INTERNATIONAL STANDARD

ISO 10081-1

Second edition
2003-12-01

Classification of dense shaped refractory products —

Part 1: **Alumina-silica**

Classification des produits réfractaires façonnés denses —

Partie 1: Silice-alumine

Reference number
ISO 10081-1:2003(E)

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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
Web www.iso.org

Published in Switzerland

Foreword

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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 10081-1 was prepared by Technical Committee ISO/TC 33, *Refractories*.

The various parts of this revised series of ISO 10081 will cancel and replace ISO 1109:1975. Part 1 is a partial revision of ISO 1109:1975, Part 2 cancels and replaces ISO 10081-1:1991, and Part 3 is new.

ISO 10081 consists of the following parts, under the general title *Classification of dense shaped refractory products*:

— *Part 1: Alumina-silica*

— *Part 2: Basic products containing less than 7 % residual carbon*

— *Part 3: Basic products containing from 7 % to 50 % residual carbon*

Part 4 is under preparation and is intended to cover special products as given in Clause 2 of ISO 1109:1975.

Classification of dense shaped refractory products —

Part 1: Alumina-silica

1 Scope

This part of ISO 10081 specifies the classification and designation of dense shaped refractory products of the alumina-silica series, with the following exceptions:

a) products containing more than 5 % of any metallic oxide other than alumina, silica, iron oxide;

b) products containing more than 1 % carbon, carbides, nitrides, oxynitrides or any associated materials.

2 Classification

2.1 Basis of classification

Dense shaped refractory products of the alumina-silica series shall be classified according to the following five criteria:

a) the type of product;

b) the group determined by its alumina and/or silica contents;

c) the principal raw material(s);

d) the state of the raw material(s);

e) the nature of the bond (including any post treatment).

2.2 Type of product

The types of dense shaped refractory products of the alumina-silica series included in this classification are:

a) high alumina (HA),

b) fireclay (FC),

c) low alumina fireclay (LF),

d) siliceous (SS), and

e) silica (SL).

NOTE The abbreviations used in the above list are from the English names for the refractory products.

These product types shall be classified in accordance with Table 1, by their chemical analysis carried out on the calcined test products.[1)]

1) A chemical analysis standard is under development.

2.3 Classification group

The classification group of dense shaped refractory products of the alumina-silica series is determined by its alumina and/or silica contents, with the product type as shown in Table 1, applicable to the ranges given in Table 1.

Table 1 — Classification by product type and group

Product type	Group	Contents % (mass fraction)	
		Al_2O_3	SiO_2
High alumina	HA 98	$Al_2O_3 \geqslant 98$	
High alumina	HA 95	$95 \leqslant Al_2O_3 < 98$	
High alumina	HA 85	$85 \leqslant Al_2O_3 < 95$	
High alumina	HA 75	$75 \leqslant Al_2O_3 < 85$	
High alumina	HA 65	$65 \leqslant Al_2O_3 < 75$	
High alumina	HA 55	$55 \leqslant Al_2O_3 < 65$	
High alumina	HA 45	$45 \leqslant Al_2O_3 < 55$	
Fireclay	FC 40	$40 \leqslant Al_2O_3 < 45$	
Fireclay	FC 35	$35 \leqslant Al_2O_3 < 40$	
Fireclay	FC 30	$30 \leqslant Al_2O_3 < 35$	
Low alumina fireclay	LF 10	$10 \leqslant Al_2O_3 < 30$	$SiO_2 < 85$
Siliceous	SS 85		$85 \leqslant SiO_2 < 93$
Silica	SL 93		$SiO_2 \geqslant 93$

2.4 Nature of raw materials

Dense shaped refractory products of the alumina-silica series shall be classified

— by their principal raw material when the content is greater than or equal to 50 %, or

— by their two principal raw materials when the content is less than 50 %.

EXAMPLES Some examples of raw materials are as follows:

— corundum;

— bauxite;

— mullite;

— sillimanite and associated minerals (andalusite, kyanite);

— fireclay;

— quartzites and associated products (silica sand, fused silica).

2.5 State of raw materials

The raw materials shall be classified by using one of the three designations, as follows:

a) naturally occurring (raw or calcined);

b) synthetic calcined;

c) fused.

2.6 Nature of the bond

The bonding system is classified by using one of the three designations, as follows:

a) ceramic bond, formed by sintering during firing to a temperature in excess of 800 °C;

b) inorganic chemical bond, formed by chemical reaction at ambient temperature or at a temperature below 800 °C;

c) fusion cast, formed by total fusion of the product.

NOTE 1 The ceramic bond may be either with or without impregnation after firing.

NOTE 2 The inorganic chemical bond may be either with or without tempering at a temperature below 800 °C.

3 Designation

The designation of dense shaped refractory products of the alumina-silica series shall comprise the listing of the five classification criteria given in Clause 2: product type, group, nature of raw materials, state of raw materials, nature of the bond.

EXAMPLES Some examples of designations are as follows:

— high alumina product of the group HA 98, based on synthetic calcined corundum, with a ceramic bond;

— high alumina product of the group HA 75, based on naturally occurring calcined bauxite and sillimanite, with an inorganic chemical bond, tempered;

— high alumina product of the group HA 75, based on fused mullite, with a ceramic bond;

— fireclay product of the group FC 40, based on naturally occurring calcined fireclay, with a ceramic bond.

ICS 81.080

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