ISO/FDIS 16206~~: 2025(en)~~

ISO-/TC 33~~/WG 31~~

Secretariat:- BSI

Date: 2025-~~02-06~~03-25

Phase ~~Quantitative Analysis~~quantitative analysis of ~~Residual Quartz~~residual quartz in ~~Silica Bricks —~~

silica bricks — X-ray ~~Diffraction Method~~diffraction method

Analyse quantitative de la phase de quartz résiduel dans les briques de silice — Méthode par diffraction des rayons X

FDIS stage

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: + 41 22 749 01 11
EmailE-mail: copyright@iso.org
Website: www.iso.orgwww.iso.org

Published in Switzerland

Contents

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).

Field Code Changed

ISO draws attention to the possibility that the implementation of this document may involve the use of (a) patent(s). ISO takes no position concerning the evidence, validity or applicability of any claimed patent rights in respect thereof. As of the date of publication of this document, ISO had not notice of (a) patent(s) which may be required to implement this document. However, implementers are cautioned that this may not represent the latest information, which may be obtained from the patent database available at ~~www.iso.org/patents~~.www.iso.org/patents. ISO shall not be held responsible for identifying any or all such patent rights.

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.

Field Code Changed

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

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.

Field Code Changed

Phase quantitative analysis of residual quartz in silica bricks — X-ray diffraction method

1 Scope

This document specifies a method for the quantitative analysis of residual quartz (i.e. alpha-quartz) in silica bricks within the mass fraction range of 0,3 % to 5,0 %, by X-ray diffraction (XRD) using a Bragg-Brentano diffractometer. This document includes details of sample preparation and of preliminary establishment of a working curve using external standards.

This document does not address the safety issues associated with its use. The ground silica brick powders and reference materials may cause damage to lungs through prolonged or repeat inhalation during tests. It is responsibility of the users of this standard to establish appropriate safety and health practices.

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 836, *Terminology for refractories*

ISO 5022, *Shaped refractory products — Sampling and acceptance testing*

ISO 23071:2021, *Refractory products — Determination of reduced species in carbon containing refractories by XRD*

3 Terms and definitions

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

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

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

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

3.1 ~~3.1~~
sample
representative collection of items that can be obtained by sampling according to a sampling plan agreed upon by the interested parties

Note 1 to entry: An example sampling plan is given in ISO 5022.

3.2 ~~3.2~~
silica brick
refractory brick containing SiO_2 greater than or equal to 93 % by mass.

3.3 ~~3.3~~
item
refractory *silica brick* ~~(3.2).~~(3.2).

3.4 ~~3.4~~
test portion
amount of powder, taken from a crushed and ground *item* ~~(3.3).~~(3.3).

3.5 ~~3.5~~
test piece
piece of material for the test, prepared by compaction into an adequate holder from *test portion* ~~(3.4).~~(3.4).

3.6 ~~3.6~~
diluent
~~the~~ silica brick without alpha-quartz~~, e.g. used~~

EXAMPLE Used silica bricks in the working area served for more than 10 years, containing tridymite and a small amount of glass phase, and alpha-quartz is not detected~~.~~

4 Principle

The X-ray diffraction peak intensity of a phase to be measured in multi-phase materials is proportional to the phase content. Silica bricks are mainly composed of phases of tridymite, cristobalite and alpha -quartz. The quantitative analysis of alpha-quartz phase in silica bricks is conducted by the external standard method.

5 Apparatus

5.1 ~~5.1~~ **X-ray diffractometer**, ~~see clauses 4 and 5~~in accordance with in ISO 23071:2021, Clauses 4 and 5.

5.2 ~~5.2~~ **Grinder and suitable grinding media,** which shall not contaminate the test portion, e.g. tungsten carbide or zirconia, grinding the item(s) into powder with particle size no more than 0,030 mm.

5.3 ~~5.3~~ **Analytical balance**, with a sensitivity of 0,1 mg.

5.4 ~~5.4~~ **Drying oven**, capable of being controlled at (110 ~~±~~ ± 5) °C, or other device which has an equivalent heating effect.

5.5 ~~5.5~~ **Cavity holder, powder holder and punch.**

6 Alpha-quartz reference materials

The alpha-quartz content of the reference materials, e.g. NIST 1878b, shall not be less than 95 %; other phases shall not be observed through X-ray diffraction or polarizing microscopy. Alternatively, a series of reference materials qualified may be used for establishment of a working curve, e.g. GSB S2021004.

7 Sampling

A sample shall consist of at least four items, obtained by sampling ~~according to~~in accordance with ISO 5022, or a sampling plan agreed upon by the interested parties.