



# Ceramic Media Product Brochure



# Ceramic ball

Pingxiang Rongjian Environmental Protection Chemical Packing Co., Ltd



# DIRECTORY

▶ **Product Introduction**

FEATURES-Product parameters

.....

▶ **List of achievements**

Engineering Case - Performance List

.....

▶ **About Us**

Company Introduction - Production  
Workshop - Qualification Certificate



# Alumina Ceramic Balls

Inert alumina ceramic balls have stable chemical properties, high strength, good thermal stability, low water absorption, high temperature resistance, high pressure resistance, acid alkali salt corrosion resistance, and do not react with organic solvents. They are an excellent catalyst support and covering material widely used in industries such as petroleum, chemical, fertilizer, natural gas, and environmental protection. Inert ceramic balls, as support and covering materials for catalysts in reactors, can improve the distribution of gases and liquids, buffer the impact of liquids and gases on catalysts, and protect catalysts with low strength.

Inert alumina ceramic balls can be classified into ordinary ceramic balls, medium aluminum ceramic balls, and high aluminum ceramic balls based on their aluminum content.

The main function of inert ceramic balls is to increase the distribution points of gases or liquids, support and protect active catalysts with low strength. It has the advantages of high density, mechanical strength, and good wear resistance. Grinding ceramic balls are an economical and widely used non-metallic grinding medium. Grinding ceramic balls are mainly used in fields such as machinery, electronics, aerospace, and can also be used in industries such as fertilizers and chemicals.

Can withstand corrosion from acids, alkalis, and other organic solvents, and can withstand temperature changes that occur during the production process. Its main function is to increase the distribution points of gas or liquid, support and protect active catalysts with low strength.



Inert alumina ceramic balls and filler ceramic balls are widely used in industries such as petroleum, chemical, fertilizer, natural gas, and environmental protection. They are used as covering support materials and tower fillers for catalysts in reactors. The main function of filler ceramic balls is to increase gas or liquid distribution points, support and protect low strength active catalysts. According to the different AL<sub>2</sub>O<sub>3</sub> content of inert alumina ceramic balls, filler ceramic balls are divided into: ordinary ceramic balls, inert alumina ceramic balls, medium alumina ceramic balls, high alumina ceramic balls, 99 high alumina ceramic balls, convex concave groove perforated ceramic balls, active ceramic balls, perforated ceramic balls, microporous ceramic balls, and thermal storage ceramic balls.

# Product parameters

| product                                    |                                    | 17%-19% Ordinary porcelain ball    |                                   |                                       |   |      |      |  |      |       |
|--|------------------------------------|------------------------------------|-----------------------------------|---------------------------------------|---|------|------|--|------|-------|
|  |                                    | minimum(%)                         |                                   |                                       | maximum(%)                                  |      |      | ordinary(%)  |      |       |
| chemical composition                       | AL <sub>2</sub> O <sub>3</sub>     | 17                                 |                                   |                                       | 19  |      |      | 18   |      |       |
|  | SiO <sub>2</sub>                   | 70                                 |                                   |                                       | 77  |      |      | 74.9   |      |       |
|  | AL <sub>2</sub> O <sub>3</sub> +Si | 90                                 |                                   |                                       | 94  |      |      | 93   |      |       |
|  | Fe <sub>2</sub> O <sub>3</sub>     | /                                  |                                   |                                       | 1   |      |      | 0.5  |      |       |
|  | TiO <sub>2</sub>                   | /                                  |                                   |                                       | 0.5   |      |      | 0.46   |      |       |
|  | CaO                                | /                                  |                                   |                                       | 0.5   |      |      | 0.42   |      |       |
|  | MgO                                | /                                  |                                   |                                       | 0.5   |      |      | 0.38   |      |       |
|  | Na <sub>2</sub> O                  | /                                  |                                   |                                       | 2   |      |      | 1.12   |      |       |
|  | K <sub>2</sub> O                   | /                                  |                                   |                                       | 3.5   |      |      | 3.28   |      |       |
| free iron(%)                               |                                    |                                    |                                   |                                       | ≤0.1  |      |      |  |      |       |
| apparent porosity                          |                                    | diameter≥10mm                      |                                   |                                       | ≤0.4  |      |      |  |      |       |
|  |                                    | diameter=6mm                       |                                   |                                       | ≤1.0  |      |      |  |      |       |
|  |                                    | diameter=3mm                       |                                   |                                       | ≤3.0  |      |      |  |      |       |
| Water absorption rate(%)                   | Acid resistance(%)                 | Alkali resistance(%)               | Bulk density (g/cm <sup>3</sup> ) | Specific gravity(kg/cm <sup>3</sup> ) | Mohs Hardness (scale)                       |      |      |  |      |       |
| <2.0                                       | >90                                | >85                                | 1.3-1.35                          | 2300                                  | >6.5  |      |      |  |      |       |
| Thermal Conductivity (w/m <sup>2</sup> .k) | Specific heat capacity (J/kg.°C)   | Maximum operating temperature (°C) |                                   |                                       | Coefficient of thermal expansion(%) (500°C) |      |      | Thermal shock stability (from 500°C to cold water) |      |       |
| 0,9-1.0                                    | 628-837                            | 1050                               |                                   |                                       | 0.2   |      |      | 10Time   |      |       |
| Geometric properties                       | Specifications (mm)                | 3                                  | 6                                 | 10                                    | 13  | 16   | 19   | 25   | 38   | 50    |
|  | Minimum compressive strength       | ≥0.3                               | ≥0.8                              | ≥1.0                                  | ≥2.5  | ≥3.2 | ≥7.4 | ≥8.3   | ≥9.3 | ≥15.4 |

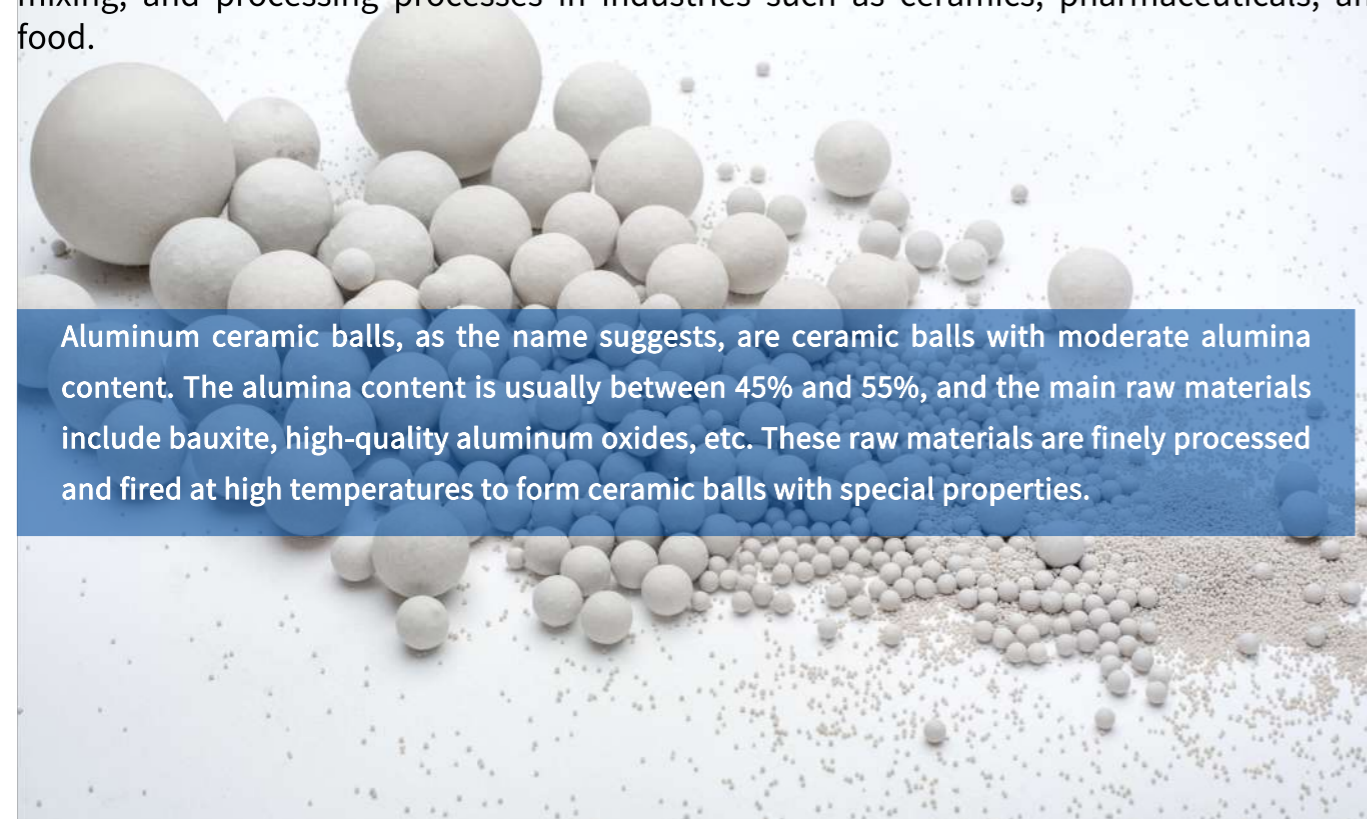
# Aluminum ceramic ball

## Main characteristics

1. High hardness: The hardness of medium aluminum ceramic balls is relatively high, usually reaching a Mohs hardness level of 9 or above, which can easily resist various wear and impact.
2. High density: Its density is relatively high, generally above 3.6g/cm<sup>3</sup>, which is conducive to improving the efficiency and production capacity of the grinding machine.
3. Strong corrosion resistance: Medium aluminum ceramic balls have good chemical stability and can withstand corrosive media such as acid and alkali, making them less susceptible to damage.
4. Strong wear resistance: After long-term use in high-speed friction environments, medium aluminum ceramic balls can still maintain good wear resistance.
5. Good temperature stability: Medium aluminum ceramic balls can work stably in high temperature environments and are not easily broken or deformed due to temperature changes.

## application area

1. Petroleum and Chemical Industry: Aluminum ceramic balls play an irreplaceable role as catalyst carriers, fillers, or grinding media in the petroleum and chemical industries. Its excellent wear resistance and corrosion resistance make it an ideal choice in these fields.
2. Metallurgy and Power: In the metallurgy and power industries, medium aluminum ceramic balls are widely used in wear-resistant, corrosion-resistant, and high-temperature resistant applications, such as refractory materials, grinding media, etc.
3. Environmental Protection and Water Treatment: Medium aluminum ceramic balls can also be used in the fields of environmental protection and water treatment as filtration media or adsorbents to remove impurities and pollutants from water.
3. Other fields: In addition, medium aluminum ceramic balls are widely used in grinding, mixing, and processing processes in industries such as ceramics, pharmaceuticals, and food.



Aluminum ceramic balls, as the name suggests, are ceramic balls with moderate alumina content. The alumina content is usually between 45% and 55%, and the main raw materials include bauxite, high-quality aluminum oxides, etc. These raw materials are finely processed and fired at high temperatures to form ceramic balls with special properties.

# Product parameters

| name of a part                        | Ordinary porcelain ball | 23-30%AL2O3 porcelain balls | Chinalco porcelain ball |
|---------------------------------------|-------------------------|-----------------------------|-------------------------|
| Al2O3+SiO2(%)                         | >93                     | >92                         | >93                     |
| Al2O3(%)                              | 17-23                   | 23-30                       | 40-75%                  |
| Fe2O3(%)                              | <1                      | <1                          | <1                      |
| CaO(%)                                | <0.5                    | <1.5                        | <1.5                    |
| MgO(%)                                | <0.5                    | <1.5                        | <0.5                    |
| K2O+Na2O(%)                           | <4                      | <4                          | <3.5                    |
| TiO2                                  | <0.5                    | ≤0.5                        | <0.1                    |
| Free Leachable Fe2O3                  | <0.1                    | <0.1                        | <0.005                  |
| water absorption                      | <0.5%                   | <0.5%                       | <1                      |
| Particle density of g/cm <sup>3</sup> | 2.3-2.4                 | 2.3-2.4                     | 2.6-2.9                 |
| Operating temperature                 | 980                     | 980                         | 1450                    |
| Moh's hardness                        | >6.5                    | >7                          | >7                      |
| compression strength                  | KN/Particle             |                             |                         |
| φ6mm                                  | >0.6                    | >0.7                        | >0.8                    |
| φ12mm                                 | >1.8                    | >2.0                        | >2.2                    |
| φ16mm                                 | >2.0                    | >2.3                        | >2.5                    |
| φ20mm                                 | >5.5                    | >5.8                        | >6.2                    |
| φ25mm                                 | >6.4                    | >6.6                        | >7.5                    |
| φ38mm                                 | >9.2                    | >9.5                        | >9.8                    |
| φ50mm                                 | >9.2                    | >9.5                        | >9.8                    |

# High alumina ceramic ball

**Excellent wear resistance:** High alumina ceramic balls are mainly made of high-purity alumina and sintered at high temperatures, with extremely high hardness and wear resistance. In high-speed operation and friction environments, it can effectively resist wear, extend service life, and reduce maintenance costs.

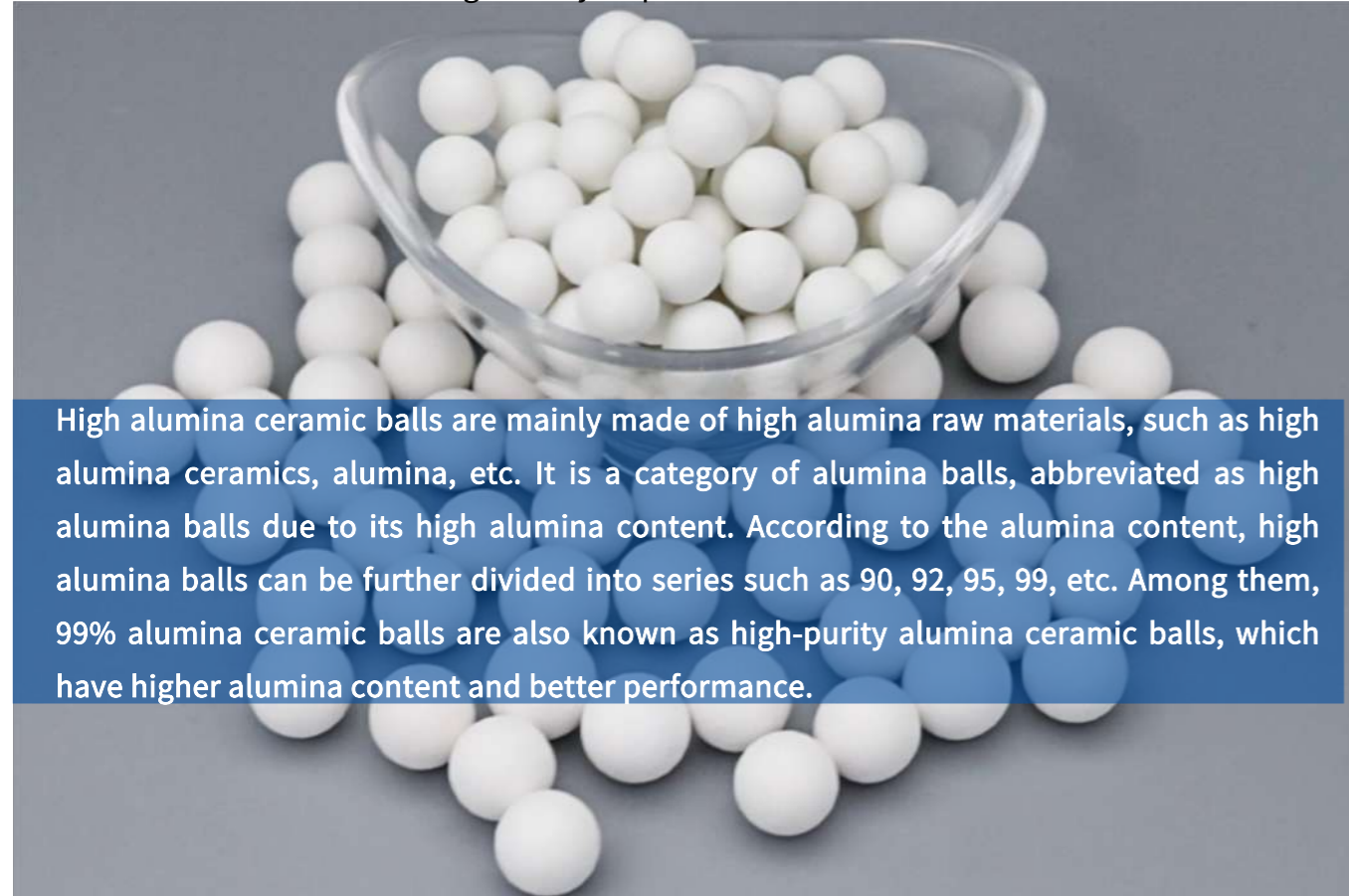
**Good chemical stability:** High alumina ceramic balls have excellent resistance to chemical corrosion and can work stably in harsh environments such as acid and alkali without failure due to chemical reactions. This characteristic has made it widely used in industries such as chemical and pharmaceutical.

**Low thermal expansion coefficient:** High alumina ceramic balls have a low thermal expansion coefficient, which can maintain stable size and shape at high temperatures, avoiding deformation and cracking caused by temperature changes. This characteristic gives it unique advantages in fields such as high-temperature furnaces.

**High density and low water absorption:** High alumina ceramic balls have the characteristics of high density and low water absorption, making them more efficient and stable in applications such as filling and grinding. Low water absorption also reduces volume changes caused by water absorption and release.

**Easy to clean and maintain:** The surface of high alumina ceramic balls is smooth and not easily stained, making cleaning very convenient. Due to its good chemical stability and resistance to pollution and corrosion, the maintenance cost is relatively low.

**Environmental protection and safety:** High alumina ceramic balls will not produce harmful substances during production and use, meeting environmental protection requirements. At the same time, it also has safety features such as fire and explosion prevention, which can be used in some situations with high safety requirements.



High alumina ceramic balls are mainly made of high alumina raw materials, such as high alumina ceramics, alumina, etc. It is a category of alumina balls, abbreviated as high alumina balls due to its high alumina content. According to the alumina content, high alumina balls can be further divided into series such as 90, 92, 95, 99, etc. Among them, 99% alumina ceramic balls are also known as high-purity alumina ceramic balls, which have higher alumina content and better performance.

# Product parameters



## 92 Ceramic ball

92 ceramic ball filler usually refers to ceramic balls with an alumina content of about 92%. As a high-performance industrial filler, it has a wide range of applications in multiple fields.

| product                     |  | 92% high-aluminum porcelain balls                    |                                   |                 |             |             |              |                              |              |              |
|-----------------------------|--|--|-----------------------------------|-----------------|-------------|-------------|--------------|------------------------------|--------------|--------------|
| <b>pigment</b>              |  | white  |                                   |                 |             |             |              |                              |              |              |
| <b>form</b>                 |  | sphere   |                                   |                 |             |             |              |                              |              |              |
| <b>size</b>                 |  | <b>minimum content (%)</b>                           | <b>The maximum content of (%)</b> |                 |             |             |              | <b>Common content of (%)</b> |              |              |
| <b>chemical composition</b> |  |  | <b>92</b>                         | <b>94</b>       |             |             |              |                              | <b>92.5</b>  |              |
|                             | Al <sub>2</sub> O <sub>3</sub>             |  |                                   | <b>2</b>        |             |             |              |                              | <b>1.5</b>   |              |
|                             | SiO <sub>2</sub>                           |  | /                                 | <b>0.3</b>      |             |             |              |                              | <b>0.02</b>  |              |
|                             | Fe <sub>2</sub> O <sub>3</sub>             |  | /                                 | <b>0.1</b>      |             |             |              |                              | <b>0.02</b>  |              |
|                             | TiO <sub>2</sub>                           |  | /                                 | <b>4</b>        |             |             |              |                              | <b>1.5</b>   |              |
|                             | CaO  |  | /                                 | <b>0.1</b>      |             |             |              |                              | <b>0.05</b>  |              |
|                             | MgO  |  | /                                 | <b>0.25</b>     |             |             |              |                              | <b>0.1</b>   |              |
|                             | Na <sub>2</sub> O                          |  | /                                 | <b>0.2</b>      |             |             |              |                              | <b>0.13</b>  |              |
|                             | K <sub>2</sub> O                           |  | /                                 |                 |             |             |              |                              |              |              |
| <b>physical property</b>    |  | <b>free iron (%)</b>                                 |                                   | <b>≤0.01</b>    |             |             |              |                              |              |              |
|                             |  | <b>apparent porosity (%)</b>                         |                                   | <b>≤7.0</b>     |             |             |              |                              |              |              |
|                             |  | <b>water absorption (%)</b>                          |                                   | <b>&lt;4.0</b>  |             |             |              |                              |              |              |
|                             |  | <b>acid fastness (%)</b>                             |                                   | <b>&gt;99.8</b> |             |             |              |                              |              |              |
|                             |  | <b>fastness to alkali (%)</b>                        |                                   | <b>≥90</b>      |             |             |              |                              |              |              |
|                             |  | <b>Accumulation density (g / cm<sup>2</sup>)</b>     |                                   | <b>1.9</b>      |             |             |              |                              |              |              |
|                             |  | <b>Specific gravity (kg/m<sup>3</sup>)</b>           |                                   | <b>3200</b>     |             |             |              |                              |              |              |
|                             |  | <b>Mohs hardness (grade)</b>                         |                                   | <b>&gt;8.0</b>  |             |             |              |                              |              |              |
|                             |  | <b>Thermal conductivity (w/m<sup>2</sup>.k)</b>      |                                   | <b>0.7-0.8</b>  |             |             |              |                              |              |              |
|                             |  | <b>Maximum operating temperature (C)</b>             |                                   | <b>1550</b>     |             |             |              |                              |              |              |
|                             |  | <b>Thermal expansion rate (%) (500°C)</b>            |                                   | <b>0.1</b>      |             |             |              |                              |              |              |
|                             |  | <b>Thermal shock stability (500°C to cold water)</b> |                                   | <b>10 Times</b> |             |             |              |                              |              |              |
| <b>geometrical features</b> | <b>specifications (mm)</b>                 | <b>3</b>   | <b>6</b>                          | <b>10</b>       | <b>13</b>   | <b>16</b>   | <b>19</b>    | <b>25</b>                    | <b>38</b>    | <b>50</b>    |
|                             | <b>Minimum compressive strength (N/PC)</b> | <b>510</b>   | <b>1030</b>                       | <b>1961</b>     | <b>6031</b> | <b>7650</b> | <b>14896</b> | <b>15288</b>                 | <b>17946</b> | <b>22065</b> |

# Product parameters

## 95 Ceramic ball

95 ceramic ball filler refers to ceramic balls with an alumina content of up to 95%. As a high-performance industrial filler, it has demonstrated its unique advantages and wide application value in multiple fields.

| product                                 |  | 95% high-aluminum porcelain balls |         |                            |      |      |       |       |                       |       |  |  |
|---|--|-----------------------------------|---------|----------------------------|------|------|-------|-------|-----------------------|-------|--|--|
| pigment form                            |  | white sphere                      |         |                            |      |      |       |       |                       |       |  |  |
| size                                    |  | minimum content                   |         | The maximum content of (%) |      |      |       |       | Common content of (%) |       |  |  |
| chemical composition                    | Al <sub>2</sub> O <sub>3</sub>             | 95                                |         | 97                         |      |      |       |       | 95.8                  |       |  |  |
|   | SiO <sub>2</sub>                           | /                                 |         | 4                          |      |      |       |       | 2                     |       |  |  |
|   | Fe <sub>2</sub> O <sub>3</sub>             | /                                 |         | 0.3                        |      |      |       |       | 0.02                  |       |  |  |
|   | TiO <sub>2</sub>                           | /                                 |         | 0.1                        |      |      |       |       | 0.02                  |       |  |  |
|   | CaO  | /                                 |         | 4                          |      |      |       |       | 1.5                   |       |  |  |
|   | MgO  | /                                 |         | 0.1                        |      |      |       |       | 0.05                  |       |  |  |
|   | Na <sub>2</sub> O                          | /                                 |         | 0.25                       |      |      |       |       | 0.1                   |       |  |  |
|   | K <sub>2</sub> O                           | /                                 |         | 0.2                        |      |      |       |       | 0.13                  |       |  |  |
| physical property                       | free iron (%)                              |                                   | ≤0.01   |                            |      |      |       |       |                       |       |  |  |
|   | apparent porosity (%)                      |                                   | <7.0    |                            |      |      |       |       |                       |       |  |  |
|   | water absorption (%)                       |                                   | <4.0    |                            |      |      |       |       |                       |       |  |  |
|   | acid fastness (%)                          |                                   | >99.8   |                            |      |      |       |       |                       |       |  |  |
|   | fastness to alkali (%)                     |                                   | ≥90     |                            |      |      |       |       |                       |       |  |  |
|   | Accumulation density (g/cm <sup>3</sup> )  |                                   | 1.9     |                            |      |      |       |       |                       |       |  |  |
|   | Specific gravity (kg/m <sup>3</sup> )      |                                   | 3200    |                            |      |      |       |       |                       |       |  |  |
|   | Mohs hardness (grade)                      |                                   | >8.0    |                            |      |      |       |       |                       |       |  |  |
|   | Thermal conductivity (w/m <sup>2</sup> .k) |                                   | 0.7-0.8 |                            |      |      |       |       |                       |       |  |  |
|   | Specific heat capacity (J/kg.°C)           |                                   | 628-837 |                            |      |      |       |       |                       |       |  |  |
|   | Maximum operating temperature is (°C)      |                                   | 1550    |                            |      |      |       |       |                       |       |  |  |
| Thermal expansion rate (%) (500°C)      |  | 0.1                               |         |                            |      |      |       |       |                       |       |  |  |
| Thermal shock stability (500°C to cold) |  | 10 Times                          |         |                            |      |      |       |       |                       |       |  |  |
| geometrical features                    | specifications (mm)                        | 3                                 | 6       | 10                         | 13   | 16   | 19    | 25    | 38                    | 50    |  |  |
|   | Minimum compressive strength (N/PC)        | 510                               | 1030    | 1961                       | 6031 | 7650 | 14896 | 15288 | 17946                 | 22065 |  |  |

## 99 Ceramic ball

99 ceramic ball filler, also known as 99% alumina ceramic ball, is a high-performance industrial filler named after its high alumina content of up to 99%.

| product                                 |   | 99% high-aluminum porcelain balls |         |                            |      |      |       |       |                       |       |  |  |
|---|---|-----------------------------------|---------|----------------------------|------|------|-------|-------|-----------------------|-------|--|--|
| pigment form                            |   | white sphere                      |         |                            |      |      |       |       |                       |       |  |  |
| size                                    |   | minimum content                   |         | The maximum content of (%) |      |      |       |       | Common content of (%) |       |  |  |
| chemical composition                    | Al <sub>2</sub> O <sub>3</sub>              | 99                                |         | 99.6                       |      |      |       |       | 99.3                  |       |  |  |
|   | SiO <sub>2</sub>                            | /                                 |         | 0.2                        |      |      |       |       | 0.18                  |       |  |  |
|   | Fe <sub>2</sub> O <sub>3</sub>              | /                                 |         | 0.2                        |      |      |       |       | 0.02                  |       |  |  |
|   | TiO <sub>2</sub>                            | /                                 |         | 0.55                       |      |      |       |       | 0.02                  |       |  |  |
|   | CaO   | /                                 |         | 0.1                        |      |      |       |       | 0.2                   |       |  |  |
|   | MgO   | /                                 |         | 0.1                        |      |      |       |       | 0.05                  |       |  |  |
|   | Na <sub>2</sub> O                           | /                                 |         | 0.25                       |      |      |       |       | 0.1                   |       |  |  |
|   | K <sub>2</sub> O                            | /                                 |         | 0.2                        |      |      |       |       | 0.13                  |       |  |  |
| physical property                       | free iron (%)                               |                                   | ≤0.01   |                            |      |      |       |       |                       |       |  |  |
|   | apparent porosity (%)                       |                                   | ≤7.0    |                            |      |      |       |       |                       |       |  |  |
|   | water absorption (%)                        |                                   | <0.5    |                            |      |      |       |       |                       |       |  |  |
|   | acid fastness (%)                           |                                   | >99.8   |                            |      |      |       |       |                       |       |  |  |
|   | fastness to alkali (%)                      |                                   | ≥95     |                            |      |      |       |       |                       |       |  |  |
|   | Accumulation density (g / cm <sup>2</sup> ) |                                   | 2.1     |                            |      |      |       |       |                       |       |  |  |
|   | Specific gravity (kg/m <sup>3</sup> )       |                                   | 3400    |                            |      |      |       |       |                       |       |  |  |
|   | Mohs hardness (grade)                       |                                   | >8.0    |                            |      |      |       |       |                       |       |  |  |
|   | Thermal conductivity (w/m <sup>2</sup> .k)  |                                   | 0.7-0.8 |                            |      |      |       |       |                       |       |  |  |
|   | Maximum operating temperature (C)           |                                   | 1550    |                            |      |      |       |       |                       |       |  |  |
|   | Thermal expansion rate (%) (500°C)          |                                   | 0.1     |                            |      |      |       |       |                       |       |  |  |
| Thermal shock stability (500°C to cold) |   | 10 Times                          |         |                            |      |      |       |       |                       |       |  |  |
| geometrical features                    | specifications (mm)                         | 3                                 | 6       | 10                         | 13   | 16   | 19    | 25    | 38                    | 50    |  |  |
|   | Minimum compressive strength (N/PC)         | 510                               | 1030    | 1961                       | 6031 | 7650 | 14896 | 15288 | 17946                 | 22065 |  |  |

# Grinding ball

With the cutting edge technology of cold isostatic press shaping, quality alumina powder as raw materials and sophisticated recipe, our products are best solution as grinding media in many walks of life such as Ceramics, Cements, Paints, Pigments, Petrochemicals, Pharmaceuticals, Coatings, Mining etc. It features high strength, big density, erosion resistance, regular shape, environment friendly so on so forth.

## Tips on the feeding proportion of our alumina balls in service:

It's highly recommended that our products (φ 30, φ 40) accounts for 50% of the total amount whereas the bigger balls (φ 50, φ 60, φ 70) are arranged at 5:3:2 to match small balls (φ 30, φ 40). General speaking the feeding amount of all balls shall be kept at least 51% of the total ball mill volume to guarantee the grinding efficiency. Special tip: The best grinding effect could be achieved if the grinded materials (slurry) is kept at 50-60 cm to the mill feeding entrance when the grinding operation is finished.

## Advantages of aluminum grinding balls:

1. No metal contamination - ensures product purity
2. High wear resistance - lower operating costs
3. Corrosion and high temperature resistance - adaptable to harsh working conditions
4. Energy saving and consumption reduction - environmentally friendly
5. Moderate specific gravity - optimizes grinding effect

Alumina Grinding Balls possess an exceptionally high bulk density, superior wear resistance, and outstanding impact toughness, offering significantly higher grinding efficiency compared to ordinary grinding media. Due to their extremely low wear rate, they are widely used as grinding media in industries such as ceramics, building materials, coatings, electronic powders, and mining & metallurgy. Inside equipment like ball mills and vibrating mills, they achieve efficient ultra-fine grinding through impact and friction on materials, effectively preventing the introduction of impurities and ensuring the purity and fineness of the ground products.

# Product parameters

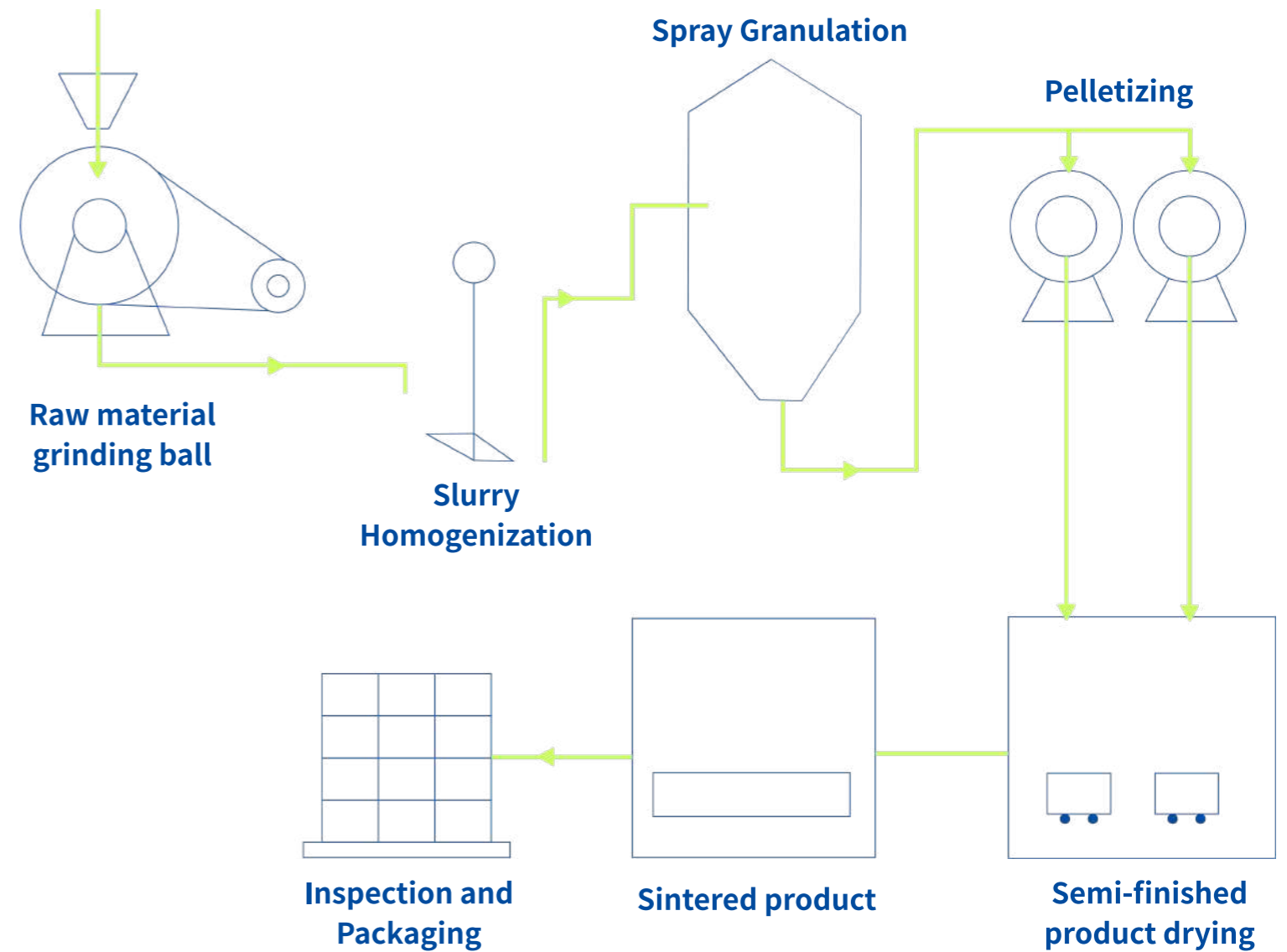
## The following are its core applicable industries:

- I. Non-metallic Minerals and Powder Processing Industry (the most widely used field)  
The value of products in this field often depends on their whiteness, purity, and particle size, with zero tolerance for iron contamination.  
Calcium carbonate powder, kaolin (porcelain clay), quartz/silica powder processing, and high-purity deep processing of other non-metallic minerals such as barite, talc, mica, feldspar, etc.
- II. Ceramics and Building Materials Industry  
Ceramic glazes and pigments, structural ceramics and electronic ceramics:
- III. Metallic Minerals and Metallurgy Industry  
Non-ferrous metal beneficiation, hydrometallurgy:
- IV. Chemicals and Pesticides Industry  
Dyes, pigments and coatings, pesticide and pharmaceutical intermediates:
- V. Emerging Energy and Electronics Industry  
Lithium battery materials, electronic pastes, magnetic materials
- VI. Environmental Protection and Other Industries  
Coal-water slurry, food and cosmetics:



# Product parameters

| Items                              | 研磨球参数/Grinding ball parameters |            |            |            |            |
|------------------------------------|--------------------------------|------------|------------|------------|------------|
| Al <sub>2</sub> O <sub>3</sub> (%) | ≥75                            | ≥80        | ≥90        | ≥92        | ≥95        |
| SiO <sub>2</sub> (%)               | <20                            | <16        | <7         | <5         | <3         |
| Fe <sub>2</sub> O <sub>3</sub> (%) | <0.4                           | <0.2       | <0.15      | <0.1       | <0.1       |
| Na <sub>2</sub> O (%)              | <0.8                           | <0.5       | <0.5       | <0.4       | <0.25      |
| Bulk density (g/cm <sup>3</sup> )  | 3.15-3.25                      | ≥3.30      | ≥3.50      | ≥3.63      | ≥3.68      |
| Wear (‰)                           | <0.15                          | <0.12      | <0.12      | <0.10      | <0.07      |
| Hardness (Mohs)                    | 8                              | 9          | 9          | 9          | 9          |
| Water absorption rate (%)          | <0.02                          | <0.01      | <0.01      | <0.01      | <0.01      |
| Color                              | 灰白色 (grey white)               | 白色 (White) | 白色 (White) | 白色 (White) | 白色 (White) |



## Applications



# Refractory ball

## Main characteristics

1. High temperature resistance: Refractory ceramic balls have high refractoriness, which varies depending on the content of alumina. For example, refractory ceramic balls with an alumina content of around 20% can withstand high temperatures up to 1300 °C, while corundum ceramic balls with an alumina content of up to 99% can withstand high temperatures up to 1900 °C.
2. High mechanical strength: Refractory ceramic balls have high mechanical strength, can withstand large impact forces, and have a long service life.
3. Good chemical stability: Refractory ceramic balls have good chemical stability and are not prone to chemical reactions with materials, ensuring the purity of the reaction process.
4. Resistance to sudden temperature changes: Refractory ceramic balls can withstand large temperature changes and are not easily broken due to temperature fluctuations.

## application area

Refractory ceramic balls have a wide range of applications in various fields, as follows:

1. Metallurgical industry: In the hot blast furnace and heating transformation equipment of the steel industry, refractory ceramic balls play a role in dispersing materials and improving reaction efficiency.
2. Chemical industry: In high, medium, and low temperature converters, desulfurization tanks, methanol synthesis towers, methanogenic furnaces, and other equipment in fertilizer and coal chemical industries, refractory ceramic balls play a role in dispersing gas-liquid, supporting, covering, and protecting catalysts. In addition, refractory ceramic balls are also used in hydrogen production, hydrogenation converters, reforming and other equipment in the petroleum and refining industries.
3. Ceramic production: In ceramic production, refractory ceramic balls serve as grinding media, which can improve the fine and smooth finish of ceramics.



Refractory ceramic balls are a high-performance industrial material mainly composed of calcined industrial alumina with high refractoriness and low thermal deformation, high-grade high alumina vanadium clay, and high viscosity refractory kaolin, which are scientifically formulated, formed, and high-temperature calcined. Refractory ceramic balls can be classified into ordinary refractory balls, high alumina refractory balls, and corundum refractory balls based on their alumina content. Its specification size range is wide, usually between  $\Phi$  20mm and  $\Phi$  80mm, and there are also some special specifications such as  $\Phi$  5mm and  $\Phi$  60mm to meet the needs of different industrial applications.

# Product parameters

| product                                    | Fire-resistant porcelain ball |
|--|-------------------------------|
| $Al_2O_3$                                  | $\geq 65$                     |
| $Fe_2O_3$                                  | $\leq 1.6$                    |
| porosity (%)                               | $\leq 24$                     |
| Accumulacking density (KG/m <sup>3</sup> ) | $\geq 1386$                   |
| Specific gravity (KG/m <sup>3</sup> )      | $\geq 2350$                   |
| Compressive strength (KG/m <sup>3</sup> )  | $\geq 900$                    |
| refractoriness (°C)                        | $\geq 1800$                   |
| refractoriness under load                  | $\geq 1500$                   |
| Heavy heat contraction (%)                 | $\leq 0.1$                    |



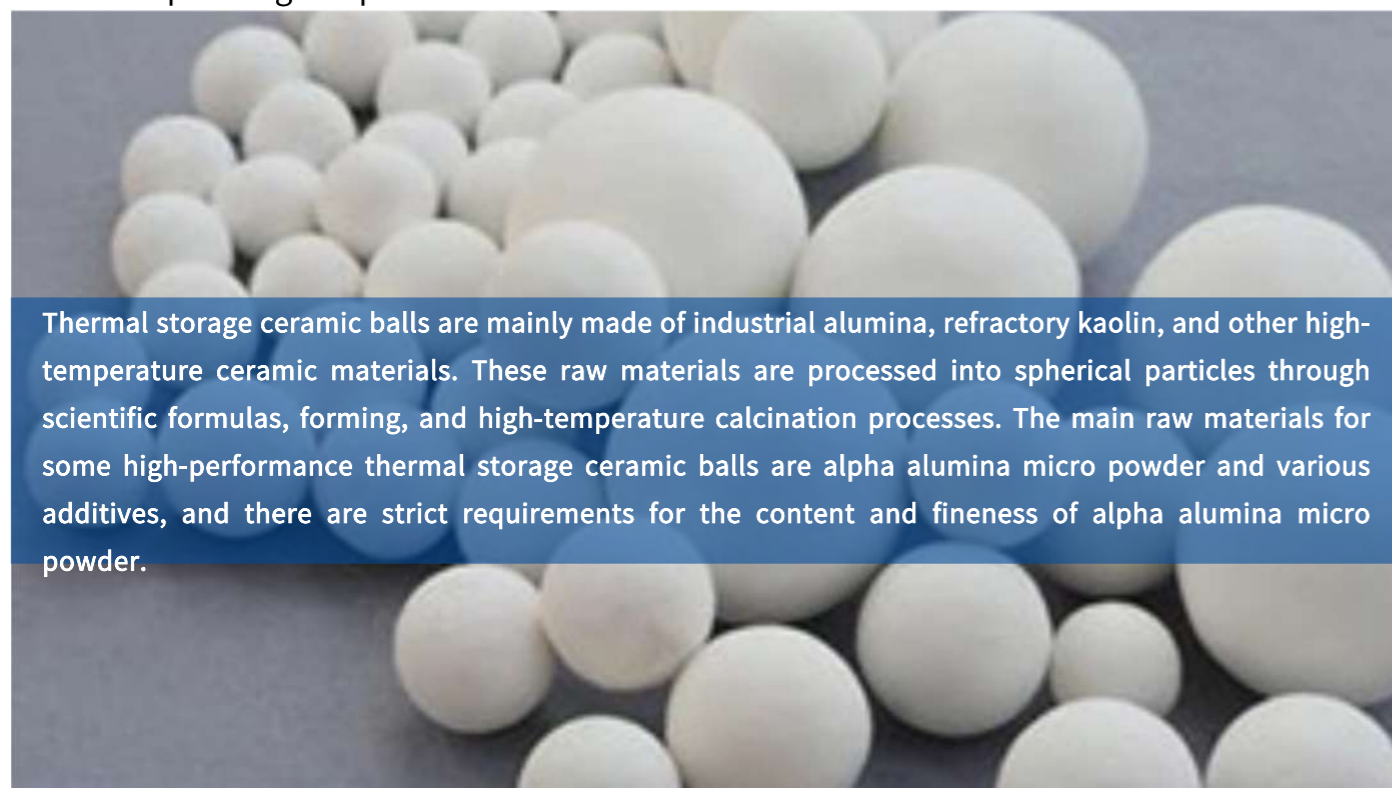
# Thermal storage ceramic ball

characteristic

1. High thermal storage performance: Thermal storage ceramic balls can absorb and store a large amount of heat energy in a short period of time, with high thermal capacity and high thermal conductivity.
2. Excellent high temperature resistance: Ceramic materials can maintain stable performance in high temperature environments, and are not easily deformed or cracked.
3. Energy saving and environmental protection: Thermal storage ceramic balls can achieve the recovery and reuse of heat energy, reduce energy consumption, and minimize environmental pollution.
4. Corrosion resistance: It has good corrosion resistance to chemical media and can be used for a long time in various acidic and alkaline environments.
5. Lightweight and convenient: Thermal storage ceramic balls have a relatively light weight, making them easy to install, transport, and store.

function

1. Thermal energy storage: Thermal storage ceramic balls can absorb excess heat during non working hours or low load periods and release it when needed, ensuring the stability of the process.
2. Thermal balance adjustment: By adjusting the heat storage and release rate of the thermal storage ceramic ball, temperature balance can be achieved during the process, improving product quality.
3. Energy conservation and consumption reduction: By recycling and reusing heat energy, energy consumption can be reduced and production efficiency can be improved.
4. Auxiliary heating: During the start-up and shutdown process of the equipment, the thermal storage ceramic ball can provide a stable heat source, shortening the time for the equipment to reach operating temperature.



Thermal storage ceramic balls are mainly made of industrial alumina, refractory kaolin, and other high-temperature ceramic materials. These raw materials are processed into spherical particles through scientific formulas, forming, and high-temperature calcination processes. The main raw materials for some high-performance thermal storage ceramic balls are alpha alumina micro powder and various additives, and there are strict requirements for the content and fineness of alpha alumina micro powder.

# Product parameters

## Main physical and chemical indexes of YG-XRQ series heat storage ball

| project  | I         | II        | III       | IV        |
|--|-----------|-----------|-----------|-----------|
| Al2O3(%);≥   | 65        | 70        | 75        | 85        |
| Fe2O3≤   | 1.5       | 1.2       | 1.0       | 1.0       |
| apparent porosity%                                 | 22        | 22        | 23        | 23        |
| Volume density (g/cm3)                             | 2.2       | 2.3       | 2.5       | 2.8       |
| Heap bulk weight (Kg/m3)                           | 1400~1500 | 1400~1600 | 1500~1650 | 1600~1700 |
| Specific surface area (m2 / m3)                    | 200~220   |           |           |           |
| Coefficient of thermal expansion (3) (10-6 / °C)   | 5.0       | 5.5       | 6         | 7         |
| Specific heat capacity reference value (103 / KgK) | 1.1       | 1.1       | 1.2       | 1.3       |
| 1100°C water cooling (times);                      | 30        | 30        | 30        | 20        |
| Applicable temperature (°C);                       | 1650      | 1700      | 1750      | 1800      |



# Engineering case

## ■ Case 1: Application of Catalytic Cracking Unit in CNOOC Huahe Coal Chemical Co., Ltd

Case background: CNOOC Huahe Coal Chemical Co., Ltd. needs to improve the stability and lifespan of catalysts in its catalytic cracking unit.

Solution: 450 tons of high-purity ceramic balls from Rongjian Environmental Protection Chemical Packing Co., Ltd. in Pingxiang City will be used as catalyst carriers.

Effect: Not only has it improved the mechanical strength and heat resistance of the catalyst, but it has also significantly extended the operating cycle of the device, reduced the frequency of replacement, and saved millions of yuan in costs annually.

## ■ Case 2: Sulfur recovery process of natural gas purification unit of China Shenhua South China Co., Ltd

Case background: China Shenhua South China Co., Ltd. needs to recover sulfur from its natural gas purification unit

Solution: Use 265 tons of ceramic balls from Rongjian Environmental Protection Chemical Packing Co., Ltd. in Pingxiang City as packing material and introduce it into the sulfur recovery process

Effect: Inert alumina ceramic balls have excellent adsorption and corrosion resistance, increased sulfur recovery rate by 5%, reduced equipment maintenance costs by 15%, significantly improved environmental protection, and effectively improved the quality of the surrounding environment.



## ■ Case 3: Reactor Optimization Project of Datang Hulunbuir Fertilizer Co., Ltd

Case background: The packing in the reactor of Datang Hulunbuir Fertilizer Co., Ltd. failed due to long-term exposure to corrosive media, affecting production efficiency and product quality.

Solution: Adopting 375 tons of ceramic balls from Pingxiang Rongjian Environmental Protection Chemical Packing Co., Ltd. as a new type of packing to improve the corrosion resistance and heat transfer efficiency of the reactor.

Effect: The performance of the reactor is restored, production efficiency is improved, product quality is stable, and the economic benefits of the enterprise are significantly improved.

## ■ Case 4: Catalytic cracking unit upgrading of middling coal Yulin Energy and Chemical Co., Ltd

Case background: The catalyst support layer of the catalytic cracking unit of middling coal Yulin Energy and Chemical Co., Ltd. failed due to long-term erosion of high temperature and corrosive gas.

Solution: Use 435 tons of ceramic balls from Pingxiang Rongjian Environmental Protection Chemical Packing Co., Ltd. as a new support layer to improve the stability and service life of the catalyst.

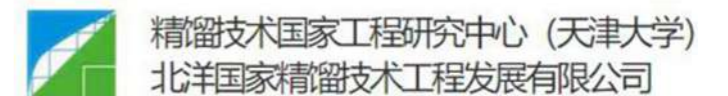
Effect: The device operates stably, the utilization rate of catalysts is improved, the product quality is enhanced, and the competitiveness of the enterprise is strengthened.



# List of achievements

| Name of purchasing unit   | Supply quantity | product name         | specifications and models | a particular year | Name of purchasing unit   | Supply quantity | product name         | specifications and models | a particular year |
|---|-----------------|----------------------|---------------------------|-------------------|---|-----------------|----------------------|---------------------------|-------------------|
| Beijing Ye Jianxin Technology Co., LTD  | 500 Tons        | Inert porcelain ball | Φ25mm                     | In 2023,          | Nanyang Environmental Protection Engineering Co., Ltd             | 120 Tons        | Inert porcelain ball | Φ10mm                     | In 2024,          |
| Hunan Resources & Technology Co., LTD   | 120 Tons        | Inert porcelain ball | Φ10mm                     | In 2024,          | Shanghai Leze Environmental Protection Co., LTD                   | 100 Tons        | Inert porcelain ball | Φ10mm                     | In 2024,          |
| Inner Mongolia North Magnesium Technology Co., LTD  | 450 Tons        | mill ball            | Φ30mm                     | In 2024,          | Taicang Xinda Chemical Industry Co., LTD                          | 450 Tons        | Inert porcelain ball | Φ30mm                     | In 2023,          |
| Shenzhen Chunwang Industrial Co., LTD   | 377 Tons        | Fire-resistant ball  | Φ10mm                     | In 2023,          | Tianjin Nankai University   | 370 Tons        | mill ball            | Φ10mm                     | In 2024,          |
| Tianjin Nankai University   | 22 Tons         | Chinalco ball        | Φ25mm                     | In 2024,          | Ningbo Dingtai Chemical Co., Ltd                                  | 300 Tons        | Fire-resistant ball  | Φ30mm                     | In 2024,          |
| Jiangsu Sato Knitting Machinery Co., Ltd  | 100 Tons        | High aluminum ball   | Φ30mm                     | In 2024,          | Ganzhou Huajin Paper Co., LTD                                     | 500 Tons        | Chinalco ball        | Φ30mm                     | In 2024,          |
| Baotou Aerospace Industry and Trade Co., Ltd  | 220 Tons        | Inert porcelain ball | Φ25mm                     | In 2024,          | Shandong Zibo Wufeng Aluminum and Magnesium Technology Co., LTD   | 220 Tons        | High aluminum ball   | Φ10mm                     | In 2024,          |
| Nanjing Environmental Protection Co., Ltd   | 980 Tons        | mill ball            | Φ30mm                     | In 2023,          | Shanxi Institute of Coal Chemistry, Chinese Academy of Sciences   | 170 Tons        | Inert porcelain ball | Φ30mm                     | In 2024,          |
| Guangzhou Luogang District Jiufotaike mechanical and electrical equipment business Department | 150 Tons        | Fire-resistant ball  | Φ10mm                     | In 2024,          | Shandong HSBC Petrochemical Co., Ltd                              | 340 Tons        | Inert porcelain ball | Φ10mm                     | In 2023,          |
| Sichuan Panzhihua Huirui Industry and Trade Co., LTD  | 400 Tons        | Chinalco ball        | Φ25mm                     | In 2024,          | Yangzhou Sinochem Southern Technology Co., LTD                    | 470 Tons        | Inert porcelain ball | Φ10mm                     | In 2024,          |
| Hangzhou Risheng Purification Equipment Co., LTD  | 68 Tons         | High aluminum ball   | Φ10mm                     | In 2024,          | Zhejiang Central Control Science and Education Equipment Co., LTD | 680 Tons        | mill ball            | Φ25mm                     | In 2024,          |
| Shenyang Hong District in Hong Township north pass forward boiler factory                     | 66 Tons         | Inert porcelain ball | Φ10mm                     | In 2024,          | Anhui Third Ring Paper Group spice Technology Co., LTD            | 380 Tons        | Fire-resistant ball  | Φ10mm                     | In 2024,          |
| Jiangsu Hongda New Materials Co., Ltd   | 330 Tons        | Inert porcelain ball | Φ30mm                     | In 2024,          | Jiangsu Crude Technology Co., Ltd                                 | 130 Tons        | Chinalco ball        | Φ10mm                     | In 2024,          |
|   |                 |                      |                           |                   | Qingdao Jimo District Fengken sewage treatment plant              | 200 Tons        | High aluminum ball   | Φ30mm                     | In 2024,          |

## Our Partners



# Production workshop



## ABOUT US

# Proof of qualifications



# Company Profile

The company has a team of young and energetic management and technical personnel with a pioneering spirit. Through continuous digestion and absorption of domestic and foreign environmental protection technologies, it has formed independent innovative core environmental protection products and equipment. The company's main products include ceramic ball packing, ceramic bulk packing, plastic bulk packing, metal bulk packing, microporous ceramic filters, microporous ceramic filtration devices, honeycomb ceramic heat storage bodies, carriers, membrane hanging bio ceramic particles and other equipment and products. Its stability and reliability have reached a good level compared to similar products at home and abroad. The purpose and pursuit of Rongjian people is to drive the future with technology, improve products with innovation, survive with quality, and ensure reputation. We sincerely hope to work together with friends from all walks of life to protect the beautiful environment of humanity!