

This is a preview of "ISO 4689-3:2017". [Click here to purchase the full version from the ANSI store.](#)

Third edition  
2017-03

---

---

## **Iron ores — Determination of sulfur content —**

### **Part 3: Combustion/infrared method**

*Minerais de fer — Dosage du soufre —*

*Partie 3: Méthode par combustion et infrarouge*



Reference number  
ISO 4689-3:2017(E)

© ISO 2017



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2017, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Ch. de Blandonnet 8 • CP 401  
CH-1214 Vernier, Geneva, Switzerland  
Tel. +41 22 749 01 11  
Fax +41 22 749 09 47  
copyright@iso.org  
www.iso.org

This is a preview of "ISO 4689-3:2017". Click here to purchase the full version from the ANSI store.

## Contents

|  | Page      |
|--|-----------|
| <b>Foreword</b> .....  | <b>iv</b> |
| <b>Introduction</b> .....  | <b>v</b>  |
| <b>1 Scope</b> .....   | <b>1</b>  |
| <b>2 Normative references</b> .....  | <b>1</b>  |
| <b>3 Terms and definitions</b> .....   | <b>1</b>  |
| <b>4 Principle</b> .....   | <b>2</b>  |
| <b>5 Reagents</b> .....  | <b>2</b>  |
| <b>6 Apparatus</b> .....   | <b>2</b>  |
| <b>7 Sampling and samples</b> .....  | <b>5</b>  |
| 7.1 Laboratory sample.....   | 5         |
| 7.2 Preparation of predried test samples.....  | 5         |
| <b>8 Procedure</b> .....   | <b>5</b>  |
| 8.1 Number of determinations.....  | 5         |
| 8.2 Test portion.....  | 5         |
| 8.3 Blank test and check test.....   | 5         |
| 8.4 Determination.....   | 6         |
| 8.5 Preparation of calibration graph.....  | 6         |
| <b>9 Expression of results</b> .....   | <b>7</b>  |
| 9.1 Calculation of sulfur content.....   | 7         |
| 9.2 General treatment of results.....  | 7         |
| 9.2.1 Repeatability and permissible tolerance.....   | 7         |
| 9.2.2 Determination of analytical result.....  | 7         |
| 9.2.3 Between-laboratories precision.....  | 8         |
| 9.2.4 Check for trueness.....  | 8         |
| 9.2.5 Calculation of final result.....   | 9         |
| <b>10 Test report</b> .....  | <b>9</b>  |
| <b>Annex A (normative) Flowsheet of the procedure for the acceptance of analytical values for test samples</b> ..... | <b>11</b> |
| <b>Annex B (informative) Derivation of repeatability and permissible tolerance equations</b> .....                   | <b>12</b> |
| <b>Annex C (informative) Precision data obtained by international analytical trial</b> .....                         | <b>13</b> |
| <b>Bibliography</b> .....  | <b>14</b> |

## 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](http://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](http://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 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 the following URL: [www.iso.org/iso/foreword.html](http://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*.

This third edition cancels and replaces the second edition (ISO 4689-3:2015), of which it constitutes a minor revision, with the following changes:

- “0,001 %” has been inserted before “sulfur” in [5.1](#);
- in [6.7](#):
  - under “Combustion crucible”, “Length” has been changed to “Height”;
  - under “Combustion crucible”, outer diameter has been changed from “10 mm” to “26 mm”;
  - under “Combustion crucible”, inner diameter has been changed from “26 mm” to “10 mm”;
- “0,2 g” has been added after “sulfur” in [8.2](#);
- [Formula \(7\)](#) and the relevant descriptions in [9.2.4](#) have been modified to harmonize this clause across all standards for which ISO/TC 102/SC 2 is responsible.

A list of all parts in the ISO 4689 series can be found on the ISO website.

This is a preview of "ISO 4689-3:2017". [Click here to purchase the full version from the ANSI store.](#)

## Introduction

ISO 4689-2 was originally published as ISO 4690:1986. Under a policy of rationalization of the numbering system used in ISO/TC 102, it has been decided to re-designate ISO 4690:1986 as ISO 4689-2. It was further decided to introduce a combustion/infrared method, numbered ISO 4689-3, i.e. this document.

When next revised, ISO 4689:1986 will be re-designated as ISO 4689-1.