

Chemical analysis of magnesite and dolomite refractory products (alternative to the X-ray fluorescence method)

**Part 2: Wet chemical analysis (ISO
10058-2:2008)**

ICS 73.080; 81.080

National foreword

This British Standard is the UK implementation of EN ISO 10058-2:2008. It partially supersedes BS EN ISO 10058:1996.

Together with BS EN ISO 10058-1 and BS EN ISO 10058-3, it supersedes BS EN ISO 10058:1996 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee RPI/1, Refractory products and materials.

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

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

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Wet chemical analysis (ISO 10058-2:2008)

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(méthode alternative à la méthode par fluorescence de
rayons X) - Partie 2: Méthodes d'analyse chimique par voie
humide (ISO 10058-2:2008)

Chemische Analyse von feuerfesten Erzeugnissen aus
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Foreword

This document (EN ISO 10058-2:2008) has been prepared by Technical Committee ISO/TC 33 "Refractories" in collaboration with Technical Committee CEN/TC 187 "Refractory products and materials" the secretariat of which is held by BSI.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by June 2009, and conflicting national standards shall be withdrawn at the latest by June 2009.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN ISO 10058:1996.

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Endorsement notice

The text of ISO 10058-2:2008 has been approved by CEN as a EN ISO 10058-2:2008 without any modification.

Contents

Page

Foreword	iv
1 Scope	1
2 Normative references	1
3 Determination of silicon(IV) oxide	2
4 Determination of aluminium oxide	4
5 Determination of iron(III) oxide	6
6 Determination of titanium(IV) oxide	7
7 Determination of manganese(II) oxide	8
8 Determination of calcium oxide	9
9 Determination of magnesium oxide	10
10 Determination of sodium oxide by flame photometry	11
11 Determination of potassium oxide by flame spectrophotometry	13
12 Determination of chromium(III) oxide	14
13 Determination of zirconium oxide by xylenol orange absorption spectroscopy	17
14 Determination of phosphorus(V) oxide by molybdenum blue method	18
15 Test report	19

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.

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ISO 10058-2 was prepared by Technical Committee ISO/TC 33, *Refractories*.

This first edition of ISO 10058-2, together with ISO 10058-1 and ISO 10058-3, cancels and replaces ISO 10058:1992 which has been technically revised to include the increasing use of flame atomic absorption spectrophotometry (FAAS) and inductively coupled plasma atomic emission spectrometry (ICP-AES) methods as well some improvements in the wet chemical analyses procedures developed in Japan.

ISO 10058 consists of the following parts, under the general title *Chemical analysis of magnesite and dolomite refractory products (alternative to the X-ray fluorescence method)*:

- *Part 1: Apparatus, reagents, dissolution and determination of gravimetric silica*
- *Part 2: Wet chemical analysis*
- *Part 3: Flame atomic absorption spectrophotometry (FAAS) and inductively coupled plasma atomic emission spectrometry (ICP-AES)*

Chemical analysis of magnesite and dolomite refractory products (alternative to the X-ray fluorescence method) —

Part 2: Wet chemical analysis

1 Scope

This part of ISO 10058 specifies traditional (“wet process”) methods for the chemical analysis of magnesite and dolomite refractory products and raw materials.

It is applicable to components within the ranges of determination given in Table 1.

Table 1 — Range of determination (percentage by mass)

Component	Range	Component	Range
SiO ₂	0,1 to 10	MgO	30 to 99,9
Al ₂ O ₃	0,05 to 10	Na ₂ O	0,01 to 1
Fe ₂ O ₃	0,01 to 10	K ₂ O	0,01 to 1
TiO ₂	0,01 to 1	Cr ₂ O ₃	0,01 to 3
MnO	0,01 to 1	ZrO ₂	0,01 to 1
CaO	0,01 to 60	P ₂ O ₅	0,01 to 5
LOI	0,01 to 60	—	—
NOTE These values are after the loss on ignition (LOI) has been taken into account.			

2 Normative references

The following referenced documents are indispensable for the application 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 10058-1:2008, *Chemical analysis of magnesite and dolomite refractory products (alternative to the X-ray fluorescence method) — Part 1: Apparatus, reagents, dissolution and determination of gravimetric silica*

ISO 10058-3:2008, *Chemical analysis of magnesite and dolomite refractory products (alternative to the X-ray fluorescence method) — Part 3: Flame atomic absorption spectrophotometry (FAAS) and inductively coupled atomic plasma emission spectrometry (ICP-AES)*

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 Determination of silicon(IV) oxide

3.1 General

The determination of silicon(IV) oxide is carried out using one of the following methods.

- a) Combined use of the dehydration or the coagulation and molybdenum blue methods

This method is applied to samples consisting of more than 4 % by mass of silicon(IV) oxide (see 3.2).

- b) Molybdenum blue method

This method is applied to samples consisting of less than 10 % by mass of silicon(IV) oxide (see 3.3).

3.2 Combined use of the coagulation and molybdenum blue methods

3.2.1 Principle

An aliquot portion of the stock solution (S1) (see ISO 10058-1:2008, Annex A), after pH adjustment, is treated with ammonium molybdate and the silicomolybdate is reduced to yield molybdenum blue, the absorbance of which is measured.

The sum of this residual silicon(IV) oxide in solution plus the mass of silicon (IV) oxide ($m_1 - m_2$) calculated in accordance with ISO 10058-1:2008, 8.2.2.3.3, gives the total silicon(IV) oxide content.

3.2.2 Procedure

This determination should be commenced with little delay after the stock solution (S1) is prepared, as prolonged standing may allow polymerization of silica to occur leading to low results.

Transfer 10 ml of stock solution (S1) (see ISO 10058-1:2008, Annex A) to a 100 ml plastic beaker, add 2 ml of hydrofluoric acid (1+9) and mix with a plastic rod. Allow to stand for 10 min and add 50 ml of boric acid solution. Add 2 ml of ammonium molybdate solution while mixing at a temperature of 25 °C and allow to stand for 10 min. Add 5 ml of L (+)-tartaric acid solution while stirring and, after 1 min, add 2 ml of L (+)-ascorbic acid solution. Transfer the solution to a 100 ml volumetric flask, dilute to the mark with water, mix and allow to stand for 60 min.

Measure the absorbance of the solution in a 10 mm cell at a wavelength of 650 nm using water as reference.

3.2.3 Plotting the calibration graph

Transfer 0 ml, 2 ml, 4 ml, 6 ml, 8 ml and 10 ml aliquot portions [0 mg to 0,4 mg as silicon(IV) oxide] of dilute standard silicon(IV) oxide solution (SiO_2 0,04 mg/ml) to separate 100 ml plastic beakers and add to each 10 ml of blank solution (B1) (see ISO 10058-1:2008, Annex A). Treat these solutions and measure the absorbance as given in 3.2.2, and plot the absorbances against the amounts of silicon(IV) oxide. Prepare the calibration graph by adjusting the curve so that it passes through the point of origin.

3.2.4 Blank test

Using the blank solution (B1) (see ISO 10058-1:2008, Annex A), carry out the procedure given in 3.2.2.