PD ISO/TS 4689-1:2023



BSI Standards Publication

Iron ores — Determination of sulfur content

Part 1: Barium sulfate gravimetric method

bsi.

National foreword

This Published Document is the UK implementation of ISO/TS 4689-1:2023. It supersedes BS 7020-7.1:1988, which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee W/-, Consumer Products and Services Sector Policy and Strategy Committee.

A list of organizations represented on this committee can be obtained on request to its committee manager.

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Published by BSI Standards Limited 2023

ISBN 978 0 580 90981 8

ICS 73.060.10

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This Published Document was published under the authority of the Standards Policy and Strategy Committee on 31 March 2023.

Amendments/corrigenda issued since publication

Date	Text affected

PD ISO/TS 4689-1:2023

TECHNICAL SPECIFICATION

ISO/TS 4689-1

First edition
2023-03-14

Iron ores — Determination of sulfur content —

Part 1: Barium sulfate gravimetric method

Minerais de fer — Dosage du soufre —

Partie 1: Méthode gravimétrique au sulfate de baryum

Reference number
ISO/TS 4689-1:2023(E)

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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 (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 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 102, *Iron Ores*, Subcommittee SC 02, *Chemical analysis*.

This first edition of ISO/TS 4689-1 cancels and replaces the first edition of ISO 4689:1986, which has been technically revised.

The main changes are as follows:

— the decomposition method of samples has been changed from the original acid dissolution and alkali melting method to soda-zinc oxide semi melting method.

A list of all parts in the ISO 4689 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

In this document, a new way of melting the samples for determination of sulfur content by barium sulfate gravimetric method is specified as follows.

— Samples are semi-molten with sodium carbonate and zinc oxide.

— The sulfate ions are leached by electromagnetic stirring and separated from the iron and other interference elements such as lead, antimony, bismuth, tin, silicon, titanium, etc.

This method is also suitable for complex natural and artificial sample analysis.

This document consists of Part 1 of the ISO 4689 series, *Iron ores — Determination of sulfur content*.

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TECHNICAL SPECIFICATION **ISO/TS 4689-1:2023**

Iron ores — Determination of sulfur content —

Part 1: Barium sulfate gravimetric method

1 Scope

This document specifies a barium sulfate gravimetric method for the determination of the sulfur content of iron ores.

This method is applicable to a concentration range of a mass fraction of sulfur from 0,01 % to 3,9 % in natural iron ores, iron ore concentrates and agglomerates including sinter products.

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*

3 Terms and definitions

No terms and definitions are listed in this document.

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

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

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

4 Principle

The analysis principle is as follows:

a) decomposition of a test portion by treatment with a soda-zinc oxide flux mixture to a semi-molten state;

b) water leaching of sulfate ion with electro-magnetic stirring and filtration of the insoluble residue;

c) transformation of sulfate ion to barium sulfate through adjustment of the acidity and addition of barium chloride solution;

d) filtration of barium sulfate and gravimetric determination;

e) removal of the interference of Cr, Sn, P through hydrogen peroxide, citric acid and calcium carbonate.

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