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Magnesia alumina spinel bricks for
cement kiln

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Foreword

China Building Materials Federation is in charge of this English translation. In case of any doubt about the contents of English translation, the Chinese original shall be considered authoritative.

This document was drafted in accordance with the rules given in the GB/T 1.1—2020.

This document was proposed and prepared by China Building Materials Federation.

This document is issued for the first time.

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Magnesia alumina spinel bricks for cement kiln

1 Scope

This document specifies the terms and definitions, classification and marking, technical requirements, test methods, inspection rules, marking, packaging, transportation, storage and quality certification of magnesia alumina spinel bricks for cement kiln.

This document is applicable to magnesia alumina spinel bricks for cement kiln.

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.

GB/T 2997 *Test method for bulk density, apparent porosity and true porosity of dense shaped refractory products*

GB/T 5069 *Chemical analysis of magnesia-alumina refractories*

GB/T 5072 *Refractories—Determination of cold compressive strength*

GB/T 7320 *Refractories—Determination of thermal expansion*

GB/T 7321 *Sample preparation for testing of shaped refractory products*

GB/T 10325-2001 *Shaped refractory products—Sampling and acceptance testing*

GB/T 10326-2001 *Refractory products—Inspections of dimension appearance and section*

GB/T 16546-1996 *Shaped refractory products—Packing, marking, transportation and storage*

GB/T 17912-1999 *Refractory bricks for rotary kilns—Dimensions*

GB/T 18257-2000 *Refractory bricks for use in rotary kilns—Hot-face identification marking*

YB/T 370 *Refractories—Determination of refractoriness under load (non-differential, with rising temperature)*

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GB/T 30873 *Refractory materials—Determination of thermal shock resistance*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1

magnesia alumina spinel bricks

sintered refractory products that are mainly made from magnesia, magnesia-alumina spinel, or alumina-magnesia spinel.

4 Product classification and marking

4.1 Classification

4.1.1 According to the content of MgO and Al₂O₃, the products are divided into three brands, i.e. MLJ-80, MLJ-85 and MLJ-90.

Note— In the brand, M, L and J are the initial Chinese phonetic alphabet of magnesium, aluminum and spinel respectively, and the Arabic numerals are the mass fraction of magnesium oxide.

4.1.2 The brick numbering shall be classified in accordance with the rules given in GB/T 17912-1999.

4.2 Marking

4.2.1 It is marked according to the sequence of product name, brand number, brick number and document number.

Example,

The magnesia alumina spinel brick with MLJ-80 in terms of brand number and B 620 in brick number is marked as:

Magnesia alumina spinel brick MLJ-80 B 620 JC/T 2036—2010.

4.2.2 The hot surface of products shall be marked in accordance with the requirements of GB/T 18257-2000.

5 Technical requirements

5.1 The dimension tolerance and the appearance quality of products shall meet the requirements given in Table

1. Diagrammatic sketch of a, b and c shall be given in Figure 1, diagrammatic sketch of e, f and g shall be given in Figure 2.

Table 1 The dimension tolerance and the appearance quality of products

Unit in millimeters

Items		Requirements
Dimension tolerance of length and height		± 2.0
The large end and small end dimension of wedge brick	Dimension tolerance	± 1.5
	Deviation of wedge degree	± 1.0
Distortion		$\leq 0.5\%$
Corner defect		≤ 20 allowed $20 < a+b+c < 50$ maximum in 2 places allowed ≥ 50 not allowed.
Edge defect		≤ 30 allowed $30 < e+f+g < 60$ maximum in 3 places allowed ≥ 60 not allowed
Crack	Width < 0.1	Allowed
	$0.1 \leq \text{Width} \leq 0.25$	Allowed if crack length ≤ 40
	Width > 0.25	Not allowed
Note— The dimension tolerance and appearance quality of special requested products may be agreed by the interested parties.		

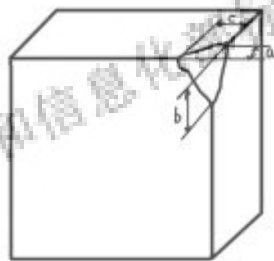


Figure 1 Diagrammatic sketch of a, b, c

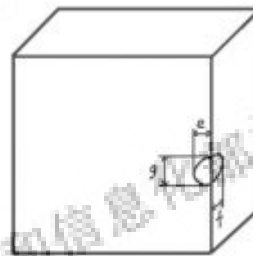


Figure 2 Diagrammatic sketch of e, f, g

5.2 The physical properties and chemical composition shall meet the requirements given in Table 2.

Table 2 Physical properties and chemical composition of products

Items		Requirements			
		MLJ-80	MLJ-85	MLJ-90	
Chemical composition	MgO /%	80±2.5	85±2.5	90±2.5	
	Al ₂ O ₃ /%	≥11	≥9	≥5	
	SiO ₂ /%	≤1.5			
Physical properties	Bulk density/ (g/cm ³)	≥2.85			
	Apparent porosity /%	≤19			
	Cold compressive strength/MPa	≥40	≥45	≥50	
	Refractoriness under load T _{0.4} /°C	≥1650			
	Thermal shock resistance (times)	950°C air quenching	≥100		
		1100°C water quenching	≥10	≥8	≥6
Thermal expansion rate /% ¹⁾		Provide the measured data			
¹⁾ The temperature of thermal expansion rate may be agreed by the interested parties. Note— The technical requirements of special requested products may be agreed by the interested parties.					

6 Test methods

6.1 Sample preparation shall be carried out in accordance with the requirements as specified in GB/T 7321.

6.2 The test of deviation tolerance of dimension and appearance quality of products shall be carried out in accordance with GB/T 10326-2001.

6.3 The test of MgO, Al₂O₃ and SiO₂ in terms of chemical composition shall be carried out in accordance with the requirements as specified in GB/T 5069.

6.4 The test of bulk density and apparent porosity shall be carried out in accordance with the requirements as specified in GB/T 2997.

6.5 The test of cold compressive strength shall be carried out in accordance with the requirements as specified in GB/T 5072.

6.6 The test of refractoriness under load shall be carried out in accordance with the requirements as specified in YB/T 370.

6.7 The test of thermal shock resistance shall be carried out in accordance with the requirements as specified in YB/T 376.1 and YB/T 376.2, of which YB/T 376.2 governs in arbitration.

6.8 The test of thermal expansion rate shall be carried out in accordance with the requirements as specified in GB/T 7320.

7 Inspection rules

7.1 Inspection classification

Inspection is divided into delivery inspection and type test.

7.1.1 Delivery inspection

The delivery inspection items include the dimension tolerance, appearance quality, chemical composition, bulk density, apparent porosity, cold compressive strength and refractoriness under load.

7.1.2 Type test

Type test include all the contents of Table 1 and Table 2. In case of any of the following circumstances, type test shall be conducted,

- a) When the production process or raw material has changed greatly,
- b) At least two times a year during normal production,
- c) To resume the production which have been stopped for more than half a year,
- d) Major differences have been found between the results of the delivery inspection and the last type test.
- e) When the national quality supervision organization puts forward requirements for type inspection.

7.2 Grouping and sampling

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7.2.1 Products with the same brand shall be grouped in lot, which shall be not over 150t each lot.

7.2.2 Sampling shall be carried out in accordance with the requirements as specified in GB/T 10325.

7.3 Rules of judgement

The judgement of products shall be carried out in accordance with the requirements as specified in GB/T 10325.

8 Packaging, marking, transportation, storage and quality certification

8.1 Packaging, marking, transportation, and storage shall be carried out in accordance with the requirements as specified in GB/T 16546.

8.2 The quality certification shall be attached when the bricks leave factory. The quality certification shall include the name of provider, the name of demander, the contract number, the production date, the product name, the applicable standard number, the brand number, the brick number, the lot number, as well as the dimension, the appearance, the physical properties and chemical composition of products.