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Australian Technical Specification

Iron ores—Rapid moisture determination

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The following are represented on Committee MN-002:

- Australasian Institute of Mining and Metallurgy
- Chamber of Minerals and Energy of Western Australia
- CSIRO Minerals
- Minerals Council of Australia
- Royal Australian Chemical Institute

Standards Australia wishes to acknowledge the participation of the expert individuals that contributed to the development of this Technical Specification through their representation on the Committee.

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PREFACE

This Australian Technical Specification was prepared by the Standards Australia Committee MN-002, Iron Ores and Direct Reduced Iron.

This document is based on ISO 3087, *Iron ores—Determination of the moisture content of a lot*. It is distinct from ISO 3087 in that it allows for rapid drying of the iron ore test sample by radiant and conduction heating whereas ISO 3087 implies that slower convection heating will be used.

In all other aspects, except for the duration of drying, which due to the much higher efficiency of the radiant and conduction heating being considerably shortened, this document does not differ from the prescriptions of ISO 3087.

Aspects that carry over virtually unchanged from ISO 3087 are test sample mass, number of tests to be carried out, test samples size, end-point determination and the calculation of the moisture content.

The terms ‘normative’ and ‘informative’ have been used in this Standard to define the application of the appendix to which they apply. A ‘normative’ appendix is an integral part of a Standard, whereas an ‘informative’ appendix is only for information and guidance.

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FOREWORD

Recently, the shipment of iron ore worldwide has become subject to the issue of transportable moisture limit (TML). The TML issue involves the monitoring and controlling of the moisture content of all shipments against ore type-specific TMLs.

In the Australian context where the shipped ore is usually carefully sampled during loading and then subsequently tested for its prevailing moisture content by a physical drying test, the conventional method for moisture determination by means of convection drying is too slow for the operational issue of ensuring that the prevailing moisture content does not exceed the specific ore's predetermined TML value.

The Australian iron ore industry response was to develop a faster, yet adequately accurate method for moisture content determination of a lot and of its sub-parts. The standardization of this method by way of an Australian Technical Specification was deemed essential to make the new method acceptable to the Australian Maritime Safety Authority (AMSA) and to other national bodies involved in the continued safe shipping of Australian iron ores.

This Australian Technical Specification does not replace ISO 3087. It complements the latter by way of faster moisture content determination. The rapid moisture values can be compared to the eventual convection drying values; however, the rapid moisture determination method specified in this Australian Technical Specification is not purported to be the accepted method for commercial moisture content certification.

STANDARDS AUSTRALIA

Australian Technical Specification
Iron ores—Rapid moisture determination

1 SCOPE

This Australian Technical Specification specifies a method for the rapid determination of moisture content of iron ore using radiant and conduction drying instead of drying by convection. The method is applicable to all iron ores, whether natural or processed, provided the drying is controlled to safeguard the test material against temperatures in excess of those specified in this document.

2 NORMATIVE REFERENCES

The following are the normative documents referenced in this Australian Technical Specification:

ISO
3082 Iron ores—Sampling and sample preparation procedures
11323 Iron ore and direct reduced iron—Vocabulary

3 TERMS AND DEFINITIONS

For the purposes of this Australian Technical Specification, the terms and definitions given in ISO 11323 apply.

4 PRINCIPLE

The test portion is dried under the influence of controlled heating at no more than 105°C to constant mass and the loss in mass is measured, which is equated to the mass of moisture originally in the wet sample. The moisture content is expressed as a percentage of mass loss relative to the original mass of the wet sample.

5 APPARATUS

The following apparatus is required:

(a) A drying pan with a smooth surface, free from contamination and capable of accommodating the specified quantity of a test portion in an average layer thickness nominally not exceeding the top size of the material.

NOTE: Examples of appropriate pan dimensions are as follows:

(a) For typical Australian iron ore fines with a top size of 6.3 mm, the pan should be at least 750 to 900 cm^2 in area for accommodating the test sample without the average layer thickness exceeding 6.3 mm.

(b) For typical Australian iron ore fines with a top size of 8 mm, the pan should be at least 600 to 700 cm^2 in area for accommodating the test sample without the average layer thickness exceeding 8 mm.

(c) For typical Australian lump ore with a top size of 31.5 mm, the pan should be at least 1600 to 1900 cm^2 in area for accommodating the test sample without the average layer thickness exceeding 31.5 mm.

(b) A drying oven equipped with overhead infrared lights and a bottom hot plate with associated temperature-monitoring mechanisms (pyrometers, thermocouples and PID control circuits) that will allow for the regulation of the temperature of the entire test sample so that it does not deviate from the chosen temperature by more than ±1°C.