet—Nominal sizes of openings | 1152 | Specification for test sieves |
| 648 | Laboratory glassware—One-mark pipettes | 2166 | Laboratory glassware—One-mark pipettes |
| 1171 | Solid mineral fuels—Determination of ash | 1038 1038.3 | Coal and coke—Analysis and testing Part 3: Proximate analysis of higher rank coal |
| 1213 1213.1 | Solid mineral fuels—Vocabulary Part 1: Terms relating to coal preparation | 2418 | Coal and coke—Glossary of terms |
| 1953 | Hard coals—Size analysis | 3881 | Higher rank coal—Size analysis |
| 1988 | Hard coal—Sampling | 4264 4264.1 | Coal and coke—Sampling Part 1: Higher rank coal—Sampling procedures |

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

CONTENTS

| | <i>Page</i> |
|---|-------------|
| Introduction..... | iv |
| 1. Scope | 1 |
| 2. Normative references | 1 |
| 3. Definitions | 1 |
| 4. Principle..... | 2 |
| 5. Reagents..... | 2 |
| 6. Apparatus | 2 |
| 7. Sampling | 2 |
| 8. Flotation conditions | 3 |
| 9. Procedure | 3 |
| 10. Expression of results..... | 4 |
| 11. Test report..... | 4 |
| Annex | |
| A Recommended layout of a form for a test report..... | 10 |
| Corrigendum 1(2001) | 11 |

INTRODUCTION

The froth flotation of coal has widespread application for the concentration and separation of fine coal particles from mineral matter. The response of coal to the froth flotation process is initially measured by a laboratory scale test. Although the principles used for the laboratory tests are generally similar, the precise type of equipment and techniques used vary considerably.

The procedure for the laboratory froth flotation test sets out, in detail, the type of equipment to be used and the methods to be adopted. The purpose of this procedure is to provide a standard method of test by which a preliminary evaluation of the froth flotation characteristics of a coal can be compared. This need is particularly important for exploration programmes. This part of ISO 8858 also serves as an introduction for operators who are not familiar with the techniques (and problems) associated with the laboratory froth flotation of coals.

AUSTRALIAN STANDARD

Coal preparation

Part 2.1: Higher rank coal—Froth flotation—Basic test

1 Scope

This part of ISO 8858 sets out a laboratory procedure for the froth flotation testing of fine coal, e.g. coal of particle size less than 0,5 mm. The procedure provides a means of evaluating the general flotation characteristics of a coal under a set of specified standard conditions and will not necessarily indicate the full flotation potential of that coal.

The flotation characteristics of coals are sensitive to changes in flotation conditions. These conditions can be changed by varying such basic parameters as flotation time, reagent and dosage rate. Separate flotation tests are required to assess the effect of varying these parameters to determine the best flotation conditions for a particular coal. A method of evaluating flotation response will be given in a separate standard.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this part of ISO 8858. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this part of ISO 8858 are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 331:1983, *Coal — Determination of moisture in the analysis sample — Direct gravimetric method*.

ISO 565:1990, *Test sieves — Metal wire cloth, perforated metal plate and electroformed sheet — Nominal sizes of openings*.

ISO 648:1977, *Laboratory glassware — One-mark pipettes*.

ISO 1171:1981, *Solid mineral fuels — Determination of ash*.

ISO 1213-1:1982, *Solid mineral fuels — Vocabulary Part 1: Terms relating to coal preparation*.

ISO 1953:1972, *Hard coals — Size analysis*.

ISO 1988:1975, *Hard coal — Sampling*.

3 Definitions

For the purposes of this part of ISO 8858, the definitions in ISO 1213-1 apply. The following definitions from ISO 1213-1 are repeated for information only.

3.1 collector; collecting agent: A reagent added to a pulp to bring about adhesion between solid particles and air bubbles.

3.2 flotation concentrate: The clean product recovered in froth flotation.

3.3 conditioning: The preparatory stage in the flotation process in which the reagents are brought into intimate contact with the solids of the pulp.

3.4 frother; frothing agent: A reagent used to control the size and stability of the air bubbles in the flotation process.

3.5 froth flotation: A process for cleaning fine coal in which the coal, with the aid of a reagent or reagents, becomes attached to air bubbles in a liquid medium and floats as a froth.

3.6 pulp: A mixture of solid particles and water.