



万高 WANGAO

FOSHAN ZHENGHONG ALUMINA PRODUCTS FACTORY
-HIGH ALUMINA CERAMIC BALL; HIGH ALUMINA LINING BRICK-



GUANGDONG-CHINA



WANGAO

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FOSHAN ZHENGHONG ALUMINA PRODUCTS FACTORY



Area: 7000 square meters



Length: 73.1 meters



WANGAO



WANGAO

COMPANY INTRODUCTION

Foshan Nanhai Zhenghong Alumina Products Factory is a manufacturer specialized in the production of high-end abrasion resistant products. Our brand Wangao, including high-quality alumina ball, high alumina lining brick series products.

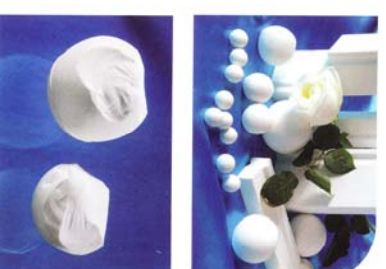
The company has its own advanced production line such as high temperature tunnel kilns, high temperature shuttle kilns, large spray granule-making machines and large-size dry isostatic press machines. It also has a team of 60 senior and middle-level technical employees. These strong technical background and advanced facilities enable the company to produce complete specifications alumina products in high quality. Our company has been sticking to customers' focus, market-oriented and creating valuable products for customers. With the high quality products, perfect service and scientific management, the reputation and social recognition of Wangao series products are greatly improved.

Our alumina products are now being exported to our clients in Turkey, Spain, India, Indonesia, Korea, Malaysia, Egypt, Iran, Nigeria, Australia, Vietnam, Russia.

WANGAO PRODUCTS INCLUDES:

- For Ceramics Industry
- For Mineral Industry

- 90a-Al₂O₃ Microcrystal Alumina Ball
- 90a-Al₂O₃ Microcrystal Alumina Lining Bricks
- 90a-Al₂O₃ Microcrystal Alumina Beads
- 92a-Al₂O₃ Microcrystal Alumina Ball
- 92a-Al₂O₃ Microcrystal Alumina Lining Bricks
- 92a-Al₂O₃ Microcrystal Alumina Beads
- 95a-Al₂O₃ Microcrystal Alumina Ball
- 95a-Al₂O₃ Microcrystal Alumina Lining Bricks
- 95a-Al₂O₃ Microcrystal Alumina Beads
- 97a-Al₂O₃ Microcrystal Alumina Ball
- 97a-Al₂O₃ Microcrystal Alumina Lining Bricks
- 97a-Al₂O₃ Microcrystal Alumina Beads



HIGH ALUMINA CERAMIC BALL

90%a-Al₂O₃, 92%a-Al₂O₃, 95%a-Al₂O₃, 97%a-Al₂O₃

This product is a grinding body used in ball mill, pot mill, vibrating mill and other fine grinding plants. It has advantages of high hardness, high volumetric density and anticorrosion. With the smashing efficiency and scuff-resistance much better than that of common ball-stone or natural cobble stone, it is widely used in ceramics, glass, porcelain enamel, pigment, chemicals and other trade.

Sizes

Dimension Size and Tolerance(mm)	φ30	φ40	φ50	φ60
	30±1	40±1	50±1	60±1

Specification

Specification Function Item	Description	Content of Alumina (%)	Wear Rate (%)	Compression Strength (Mpa)	Hardness (Mohs)	Bulk Density (g/cm ³)	Water Absorption (%)	Color
90%a-Al ₂ O ₃		≥90	≤0.15	≥1900	≥9	≥3.63	<0.01	White
92%a-Al ₂ O ₃		≥92	≤0.12	≥2000	≥9	≥3.65	<0.01	White
95%a-Al ₂ O ₃		≥95	≤0.10	≥2100	≥9	≥3.78	<0.01	White
97%a-Al ₂ O ₃		≥97	≤0.02	≥2300	≥9	≥3.81	<0.01	White



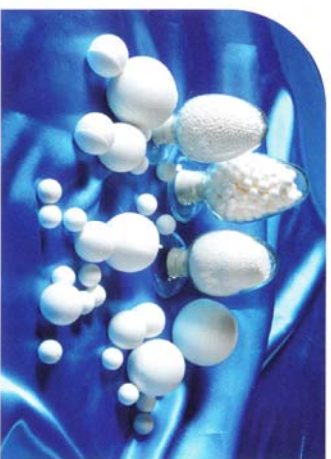
HIGH PERFORMANCE ABRASION RESISTANCE ALUMINA MICRO BEADS

Application

◆ High performance abrasion resistance alumina micro bead is mainly used for non-metal mineral products extra refining; it is the ideal grinding media for stirring grinding, sand grinder and vibration grinding; it is widely applied in ceramics, paint, ink, coatings, dyes, rubber and power industries.

Performance

- ◆ High density and hardness, impact resistance, low wear rate, smooth surface and no contamination to product.
- ◆ Fine chemical stability, anti-corrosion, no pollution to the grinded products.
- ◆ Under condition of appropriate ball size ratio, it can achieve high grinding efficiency with material results $D \leq 2\mu m$
- ◆ High performance and low price.



Alumina Micro Beads Specification

Dimension	φ0.1-0.5	φ0.6-1	φ2-3	φ4-6	φ7-10	φ11-15	φ16-19	φ20-29
Size and Tolerance(mm)	0.1-0.5	0.6-1±0.1	2-3±0.1	4-6±0.1	7-10±0.1	11-15±0.5	16-19±0.5	20-29±0.5

Specification

Specification	Type	90%-Al ₂ O ₃	92%-Al ₂ O ₃	95%-Al ₂ O ₃	97%-Al ₂ O ₃
Function Item					
-Al ₂ O ₃ Content(%)		≥90	≥92	≥95	≥97
Bulk Density(g/cm ³)		≥3.63	≥3.65	≥3.78	≥3.81
Wear Rate(%)		≤0.15	≤0.12	≤0.10	≤0.02
Hardness (Mohs)		≥9	≥9	≥9	≥9
Compression strength(Mpa)		≥1900	≥2000	≥2100	≥2300
Water Absorption(%)		<0.01	<0.01	<0.01	<0.01
Color		White	White	White	White





HIGH ALUMINA (ALUMINIUM OXIDE)LINING BRICKS



■ Lining brick dimensions(Non tapered) (mm)

H	40	60	70
Wa	50	50	50
L	150	150	150

■ Lining brick dimensions(tapered) (mm)

H	40	60	70
Wa	45	45	45
L	50	50	50
Wa	50	50	50
L	150	150	150

■ Lining brick dimensions(half-non tapered) (mm)

H	40	60	70
Wa	50	50	50
L	75	75	75

■ Lining brick dimensions(half-tapered) (mm)

H	40	60	70
Wa	45	45	45
L	50	50	50
Wa	50	50	50
L	75	75	75

■ Lining brick dimensions(thin-non tapered) (mm)

H	40	60	70
Wa	25	25	25
L	150	150	150

■ Specification

Function Item	Specification	Type
-Al ₂ O ₃ Content(%)	≥90	90%-Al ₂ O ₃
Bulk Density(g/cm ³)	≥3.63	≥92
Wear Rate(‰)	≤0.15	≥3.65
Hardness (Mpa)	≥9	≤0.12
Compression Strength(Mpa)	≥1900	≥9
Water Absorption(%)	<0.01	≥2000
Color	White	<0.01
		White



THE EQUIPMENTS

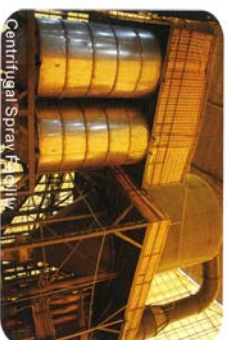
■ Characters of microcrystal alumina Lining bricks

- ◆ Better wear resistance and impact resistance due to high quality of raw materials
- ◆ WANGAO adopts different raw materials for alumina bricks and balls according to the different use conditions of bricks and balls.
- ◆ No less than 5 years use life time of WANGAO alumina lining bricks.
- ◆ With all available size of alumina lining bricks.
- ◆ Substitute for rubber linings with 15% efficiency improvement.



■ High powerful centrifugal spray machine to have the following advantages

- ◆ Better roundness and fluidity of the powder.
- ◆ Smaller grain size compared with the traditional spraying particles to have more smooth surface of the green body.
- ◆ Maximum density of the finished products by CIP.

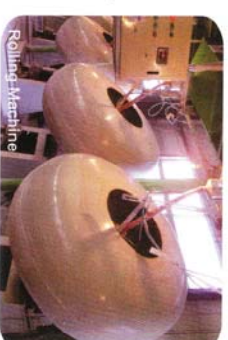


■ Producing technique

- ◆ Rolling machine by centrifugal theory,water and materials automatic adding system,different diameter of machine for different size of alumina ball with flexible adjustment of angle and rotate speed
- ◆ Key process: Interval of adding water and materials time based on size of alumina ball .
- ◆ Different angle of rolling machine based on different product.
- ◆ Exact control of water.
- ◆ Wet control.

■ Materials choosing

- ◆ Different raw materials for different product according to the special specification of each product.
- ◆ Low sodium content calcined microcrystal alumina powder of high content of α-Al₂O₃
- ◆ Less than 2μm of ultimate crystal size of the raw materials,the smaller size of original crystal,with low wear rate of the finished products.



Rolling Machine



Granularity Test Facility



CORUNDUM ALUMINA PLATE SERIES

These products with the character of abrasion resistance impact resistance and easy application are available to be fitted in loading slot spiral pipe and unloading slot of the steel plant mine power plant etc.to protect these

Specification	90%-Al ₂ O ₃	92%-Al ₂ O ₃
Al ₂ O ₃	≥90	≥92
Hardness(MoHS)	≥9	≥9
Bulk Density(g/cm ³)	≤3.63	≤3.65
Water Adsorption(%)	≥0.01	≥0.01

OPERATIONAL PRINCIPLE OF BALL MILL

Generally speaking ceramics factories adopt intermittent ball mill. Within the inner tube of ball mill loaded are some alumina balls, materials to be grinded and a proper amount of water which are properly matched according to process requirement. When the inner tube turns around under the effect of motor, the grinding body will turn around and upward closely together with the inner wall and body of the inner tube with the effect of centrifugal force. The grinding body will be shot off with the effect of gravitation when it is brought to a certain height and will drop at a certain speed. During the above process, the materials within the inner tube will be crushed up with the dual effect of shock of grinding body and grinding.



Rotary speed of ball mill:

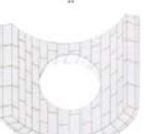
Rotary speed of ball mill plays an important role in ball grinding efficiency. If the ball mill rotates at the speed of critical or higher, there will not be any smashing effect. Both theory and practice have proven that critical speed of ball mill is:

$$V_{\text{Critical}} = \frac{32}{\sqrt{D}}$$

D: Diameter of ball mill(m)
operating speed $V = V_{\text{Critical}} \times (0.7 - 0.9)$ min
For big tonnage mill, lower limit should be taken
and for small tonnage ball mill upper limit should be taken.



1 End Face:
 $G_1 = \pi \cdot r \cdot d \cdot H \cdot 2 \div 1000$
 G_1 : weight of rectangle brick(kg);
 r : radius of cylinder of ball mill(cm);
 H : thickness of lining brick(cm);
 d : density of lining brick(g/cm³);



2. Cylinder:
 $G_2 = \pi \cdot D \cdot L \cdot H \cdot d \div 1000$
 G_2 : weight of rectangle brick and ladder type brick(kg)
 D : diameter of cylinder of ball mill(cm);
 L : length of ball mill(cm);
 d : density of lining brick(cm³);
 H : thickness of lining brick(cm)



Long tunnel kiln with broad firing section

- ◆ Firing is a key process of alumina ball production.
- ◇ Long tunnel kiln with broad firing section can achieve:
 - ◇ Continual constant uniform temperature to keep the consistent quality of products.
 - ◇ Scientific burning system to control the growth speed of α -Al₂O₃ crystal, make the crystal size less than 4 μ m and achieve the best wear resistance.

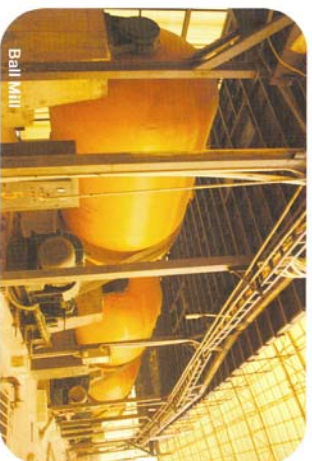
Dry isostatic press

- ◆ Till now, dry isostatic press is the most advanced process in the world.
- By dry isostatic press, the products can achieve uniform density and roundness.



Ball mills of large capacity and super fine grinding process

- ◆ With large capacity of ball mills, the super-fine grinding process can guarantee the granularity to be controlled in a best and continual status, and the D50 less than 2 μ m which is good for the growth of microcrystal during the firing.



Quantity of Lining Brick Required for Various Ball Mill

Weight(kg) Specification of ball mill(cm)	Thickness of inner lining brick			Ratio (rectangle:trapezoid)
	4cm	6cm	7cm	
φ 95xL:102(Ball mill:0.3MT)	580	870	1015	1:5
φ 130xL:150(Ball mill:0.5MT)	1200	1700	2045	1:5
φ 150xL:180(Ball mill:1.0MT)	1600	2400	2800	1:2
φ 180xL:200(Ball mill:1.5MT)	2300	3400	3950	1:1
φ 200xL:280(Ball mill:3.0MT)	3100	4600	5370	2:1
φ 245xL:300(Ball mill:5.0MT)		6700	7800	3:1
φ 285xL:400(Ball mill:8.0MT)		11000	13000	4:1

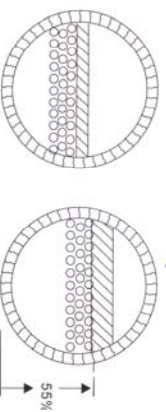
PACKING



Alumina Microbead Bag

Common Wooden Pallet

Installation Sketch Map Of Ball Mill



Wrong installation

Correct installation

