

This is a preview of "ISO 12677:2011". [Click here to purchase the full version from the ANSI store.](#)

Second edition  
2011-10-01

---

---

## **Chemical analysis of refractory products by X-ray fluorescence (XRF) — Fused cast-bead method**

*Analyse chimique des matériaux réfractaires par fluorescence de  
rayons X — Méthode de la perle fondue*



Reference number  
ISO 12677:2011(E)

© ISO 2011

This is a preview of "ISO 12677:2011". [Click here to purchase the full version from the ANSI store.](#)



**COPYRIGHT PROTECTED DOCUMENT**

© ISO 2011

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office  
Case postale 56 • CH-1211 Geneva 20  
Tel. + 41 22 749 01 11  
Fax + 41 22 749 09 47  
E-mail [copyright@iso.org](mailto:copyright@iso.org)  
Web [www.iso.org](http://www.iso.org)

Published in Switzerland

This is a preview of "ISO 12677:2011". [Click here to purchase the full version from the ANSI store.](#)

## Contents

Page

Foreword .....	v
1 Scope .....	1
2 Normative references .....	1
3 Types of material .....	1
4 Principle .....	2
5 Apparatus .....	2
6 Sample grinding .....	3
7 Loss on ignition (and/or drying) .....	4
8 Flux .....	4
8.1 Choice of flux and ratio of flux to sample .....	4
8.2 Compensations for moisture in flux .....	5
9 Fusion casting procedures .....	5
9.1 Fusion of samples and casting of beads .....	5
9.2 Automatic bead preparation .....	7
9.3 Storage .....	7
9.4 Special problems .....	8
10 Calibration .....	8
10.1 Calibration standards .....	8
10.2 Reagents and series reference materials (SeRMs) .....	8
10.3 Calibration using reagents .....	10
10.4 Calibration using SeRMs .....	15
11 Corrections .....	17
11.1 Line-overlap correction .....	17
11.2 Background correction .....	17
11.3 Drift correction .....	18
11.4 Calculation of results .....	18
11.5 Software requirements .....	19
12 Reproducibility and repeatability .....	20
12.1 Fusion tests .....	20
12.2 Frequency of instrument tests .....	20
12.3 Maximum allowance differences of sample holders .....	20
12.4 Sample measuring positions .....	21
12.5 Instrument repeatability .....	21
12.6 Sequential systems .....	21
12.7 Dead time .....	22
12.8 Other tests .....	22
12.9 Flow gas .....	22
13 Accuracy determined by certified reference materials .....	22
13.1 Validation of synthetic calibrations .....	22
13.2 Validation of SeRM calibrations .....	22
13.3 Fresh beads of the CRMs or synthetic standards used to check SeRM calibrations .....	22
14 Definitions of limits of detection .....	23
15 Test report .....	23

This is a preview of "ISO 12677:2011". [Click here to purchase the full version from the ANSI store.](#)

<b>Annex A</b> (normative) <b>Calibration range and required detection limits</b> .....	<b>24</b>
<b>Annex B</b> (normative) <b>Corrections for tungsten carbide grinding media</b> .....	<b>28</b>
<b>Annex C</b> (informative) <b>Examples of fluxes/flux ratios</b> .....	<b>30</b>
<b>Annex D</b> (normative) <b>Examples of CRM to be used to check synthetic calibrations</b> .....	<b>32</b>
<b>Annex E</b> (normative) <b>Examples of SeRM</b> .....	<b>38</b>
<b>Annex F</b> (normative) <b>Equation for theoretical calculations</b> .....	<b>43</b>
<b>Annex G</b> (normative) <b>Certified reference materials (CRMs)</b> .....	<b>44</b>
<b>Annex H</b> (normative) <b>Method of inter-element correction used to compensate for the effects of co-existing components when using SeRM for calibration</b> .....	<b>47</b>
<b>Annex I</b> (normative) <b>Standard deviations achieved with certified reference materials</b> .....	<b>68</b>
<b>Bibliography</b> .....	<b>75</b>

This is a preview of "ISO 12677:2011". [Click here to purchase the full version from the ANSI store.](#)

## 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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

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.

ISO 12677 was prepared by Technical Committee ISO/TC 33, *Refractories*.

This second edition cancels and replaces the first edition (ISO 12677:2003), which has been technically revised. Although the method in this International Standard has been considerably modified editorially and in layout, the technical changes are limited. Some minor corrections have been made to certain equations. The only significant changes are a reference to a further International Standard method (being prepared) for the preparation of reduced materials for analysis by this standard, and instructions on how to add other constituents to calibrations at the end of 10.2.1, *Purity and preparation of reagents*.