
**Determination of sulfur in refractory
products and raw materials by
gravimetric, photometric and
titrimetric methods**

*Dosage du soufre dans les produits réfractaires et les matériaux bruts
par gravimétrie, et des méthodes photométriques et titrimétriques*





COPYRIGHT PROTECTED DOCUMENT

© ISO 2015, 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

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Apparatus	1
4.1 General	1
4.2 Apparatus specified in method B	2
5 Reagents	3
5.1 General	3
5.2 Standard solutions for method B	5
6 Sample preparation	5
7 Determination of sulfur	6
7.1 General	6
7.2 Method A	6
7.2.1 Method A1	6
7.2.2 Method A2	7
7.3 Method B	8
7.3.1 Principle	8
7.3.2 Mass of test portion	8
7.3.3 Procedure	8
7.3.4 Blank test	9
7.3.5 Calculation	9
7.4 Method C	9
7.4.1 Principle	9
7.4.2 Mass of test portion	9
7.4.3 Procedure	9
7.4.4 Calculation	10
8 Test report	10
Annex A (informative) Statistical results of sulfur analyses in refractories and raw materials	11
Bibliography	13

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 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 33, *Refractories*.

Determination of sulfur in refractory products and raw materials by gravimetric, photometric and titrimetric methods

1 Scope

This International Standard specifies methods for the wet chemical analysis of refractory products and their raw materials with below 5 % (mass percentage) sulfur.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 836, *Terminology for refractories*

ISO 6353-1, *Reagents for chemical analysis — Part 1: General test methods*

ISO 6353-2, *Reagents for chemical analysis — Part 2: Specifications — First series*

ISO 6353-3, *Reagents for chemical analysis — Part 3: Specifications — Second series*

ISO 8656-1, *Refractory products — Sampling of raw materials and unshaped products — Part 1: Sampling scheme*

ISO 26845, *Chemical analysis of refractories — General requirements for wet chemical analysis, atomic absorption spectrometry (AAS) and inductively coupled plasma atomic emission spectrometry (ICP-AES) methods*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 836, ISO 26845, and the following apply.

3.1

sulfur

general term for elemental sulfur, sulfides, sulfates, sulfites, etc. in refractory products and their raw materials

4 Apparatus

4.1 General

The following apparatus is required in addition to ordinary laboratory apparatus and the apparatus given in ISO 26845.

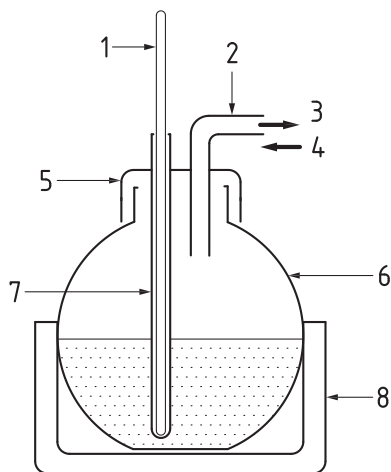
4.1.1 Platinum crucible, with a nominal volume of 25 ml, made, for example, in Pt/Au 95/5 %.

4.1.2 pH-meter.

4.1.3 Electrically heated furnace, adjustable to $(1\,150 \pm 25)^\circ\text{C}$.

4.2 Apparatus specified in method B

4.2.1 Apparatus for tin(II): strong phosphoric acid solution preparation, an example of an apparatus consisting of a quartz flask is shown in [Figure 1](#).



Key

- | | | | |
|---|------------------------|---|-----------------------|
| 1 | thermometer (360 °C) | 5 | cap made of quartz |
| 2 | quartz tubes (ø 10 mm) | 6 | quartz flask (500 ml) |
| 3 | tap aspirator | 7 | quartz tube (ø 10 mm) |
| 4 | N ₂ gas | 8 | heating mantle |

Figure 1 — Example of apparatus for tin(II): strong phosphoric acid solution preparation

4.2.2 Sample decomposition and gas absorption equipment, example of apparatus is shown in [Figure 2](#).