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Iron ores — Determination of various elements by X-ray fluorescence spectrometry

Part 4: Performance-based method using fusion preparation method

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Contents

Page

Foreword ... **iv**
Introduction ... **v**
1 Scope ... **1**
2 Normative references ... **1**
3 Terms and definitions ... **1**
4 Reagents and materials ... **2**
4.1 Pure reagents ... 2
4.2 Flux 3
4.3 Releasing agent ... 3
4.4 Oxidizing agents ... 3
4.5 Certified reference materials ... 3
4.6 Reference materials ... 3
5 Sampling and samples ... **3**
5.1 Laboratory sample ... 3
5.2 Preparation of test samples, CRMs and RMs ... 4
5.2.1 General ... 4
5.2.2 Ores having significant contents of combined water or easily oxidizable compounds ... 4
5.2.3 Ores outside the scope of 5.2.2 ... 4
5.3 Test portion ... 4
6 Apparatus ... **4**
6.3 Fusion equipment. ... 4
6.5 Gas burner. ... 5
6.7 XRF spectrometer. ... 5
7 Measurements ... **5**
7.1 General ... 5
7.1.1 Analytical line ... 5
7.1.2 Voltage and current ... 6
7.1.3 Measuring times ... 6
7.1.4 Background measurements ... 6
8 Calibration and validation ... **6**
8.1 Principles ... 6
8.2 Preparation of fusion beads ... 6
8.3 Calibration and validation samples ... 6
8.4 Validation of the calibration ... 7
8.4.1 Specimens ... 7
8.4.2 Trueness validation ... 7
8.5 Calibration maintenance ... 8
8.5.1 Monitor disc ... 8
8.5.2 Duplicate monitor discs ... 8
8.5.3 Monitor measurements ... 8
8.5.4 Quality control measurements ... 9
9 Reporting ... **10**
9.1 General ... 10
9.2 Calculation of results ... 10
9.3 Number of decimals ... 11
10 Test report ... **11**
Bibliography ... **12**

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 102, *Iron ore and direct reduced iron*, Subcommittee SC 2 *Chemical analysis*.

A list of all parts in the ISO 9516 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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Introduction

X-ray fluorescence (XRF) spectrometry is a multi-elemental non-destructive analytical methodology used for quantitative and qualitative determinations. It is element specific covering an elemental range from boron (B) to uranium (U).

Once the sample has been dissolved into a borate glass it may be introduced to the spectrometer for analysis. The sample is then irradiated by intense radiation from an X-ray tube. Analysis of fused glass beads offers advantages over pressed powder techniques as it eliminates particle size effects, and it produces a homogeneous specimen for each element.

In some instances, the relationship between intensity (or intensity ratios) and concentration can be linear. For most analytes there is no direct straightforward relationship between intensity and concentration. With samples of differing compositions, the X-rays are absorbed differently in the different samples giving rise to what are generally referred to as matrix effects. These inter-element effects can be corrected using mathematical models derived from the known physics of X-rays.

Calibration can be based on binary standards (prepared from pure oxides or liquid solutions), reference materials, secondary standards, or combinations therewith.

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TECHNICAL SPECIFICATION **ISO/TS 9516-4:2021**

Iron ores — Determination of various elements by X-ray fluorescence spectrometry —

Part 4: Performance-based method using fusion preparation method

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1 Scope

This document specifies a performance-based method for the chemical analysis of natural and processed iron ores by fused bead wavelength and energy dispersive X-ray fluorescence (XRF).

It is applicable to all elements of interest when adequate calibrations have been established.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 2596, *Iron ores — Determination of hygroscopic moisture in analytical samples — Gravimetric, Karl Fischer and mass-loss methods*

ISO 3082, *Iron ores — Sampling and sample preparation procedures*

ISO 7764, *Iron ores — Preparation of predried test samples for chemical analysis*

ISO Guide 31, *Reference materials — Contents of certificates, labels and accompanying documentation*

ISO Guide 35, *Reference materials — Guidance for characterization and assessment of homogeneity and stability*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
primary standard
standard that is designated or widely acknowledged as having the highest metrological qualities and whose value is accepted without reference to other standards of the same quantity

Note 1 to entry: The concept of a primary standard is equally valid for base quantities and derived quantities.

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