# ORIENT NEW MATERIAL (HEBEI) CO.,LTD

ROOM 415, GOLDEN PLAZA, NO.318 HONGQI STREET, HENGSHUI CITY, HEBEI PROVINCE, CHINA

TEL/FAX: 0086-318-2883050


## Silica Refractory Bricks

### Brief Introduction:

Silica Refractory bricks is made of quartzite as raw material, adding a small amount of mineralizer and burning at high temperature. Its mineral composition is composed of scaly quartz, square quartz and vitreous heterogeneous tissue formed at high temperature, and its SiO2, content is over 93%. The content of scale quartz is the highest in the better silica brick, accounting for 50%~80%, followed by calcite, only 10%~30%, while the content of quartz and glass phase fluctuates at 5% and 15% respectively.

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## Physical characteristics:

1. Anti-acid-base

Silicon brick belongs to acid refractory, which has strong resistance to acid slag erosion, but it is easy to be destroyed by AI2O3 and other oxides when it is strongly eroded by alkaline slag, and has good resistance to CaO、FeO、Fe2O3 and other oxides.

2. Expansion

The thermal conductivity of silicon brick increases with the increase of working temperature, and there is no residual shrinkage. In the process of oven, the volume of silicon brick increases with the increase of temperature. The maximum expansion of silicon brick occurs between 100~300℃ in the oven process, and the expansion before 300℃ is about 70%~75% of the total expansion. the reason is SiO2 there are 117℃,163℃,180~270 and 573 crystal transformation points in the oven process. between 180 and 270℃, the volume expansion caused by calcite is the largest.

3. Deformation temperature

The high load deformation temperature is the advantage of silicon brick, close to the melting point of scale quartz and square quartz, about 1640~1680℃.

4. Thermal stability

The biggest disadvantage of silicon brick is low thermal shock stability and low fire resistance, which is generally between 1690~1730℃, which limits its application range. The key to determine the thermal stability of silicon brick is density, which is one of the important symbols to determine its quartz transformation. The smaller the density of silicon brick, the more complete the lime conversion, and the smaller the residual expansion in the oven process.

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## Specification:

| Item | | BG-94 | BG-95 | BG-96A | BG-96B |
|---|---|---|---|---|---|
| Chemical composition% | SiO2 | ≥94 | ≥95 | ≥96 | ≥96 |
| | Fe2O3 | ≤1.5 | ≤1.5 | ≤0.8 | ≤0.7 |
| | Al2O3+TiO2+R2O | | ≤1.0 | ≤0.5 | ≤0.7 |
| Refractoriness ℃ | | 1710 | 1710 | 1710 | 1710 |
| Apparent Porosity% | | ≤22 | ≤21 | ≤21 | ≤21 |
| Bulk Density g/cm3 | | ≥1.8 | ≥1.8 | ≥1.87 | ≥1.8 |
| True Density, g/cm3 | | ≤2.38 | ≤2.38 | ≤2.34 | ≤2.34 |
| Cold Crushing Strength Mpa | | ≥24.5 | ≥29.4 | ≥35 | ≥35 |
| 0.2Mpa Refractoriness Under Load T0.6 ℃ | | ≥1630 | ≥1650 | ≥1680 | ≥1680 |
| Permanent Linear Change On Reheating （%）1500℃X2h | | 0～+0.3 | 0～+0.3 | 0～+0.3 | 0～+0.3 |
| 20－1000℃ Thermal Expansion 10-6/℃ | | 1.25 | 1.25 | 1.25 | 1.25 |
| Thermal Conductivity (W/MK) 1000℃ | | 1.74 | 1.74 | 1.44 | 1.44 |

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## MAGNESIA BRICK

Magnesium brick is an alkaline refractory with magnesium oxide content of more than 90% and main crystal phase of magnesite.

### Classification:

Generally Magnesium brick can be divided into two categories, sintered magnesia brick (also known as fired magnesia brick) and chemical combined magnesia brick (also known as non-fired magnesia brick) .

Magnesia bricks with high purity and firing temperature are called direct combined magnesia bricks because of the direct contact of magnesite grains, and bricks made of fused magnesia as raw materials are called fused and then combined magnesia bricks.

### Physical characteristics

The product has the characteristics of high temperature mechanical strength, good slag resistance, strong corrosion resistance and stable volume at high temperature.

Magnesium brick has high fire resistance, good alkaline slag resistance, high

temperature of load softening, but poor thermal shock resistance.

The sintered magnesia brick is made of brick magnesia brick. After crushing, batching, mixing and forming, it is burned at high temperature of 1550~1600℃, and the firing temperature of high purity products is above 1750℃. Non-pouring magnesia brick is made by adding appropriate chemical binder to magnesia and mixing, forming and drying.

**Application：**

Mainly used for steelmaking alkaline open furnace, electric furnace bottom and furnace wall, permanent lining of oxygen converter, non-ferrous metal smelting furnace, high temperature tunnel kiln, calcined magnesia brick and cement rotary kiln lining, furnace bottom and furnace wall of heating furnace, lattice brick of glass kiln heat storage chamber, etc.

**Specification:**

| Magnesium brick | | MZ-91 | MZ-92 | MZ-93 | MZ-94 |
|---|---|---|---|---|---|
| Chemical composition % | MgO ≥ | 91 | 92 | 93 | 94.5 |
| | SiO2 ≤ | 4.0 | 3.5 | 3.5 | 2.0 |
| | Fe2O3 ≤ | 1.3 | - | - | 1.2 |
| | CaO ≤ | 3.0 | 2.0 | 2.0 | 2.0 |
| Apparent Porosity% ≤ | | 18 | 18 | 18 | 18 |
| Bulk Density g/cm3 ≥ | | 2.86 | 2.90 | 2.95 | 2.92 |
| Cold Crushing Strength Mpa ≥ | | 60 | 60 | 60 | 60 |
| 0.2Mpa Refractoriness Under Load T0.6 ℃ | | ≥1560 | ≥1560 | ≥1620 | ≥1650 |
| Permanent Linear Change On Reheating （%）1500℃X2h | | 0～+0.4 | 0～+0.4 | 0～+0.4 | 0～+0.4 |
| Thermal Shock Resistances 100℃ water cycles | | ≥18 | ≥18 | ≥18 | ≥18 |

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## MAGNESIA CARBON BRICKS

### Introduction:

Magnesium carbon brick is a non-burning carbon-containing alkaline refractory made from fused magnesia, high purity magnesia and flake graphite and phenolic resin as binder.

### Characteristics:

1) High Temperature Resistance

2) Strong resistance to alkaline erosion

3) Thermal shock stability

**Classification:**

It is divided into Magnesia carbon brick for converter,Magnesia carbon brick for electric furnace and Magnesia carbon brick for Ladle.

**Specification:**

| Item | MgO % | F/C % | B.D. g/cm $^3$ | Apparent Porosity % | Cold Crushing Strength MPa | High Temperature Bending Strength MPa |
|---|---|---|---|---|---|---|
| MT-18A | ≥72 | ≥18 | 2.97±0.08 | ≤3.0 | ≥35 | ≥10 |
| MT-16A | ≥74 | ≥16 | 3.00±0.08 | ≤3.5 | ≥35 | ≥8 |
| MT-14A | ≥76 | ≥14 | 3.03±0.08 | ≤3.5 | ≥40 | ≥10 |
| MT-12A | ≥78 | ≥12 | 3.05±0.08 | ≤4.0 | ≥40 | ≥6 |
| MT-10A | ≥80 | ≥10 | 3.10±0.08 | ≤4.0 | ≥40 | ≥6 |
| MT-8A | ≥82 | ≥8 | 3.12±0.08 | ≤4.5 | ≥45 | - |
| MT-5A | ≥85 | ≥5 | 3.15±0.08 | ≤5.0 | ≥50 | - |

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## Magnesia- Calcia Bricks

Magnesia- calcia brick is a magnesium composite refractory with MgO and CaO as the main chemical composition. It is mainly composed of brucite and calcite.

Orient New Material

### Classification:

1.Burning magnesia-calcium bricks

2.No burning magnesia-calcium bricks

3. Magnesium calcium carbon brick

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**Specification：**

| Item | | | MG-20 | MG-20A | MG-30 | MG-30A | MG-40 | MG-40A | MG-50 |
|---|---|---|---|---|---|---|---|---|---|
| ω CaO(%) | μo | ≥ | 18 | | 28 | | 38 | | 48 |
| | σ | | 1 | | | | | | |
| ω（MgO+CaO）% | μo | ≥ | 92 | 94 | 92 | 94 | 92 | 94 | 94 |
| | σ | | 1 | | | | | | |
| ω(∑ SAF)(%) | μo | ≤ | 3.0 | 2.5 | 3.0 | 2.5 | 3.0 | 2.5 | 2.5 |
| | σ | | | | | | | | |
| Apparent Porosity AP（%） | μo | ≤ | 15.0 | | | | | | |
| | σ | | 0.5 | | | | | | |
| B.D. (g/㎤) | μo | ≥ | 2.90 | 2.95 | 2.90 | 2.95 | 2.90 | 2.95 | 2.90 |
| | σ | | 0.05 | | | | | | |
| Cold Crushing Strength（Mpa） | μo | ≥ | 60 | | | | | | |
| | σ | | 5 | | | | | | |
| 0.2Mpa Refractoriness Under Load T0.6（℃） | μo | ≥ | 1650 | 1700 | 1650 | 1700 | 1650 | 1700 | 1700 |
| | σ | | 10 | | | | | | |

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## Magnesia-Chrome Bricks

Magnesium-chromium brick is a refractory product with magnesium oxide (MgO) and chromium trioxide (Cr2O3) as the main components and brucite and spinel as the main mineral components.

The main raw materials for making magnesia-chromium bricks are sintered magnesia and chromite. The purity of magnesia is high, the chemical composition of ferrochrome is Cr2O3 at 30~45, and the CaO is not more than 1.0~1.5.

**Classification：**

1. Direct combination of magnesium and chromium brick direct bonded magnesia-chrome bricks It refers to refractory products made of high purity magnesia and chromium concentrate.

2. Melting combined with magnesium chromium brick fused relmnded magnesia-chrome bricks It refers to the refractory products made of fused magnesium chromium sand as the main raw material.

3. Melting half combined with magnesium chromium brick fused semi-rdmnded magnesia-chrome bricks Refractory products made from fused magnesia-chromium sand and sintered magnesia, chromite or pre-reactive magnesia-chromium sand.

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4. Silicate combined with magnesium chrome brick made from sintered magnesia and chromite by fine ingredients. It is widely used in iron and steel metallurgy, non-ferrous smelting and other industrial kilns.

**Specification：**

| Item | Common Magnesium Chromium Brick | | | | Direct combination of Mg-Cr brick | | | |
|---|---|---|---|---|---|---|---|---|
| | MCr-8 | MCr-12 | MCr-16 | MCr-18 | ZMCr-9A | ZMCr-9B | ZMCr-12A | ZMCr-12B |
| Mg0（%） | ≥65 | ≥60 | ≥55 | ≥50 | ≥75 | ≥75 | ≥75 | ≥70 |
| $Cr_2O_3$（%） | ≥8 | ≥12 | ≥16 | ≥18 | ≥9 | ≥9 | ≥12 | ≥12 |
| $AL_2O_3$（%） | - | - | - | - | 3-5 | - | 4-6 | - |
| $Fe_2O_3$（%） | - | - | - | - | 4-6 | - | 5-6 | - |
| $SiO_2$（%） | - | - | - | - | 1.4 | 3.5 | 1.2 | 3.5 |
| Apparent Porosity AP（%）≤ | 20 | 20 | 20 | 20 | 17 | 18 | 17 | 18 |
| B.D（g/cm³)≥ | 3.00 | 3.00 | 3.00 | 3.00 | 3.05 | 3.05 | 3.05 | 3.05 |
| Cold Crushing Strength（Mpa）≥ | 40 | 40 | 35 | 35 | 50 | 50 | 50 | 50 |
| 0.2Mpa Refractoriness Under Load T0.6（℃）≥ | 1550 | 1580 | 1580 | 1580 | 1620 | 1600 | 1650 | 1610 |
| Thermal Shock Resistances 1100℃ water cycles | - | - | - | - | ≥5 | ≥5 | ≥5 | ≥5 |
| Thermal expansion1200℃（%） | - | - | - | - | 1.65 | - | 1.64 | - |
| Thermal conductivity1000℃（w/m.k) | - | - | - | - | 2.65 | | 2.68 | - |

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## Aluminum Magnesium Carbon Brick

**Production process:**

It is used high bauxite, corundum, high quality fused magnesia and flake graphite as main raw materials, phenolic resin as binder and adding antioxidants through heat mixing, high pressure molding and heat treatment.

**Main Application:**

masonry of working layer of various types of ladle.

The properties of magnesia-aluminum carbon brick are between magnesia-carbon brick and aluminum-magnesium-carbon brick, which can be used in the transition zone between ladle slag line and ladle wall, and also in ladle wall part.

| ITEM | Magnesium aluminum carbon brick | | | Aluminum Magnesium Carbon Brick | | | Aluminum carbon silicon carbon brick | | |
|---|---|---|---|---|---|---|---|---|---|
| | QMGT-10 | QMGT-15 | QMGT-25 | QMGT-60 | QMGT-65 | QMGT-70 | QASCT-5A | QASCT-7A | QASCT-7b |
| MgO% ≥ | 63 | 58 | 53 | 15 | 15 | 10 | | | |
| $Al_2O_3$% ≥ | 10 | 15 | 25 | 55 | 60 | 65 | 65 | 75 | 65 |
| C% ≥ | 12 | 12 | 10 | 10 | 8 | 7 | 10 | 10 | 10 |
| $SiO_2$ % ≥ | | | | | | | 6 | 7 | 9 |
| Bulk Density g/$cm^3$≥ | 2.90 | 2.90 | 2.90 | 2.90 | 2.90 | 2.95 | 2.85 | 3.00 | 2.85 |
| Apparent Porosity % ≤ | 6 | 6 | 6 | 8 | 8 | 8 | 8 | 8 | 8 |
| Cold Crushing Strength MPa≥ | 35 | 35 | 35 | 40 | 40 | 40 | 40 | 40 | 40 |