AS 5142:2016

Dewatering characteristics of coarse coal in a vibrating centrifuge

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- Australasian Institute of Mining and Metallurgy
- Australian Coal Industry Reference Samples
- Australian Coal Preparation Society
- Australian Energy Council
- CSIRO
- Department of Natural Resources and Mines, Qld
- Minerals Council of Australia
- National Association of Testing Authorities Australia
- University of Newcastle
- University of New South Wales
- University of Queensland

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Australian Standard®

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PREFACE

This Standard was prepared by the Standards Australia Committee MN-001, Coal and Coke, as a new Standard.

The moisture content of a product from a coal preparation plant is an important factor with respect to the quality and value of the coal. A significant majority of the product coal is coarse (nominally plus 0.5 mm) and has been cleaned in a water based process. After the cleaning step the product coal is screened to remove the majority of the water, then usually passed through a centrifuge to remove as much of the remaining water as possible.

It has been found that there are distinct limits to the final moisture contents that can be achieved. This is due to there being three types of water associated with the feed to the centrifuge, i.e. water which has little relationship with the coal and can be centrifuged off very easily; water which is closely related to the coal surface termed Experimentally Centrifugable Moisture (ECM); and water on the surface and in the internal pore structure of the coal, which cannot be removed by centrifugation at commercially available G forces, termed the Non Centrifugable Moisture (NCM).

This Standard specifies a laboratory test using the analysis of individual size fractions of a sample of product coal to provide an estimate of NCM values. The values generated from the tests are used to provide an estimate of the moisture held internally in the coal. This value varies markedly for different coals.

This Standard provides quantitative information with regard to the dewatering characteristics of a coarse coal in a vibrating basket centrifuge via an estimate of the amount of moisture held internally in the coal's pore structure (NCMi) and the potential moisture of the coal (NCM + ECM) after it has passed through a conventional vibrating basket centrifuge.

The term 'normative' has been used in this Standard to define the application of the appendix to which it applies. A 'normative' appendix is an integral part of a Standard.

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Dewatering characteristics of coarse coal in a vibrating centrifuge

1 SCOPE

This Standard specifies the apparatus and methods for determining the following three moisture elements that make up the final moisture content of a coarse (nominally 50 mm to 0.5 mm) product coal after centrifugation:

(a) Exponentially Centrifugable Moisture (ECM).

(b) Non Centrifugable Moisture (NCM).

(c) Non Centrifugable Moisture Internal (NCMi).

NOTE: Figure 1 illustrates how this Standard relates to commonly used moisture terms (shaded area).

WARNING: USE OF THIS STANDARD CAN INVOLVE HAZARDOUS MATERIALS, OPERATIONS AND EQUIPMENT. THIS STANDARD DOES NOT PURPORT TO ADDRESS ALL OF THE SAFETY ISSUES ASSOCIATED WITH ITS USE. IT IS THE RESPONSIBILITY OF THE USER OF THIS STANDARD TO ESTABLISH APPROPRIATE SAFETY AND HEALTH PRACTICES AND DETERMINE THE APPLICABILITY OF REGULATORY LIMITATIONS PRIOR TO USE.

2 REFERENCED DOCUMENTS

The following documents are referred to in this Standard:

AS
1152 Specification for test sieves

2418 Coal and coke—Glossary of terms

ISO
13909 Hard coal and coke—Mechanical sampling
13909-1 Part 1: General introduction

3 DEFINITIONS

For the purpose of this Standard the definitions given in AS 2418 and those below apply:

3.1 Exponentially Centrifugable Moisture (ECM)

Water closely related to the surface of the coal, and therefore results in a slow rate of moisture removal during centrifugation (exponential with time).

3.2 Non Centrifugable Moisture (NCM)

The moisture content of the coal after centrifugation in the laboratory test, i.e. the moisture content 'unrecoverable by centrifugation'.

3.3 Non Centifugable Moisture Internal (NCMi)

An internal moisture closely related to the pore structure of the coal.

3.4 Non Centrifugable Moisture Surface (NCMs)

Water closely related to surface particles and surface topography. This moisture can be expressed as the difference between NCM and NCMi.

NOTE: A diagrammatic description of these definitions is given in Figure 1.