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Australian STANDARD

Iron ores—Wavelength dispersive X-ray fluorescence spectrometers—Determination of precision

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Iron ores—Wavelength dispersive X-ray fluorescence spectrometers—Determination of precision

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Preface

This Standard was prepared by the Standards Australia Committee MN-002, Iron Ores and Direct Reduced Iron, to supersede AS 2563—1996, *Wavelength dispersive X-ray fluorescence spectrometers — Determination of precision*.

The objective of this Standard is to describe methods of test that can be applied to wavelength dispersive X-ray fluorescence (WD-XRF) spectrometers to ensure that the spectrometers are functioning in a manner that allows precise analyses to be made.

The tests outlined are designed to measure the errors associated with the operation of certain parts of the spectrometer. They are not designed to check every part of the spectrometer but only those parts that may be the common sources of error.

It is assumed that the performance of the instrument has been optimized according to the manufacturer's instructions.

This Standard is identical with, and has been reproduced from, ISO/TR 18231:2016, *Iron ores — Wavelength dispersive X-ray fluorescence spectrometers — Determination of precision.*

As this document has been reproduced from an International Technical Report, the following applies:

(a) In the source text “this Technical Report” should read “this Australian Standard”.

(b) A full point substitutes for a comma when referring to a decimal marker.

The terms “normative” and “informative” are used in Standards to define the application of the annexes to which they apply. A “normative” annex is an integral part of a Standard, whereas an ”informative” annex is only for information and guidance.

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 102, *Iron ore and direct reduced iron*, Subcommittee SC 2, *Chemical analysis.*

Introduction

If an X-ray fluorescence spectrometer is to be used for precise analyses, it needs to be functioning correctly to specification, that is, the errors associated with the various functions of the instrument have to be very small. It is important therefore that the spectrometer be tested to ensure that it is indeed functioning to deliver the required precision. The objective of this Technical Report is to set out tests that can be used to ascertain the extent of the errors and to suggest procedures for their rectification. These tests are not used to ascertain whether the instrument is operating optimally but to determine whether the instrument is capable of giving a preselected precision.

Australian Standard®

Iron ores—Wavelength dispersive X-ray fluorescence spectrometers—Determination of precision

1 Scope

This Technical Report describes methods of test that can be applied to wavelength dispersive X-ray fluorescence (WD-XRF) spectrometers to ensure that the spectrometers are functioning in a manner that allows precise analyses to be made.

The tests outlined are designed to measure the errors associated with the operation of certain parts of the spectrometer. They are not designed to check every part of the spectrometer but only those parts that may be the common sources of error.

It is assumed that the performance of the instrument has been optimized according to the manufacturer’s instructions. For all tests, the two-theta angle should be carefully set for the line being measured. The pulse height window should be set according to the manufacturer’s instructions and should have a broad setting which may also include the escape peak for gas proportional counters. The instrument and detector gas environment should be as specified by the manufacturer, as should the power supply to the instrument.

NOTE Where no distinction has been made, it is assumed that a test is applicable to both sequential and simultaneous spectrometers.

2 Frequency of testing

Testing is not required to be carried out with each batch of analyses. The frequency of testing varies depending on the test involved. Table 1 lists the suggested frequency with which each test should be carried out. Where specific problems are encountered, more frequent testing may be required and remediation work performed.

Table 1 — Suggested frequency of precision tests

Frequency	Test
Monthly	Resolution of the gas-flow proportional counter Resolution of the scintillation and sealed gas counters Operation of the pulse height shift corrector[a]
Half yearly	Conductivity of gas-flow proportional counter window General stability Collimator reproducibility Detector changing reproducibility Crystal changing reproducibility Angular reproducibility
Yearly	Carousel reproducibility Comparison of carousel positions Comparison of sample holders Sample loading and unloading

[a] The position of the pulse height peak should also be checked after changing a bottle of detector gas since a variation in the methane content of the gas will change the position of the peak.

The frequencies with which the tests listed in Table 1 are carried out are suggested on the basis that there have been no changes to the spectrometer. If mechanical or electronic maintenance of a major nature is carried out, the appropriate tests should be made before the spectrometer is taken back into routine service.