



## 青花耐火 您可信赖的合作伙伴

Qinghua Refractories—Your Trusted Partner

## 玻璃窑蓄热室用耐火产品

REFRACTORIES FOR REGENERATOR OF GLASS TANK

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## 公司简介 About Us

青花耐火材料股份有限公司，是集科、工、贸一体化的亚太地区大型碱性耐火材料生产企业。耐火材料年生产能力100万吨以上。现有员工2000多人，占地400万平方米，总资产40亿元，年出口创汇6000万美元。青花耐火是目前国际上在优质镁质资源储量、制造装备水平、生产规模、科技研发实力、产品质量及服务水平均处于世界前列的，服务于冶金、建材行业的碱性耐火材料生产企业之一；公司能够根据客户的需求，提供各种冶金和建材行业用碱性耐火材料，并为上百家国内、外冶金和建材行业客户长期稳定供货；全方位的服务能力和较高的使用寿命，为客户创造了巨大的价值，被很多国际大型集团确定为战略供应商和可信赖的合作伙伴。

## Since 1984

Qinghua Refractories is a leading basic refractory manufacturer in the Asia-Pacific region integrated with researching, manufacturing and trading. Its annual refractory production capacity is over 1 million metric tons and it covers an area of 4 million square meters with 2000 employees. The total assets of the company has exceeded RMB 4.00 billion and annual export volume exceeded 60 million US dollars. We are dedicating ourselves to manufacturing top grade basic refractories for metallurgy and building materials industries based on our high quality magnesite resources, advanced equipments, large manufacturing scale, and strong R&D ability. With comprehensive services and satisfied products performances, we have created tremendous values for our customers and become strategic supplier of many global giants.



## Qinghua Group

## 生产基地 Manufacturing facilities



矿产储量约15500万吨  
菱镁石约13200万吨  
吨镁白云石约2300万吨  
Mineral reserves:155,000,000 tons  
Magnesite:132,000,000 tons  
Mangesia dolomite:23,000,000 tons



金桥镁砖厂  
Jinqiao Complex



自动称量系统  
Automatic weighing cars

生产基地  
Manufacturing facilities



德国强力混砂机  
German Intensive Mixers



德国2000-2500吨液压机  
German 2000-2500 ton Hydraulic Presses

日本2000吨液压机  
Japanese 2000 ton Hydraulic Presses

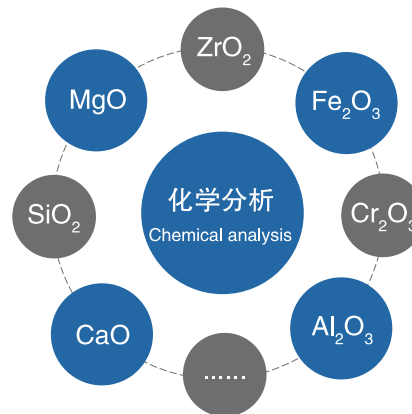


22条超高温隧道窑  
22 Ultra-high temperature Tunnel Kilns

研发中心  
R & D center

青花研究院的检验中心可以检验耐火砖、不定形和耐火原材料所要求的各种理化性能。

The test center of Qinghua R & D Institute makes all necessary tests on raw materials, refractory bricks and monolithics.



物理分析:

体积密度、显气孔率、荷重软化温度、常温耐压强度、高温抗折强度、抗热震性、透气度、加热永久线变化、抗氧化性、导热系数、热膨胀、蠕变、SEM微观结构分析等

Physical analysis:

Bulk Density, Apparent Porosity, Refractoriness under Load, Cold Crushing Strength, Modulus of Rupture at high temperature, Thermal Shock resistance, Air permeability, Linear changes on reheating, Anti-oxidation, Thermal conductivity Thermal expansion and creep , micro structure analysis by SEM.....



扫描电子显微镜 SEM  
Scanning Electron Microscope

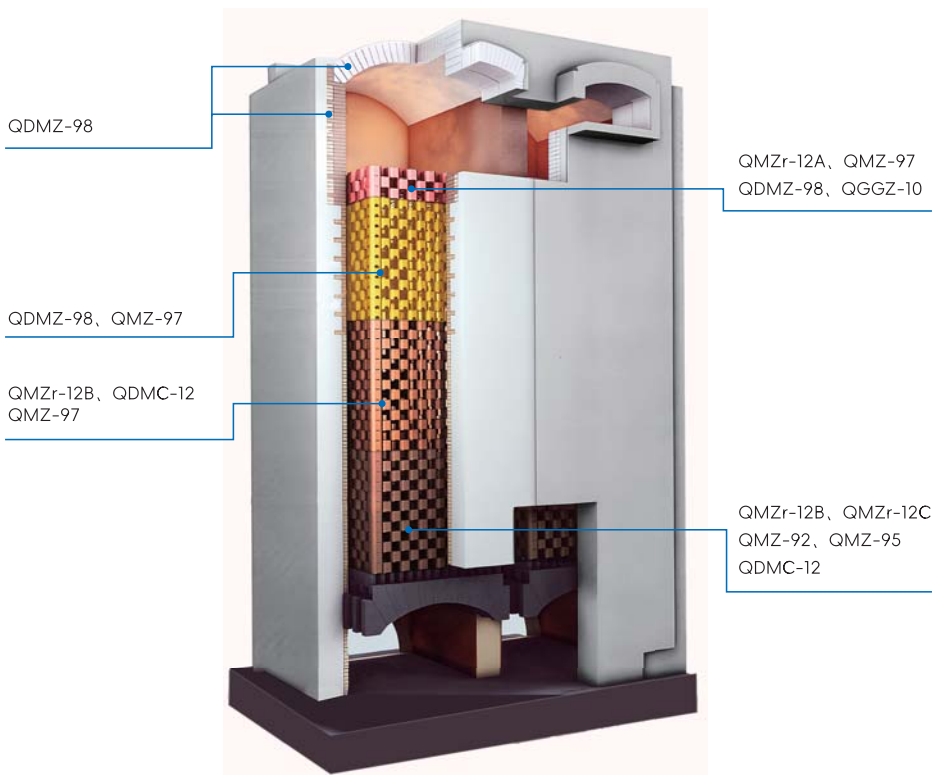


X-射线荧光光谱仪 XRF  
X-ray Fluorescence Spectrometer



X-射线衍射仪 XRD  
X-Ray Diffractometer

## 玻璃窑蓄热室 REGENERATOR



## 玻璃窑蓄热室的材料推荐

### Recommendations for Regenerator of Glass Tank

#### ▶ 格子体顶部 Top Layers

1-4层温度最高,受高温烟气及粉尘侵蚀最严重,且化学侵蚀性强,建议使用低气孔率、高体积密度、具有良好抗侵蚀性能的高温镁铬砖(QMZr-12A)、高纯镁砖(QMZ-97)、优质电熔镁砖(QDMZ-98)、铬刚玉砖(QGGZ-10)。

The uppermost 2 to 4 checker layers are confronted with highest temperature, attacked by batch dust and vanadium oxide from heavy oil, and suffering strong chemical erosion, QMZr-12A, a high temperature Magnesia-zirconia brick with characters of Low AP, high BD and good corrosion resistance, or Magnesite Brick (QMZ-97), Fused Magnesia bricks (QDMZ-98), Corundum Brick (QGGZ-10), are recommended.

#### ▶ 格子体上部 Hot zone

该区域受高温气体侵蚀严重,建议使用不易爆裂剥落的优质电熔镁砖(QDMZ-98)或高纯镁砖(QMZ-97)。

Suffering severe stress by high temperature, Fused Magnesia bricks (QDMZ-98) or Magnesite Brick (QMZ-97) are recommended for this area, with proven good performance and not easily cracking or spalling.

#### ▶ 格子体中部 Intermediate zone

该区域粉尘侵蚀较少,有较高含量硫酸钠渗透,建议使用具有良好耐高温、抗热震性能的优质镁砖(QMZ-97)、镁铬砖(QMZr-12B)、直接结合镁铬砖(QDMC-12)。

This area has less dust erosion, but more strict attack of sulfate penetration which requires strong resistance to high temperature and thermal shock. Recommendations: High quality Magnesite bricks (QMZ-97), Magnesia-Zirconia brick (QMZr-12B), Direct bonded magnesia-chrome brick (QDMC-12).

#### ▶ 格子体下部 Lower zone

该区域是硫酸盐冷凝区,烟气温度相对较低,受挥发性成分(碱式硫酸盐复盐)冷凝、急冷急热因素影响较大,建议使用低温镁铬砖(QMZr-12B、QMZr-12C)或可使用致密的镁砖(QMZ-95、QMZ-92)也可使用直接结合镁铬砖(QDMC-12)。

This zone has lower flue gas temperature, but seriously affected by and volatile components and complex sulfate condensation (alkali sulfates composite) and thermal shock effects. QMZr-12B, QMZr-12C, a lower-temperature magnesia-zirconia brick, is suited for this area. The other options are QMZ-95, QMZ-92, a high density magnesia brick; or QDMC-12, a direct bonded magnesia-chrome brick.

## 玻璃窑用镁砖 Magnesite Brick

烧成镁砖采用一种或两种优质重烧镁砂为原料制成。镁含量越高，其高温性能和抗侵蚀性能也越好，广泛应用于玻璃窑蓄热室。

Sintered Magnesite brick is batched and fired with different types of dead-burned magnesite. The higher purity of raw material, the better specification. It is widely used for regenerator of glass tank.



牌号 Brand	MgO (%)	SiO <sub>2</sub> (%)	Al <sub>2</sub> O <sub>3</sub> (%)	Fe <sub>2</sub> O <sub>3</sub> (%)	CaO (%)	B.D (g/cm <sup>3</sup> )	A.P (%)	C.C.S (MPa)	R.U.L. (°C)
QMZ-92	92.5	3.8	0.7	0.9	1.8	2.95	16.0	70	1540
QMZ-95A	95.5	1.4	0.2	0.7	1.9	2.95	16.0	80	1700
QMZ-95B	95.0	2.0	0.2	0.7	1.8	2.95	16.0	70	1650
QMZ-96A	96.2	1.2	0.2	0.7	1.5	2.95	15.0	80	1700
QMZ-96B	95.7	1.6	0.2	0.7	1.6	2.95	15.5	75	1680
QMZ-97A	97.2	0.6	0.2	0.6	1.2	3.00	13.5	80	1700
QMZ-97B	96.5	0.9	0.2	0.6	1.6	2.96	15.5	75	1700

以上数据为基于长期的生产统计数据得出的典型值，不作为保证值，青花耐火可根据实际生产状况进行调整。

The above properties are typical values based on the production averages and should not be used as the guaranteed specification. Qinghua may make the modification upon the production request.

## 玻璃窑用电熔镁砖 Fused Magnesite Brick

电熔镁砖以电熔镁砂为原料制造，致密度高，显气孔率低，方镁石晶体尺寸大，抗蠕变性能更佳，广泛应用于玻璃窑蓄热室拱顶和上部室墙。

Fused magnesite brick is made from fused magnesite, characterized with higher density, lower apparent porosity, bigger crystallized periclase, better creep resistance performance. It is widely applied in the regenerator crown and upper part of wall.



牌号 Brand	MgO (%)	SiO <sub>2</sub> (%)	Al <sub>2</sub> O <sub>3</sub> (%)	Fe <sub>2</sub> O <sub>3</sub> (%)	CaO (%)	B.D (g/cm <sup>3</sup> )	A.P (%)	C.C.S (MPa)	R.U.L. (°C)
QDMZ-92	93.3	3.0	0.7	0.9	1.8	2.95	15.5	70	1560
QDMZ-95	95.5	1.4	0.2	0.7	1.9	2.98	15.0	80	1700
QDMZ-96	96.2	1.2	0.2	0.7	1.5	3.02	15.0	80	1700
QDMZ-97	96.8	0.8	0.2	0.7	1.3	3.05	14.5	85	1700
QDMZ-98	97.5	0.6	0.2	0.5	1.0	3.05	14.0	85	1700

以上数据为基于长期的生产统计数据得出的典型值，不作为保证值，青花耐火可根据实际生产状况进行调整。

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## 玻璃窑用镁锆砖 Magnesia-Zirconia Brick

镁锆砖具有较高的耐火度和使用寿命，抗蠕变性能强，抗侵蚀性能优于镁铬砖，其高温强度和热震稳定性比再结合镁砖好。广泛应用于玻璃窑蓄热室格子体上部、中部、下部。

Magnesia-Zirconia brick is characterized with high refractoriness, longer service life, and strong creep resistance. It has better corrosion resistance than magnesia-chrome brick, also better than rebonded magnesite brick for CCS at high temperature and thermal shock resistance. These brands are used in the top layers, intermediate zone and lower zone for regenerator checker.



牌号 Brand	MgO (%)	SiO <sub>2</sub> (%)	Al <sub>2</sub> O <sub>3</sub> (%)	Fe <sub>2</sub> O <sub>3</sub> (%)	CaO (%)	ZrO <sub>2</sub> (%)	B.D (g/cm <sup>3</sup> )	A.P (%)	C.C.S (MPa)	R.U.L. (°C)
QMZr-12A	78.9	6.5	0.3	0.5	1.1	12.5	3.18	13.5	90	1680
QMZr-12B	78.3	6.7	0.3	0.7	1.3	12.5	3.13	14.5	90	1660
QMZr-12C	77.4	7.0	0.3	0.7	1.6	12.5	3.10	15.5	85	1630

以上数据为基于长期的生产统计数据得出的典型值，不作为保证值，青花耐火可根据实际生产状况进行调整。

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## 玻璃窑用铬刚玉砖 Chrome-Corundum Brick

铬刚玉砖是以铬刚玉相为主晶相，白刚玉、板状刚玉及高品质铬为主要原料，经高温烧成的非碱性耐火砖，以其优异高温性能和热震稳定性及抗硫及钒侵蚀能力在玻璃窑蓄热室使用。

Chrome corundum brick, with chrome corundum phase as the main crystal phase, is a non-basic refractory brick using white corundum, tabular corundum and high-quality chromium as the main raw materials, fired at high temperature. It is used in the regenerator of glass tank for its excellent high-temperature performance, thermal shock stability and resistance to sulfur and vanadium corrosion.



牌号 Brand	MgO (%)	SiO <sub>2</sub> (%)	Al <sub>2</sub> O <sub>3</sub> (%)	Fe <sub>2</sub> O <sub>3</sub> (%)	CaO (%)	ZrO <sub>2</sub> (%)	Cr <sub>2</sub> O <sub>3</sub> (%)	B.D (g/cm <sup>3</sup> )	A.P (%)	C.C.S (MPa)	R.U.L. (°C)
QGGZ-10	0.3	1.5	82.5	0.2	0.2	3.0	10.5	3.4	14	120	1700

以上数据为基于长期的生产统计数据得出的典型值，不作为保证值，青花耐火可根据实际生产状况进行调整。

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## 玻璃窑用镁铬砖 Magnesia-Chrome Brick

镁铬砖是以方镁石和镁铬尖晶石为主晶相的碱性耐火制品,采用优质镁砂和铬矿为原料高温烧成,高温性能好,广泛应用于玻璃窑蓄热室。

With periclase and magnesia-chrome spinel as the main crystal phases, magnesia - chrome brick is made from sintered magnesia and chrome ore, and fired at optimum "sintering curve". They are widely used in regenerator of glass tank.



牌号 Brand	MgO (%)	SiO <sub>2</sub> (%)	Al <sub>2</sub> O <sub>3</sub> (%)	Fe <sub>2</sub> O <sub>3</sub> (%)	CaO (%)	Cr <sub>2</sub> O <sub>3</sub> (%)	B.D (g/cm <sup>3</sup> )	A.P (%)	C.C.S (MPa)	R.U.L. (°C)
QDMC-12	74	1.8	3.5	6.5	1.5	12.5	3.08	17.5	42	1700

以上数据为基于长期的生产统计数据得出的典型值,不作为保证值,青花耐火可根据实际生产状况进行调整。

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## 轻质镁橄榄石砖 Light Forsterite Brick

轻质镁橄榄石砖以热导率低的镁橄榄石砂为主要原料,制品保温性能好,高温稳定性好,应用于玻璃窑蓄热室需保温部位。

Mainly using synthetic forsterite clinker as raw material, the light forsterite brick has good insulation property and superior stability at high temperature. It is widely used in the insulation layer of regenerator.



牌号 Brand	MgO (%)	SiO <sub>2</sub> (%)	Al <sub>2</sub> O <sub>3</sub> (%)	Fe <sub>2</sub> O <sub>3</sub> (%)	CaO (%)	B.D (g/cm <sup>3</sup> )	A.P (%)	C.C.S (MPa)	R.U.L. (°C)
QF-18	54.3	35.5	1.5	7.0	1.5	1.88	42.5	8	1400

以上数据为基于长期的生产统计数据得出的典型值,不作为保证值,青花耐火可根据实际生产状况进行调整。

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## 玻璃窑用镁火泥 Magnesia Mortar

镁质火泥针对不同材质耐火砖，采用不同纯度的镁砂为原料，根据不同需要，选择适宜的结合剂。特点是施工性能好，粘结强度大，凝结时间为120秒左右，烧结强度高。适用于玻璃窑碱性砖的砌筑。

Matched with diversity of bricks, Qinghua develops different range of Magnesia Mortar, with corresponding grade of magnesia, and suitable binder. These brands have high adhesive strength, easy installation with setting time of 120 seconds approximately, and high sintered strength. It performs well as the joint filler for brick lining of regenerator.



牌号 Brand	MgO (%)	RSK	BT min	GS +0.5mm≤	GS -0.074mm≥	Water (%)	BSM 110°Cx24h	BSM 1400°Cx3h
QN-2	83	37	2	2	65	25-35	5-20	25-40
QN-4	88	37	2	2	65	25-35	5-20	25-40

以上数据为基于长期的生产统计数据得出的典型值，不作为保证值，青花耐火可根据实际生产状况进行调整。

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## 玻璃窑用镁质捣打料 Magnesia Ramming Mix

镁质捣打料以优质镁砂为主要原料，加入化学结合剂，硬化过程中产生化学陶瓷结合。适用于玻璃窑蓄热室填缝和砌筑，施工时需加水5-10%。

Magnesia Ramming mix is made from high quality magnesia with adding a special chemical binder to batches. It is used for joint filling and brick lining of regenerator. During the hardening process, it forms "chemical-ceramic" change at suitable temperature. 5-10% water shall be added in operation.



牌号 Brand	MgO (%)	SiO <sub>2</sub> (%)	GS mm	Water (%)	Bonding
QD-4	93-96	2	0-5	5-10	CCB

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## 体系认证 System Certification



- ISO9001:2015 质检管理体系认证证书
- ISO9001:2015 Quality Management System Certificate

- ISO14001:2015 环境管理体系认证证书
- ISO14001:2015 Environmental Management System Certificate

- ISO45001:2018 职业健康安全管理体系认证证书
- ISO45001:2018 Occupational Health and Safety Management System Certificate