

陶瓷纳米技术  
CERAMIC NANO TECHNOLOGY



叁鑫新材  
SANXIN NEW MATERIALS



江西省叁鑫新材料有限公司  
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## Zirconia Fine Beads (YZV)

YZV high quality microsphere grinding beads are produced from the consistent high quality yttria-stabilized zirconia powder through the latest hydrolysis process. It have super grinding efficiency because of highest crushing strength, lowest wear loss. The qualities and properties reach the international advanced level. It is suitable for grinding material down to Nano size such as electronic ceramics; ceramic ink; MLCC; CMP and Photo Catalysts etc.



### Size:

Ø 0.03mm, Ø 0.05mm, Ø 0.1mm, Ø 0.2mm, Ø 0.3mm (Nano grinding).  
Allowable requests for different sizes.

### Product Features:

- 1 High crushing strength and fracture durability, superior wear resistance which has no any break under high speed impact.
- 2 Smooth surface, good sphericity.
- 3 High density and excellent grinding efficiency for grinding materials down to Nano size.
- 4 Significant cost and waste reduction.

### Specifications:

Type	Density (g/cm <sup>3</sup> )	Bulk density (g/cm <sup>3</sup> )	Major composition (%)	Crush strength (N)	V-Hardness (HV1)
YZV	≥6.0	≥3.7	ZrO <sub>2</sub> ≥94.6 Y <sub>2</sub> O <sub>3</sub> ≥5.2	≥90 (Ø0.3mm)	≥1350



## Y-TZP Grinding Media (YZ)

YZ high quality grinding media are produced from the high quality yttria-stabilized zirconia powder. It have super grinding efficiency because of highest crushing strength, lowest wear loss. The qualities and properties reach the international advanced level. It is suitable for grinding and dispersion of ultrafine materials such as electronic ceramics; magnetic materials; high purity ceramics material such as aluminum oxide, silicon oxide, zirconium silicate and titanium dioxide; foodstuffs; cosmetic and pigment, inks, paint and coating materials.

### Size:

B series:  $\Phi$ 0.3-5mm (Ultrafine grinding)

C series: 3X3, 5.5X5.5, 7.5X7.5, 10X10, 12X12;

L series:  $\Phi$ 5mm,  $\Phi$ 6mm,  $\Phi$ 8mm,  $\Phi$ 10mm,  $\Phi$ 15mm,  $\Phi$ 20mm,  $\Phi$ 25mm,  $\Phi$ 30mm (Coarse grinding).

Allowable requests for different sizes.

### Specifications:

Type	Density (g/cm <sup>3</sup> )	Bulk density (g/cm <sup>3</sup> )	Major composition (%)	Crush strength (N)	V-Hardness (HV10)
YZ	≥6.0	≥3.7	ZrO <sub>2</sub> ≥94.6 Y <sub>2</sub> O <sub>3</sub> ≥5.2	≥2000 (Ø2mm)	≥1250



### Product Features:

- 1 High crushing strength and fracture durability which has no any break under high speed impact.
- 2 Smooth surface, good sphericity.
- 3 High wear resistance, longer service life 30-50 times than glass beads, 5 times than zirconium silicate beads and 6-8 times than Al<sub>2</sub>O<sub>3</sub> beads.
- 4 High density and excellent grinding efficiency.



## High Purity Alumina Beads(HAB)

Dielectric, piezoelectric, magnetic substance materials.  
 Rare earth phosphor material.Lithium battery electrode  
 material.CMP Polishing powder.High grade pigment and  
 ink.Medicine, pesticide, antibiotic material and food.High  
 performance ceramic materials.



### Size:

0.1 0.2 0.3-0.4 0.4-0.6 0.6-0.8 0.8-1.0  
 1.0-1.2 1.2-1.4 1.4-1.6 1.6-1.8 1.8-2.0  
 Allowable Requirement for Different Size.

### Product Features:

- 1 High Hardness, Over 1800HV10,High Machine Strength.
- 2 High compactness, Fine Microcrystal, Lower Wear Loss.
- 3 Chemical Stability, Good corrosion resistance.
- 4 High Purity 99.9% Alumina content. No more other metal content except  $Al_2O_3$ ..Suit for grinding high purity materials.
- 5 High thermal conductivity.

### Specifications:

Item	Unit	Data
Purity	$Al_2O_3$	$\geq 99.9\%$
Density	$g/cm^3$	3.9
HV Hardness	GPa	17.2
Flexural Strength	$Kgf/m^2$ (Room temperature)	60
Coefficient of Thermal Expansion	$1/^\circ C$	$8 \times 10^{-6}$
Thermal Conductivity	W/m.k	37
Volume Resistivity	Ohm.cm	$>10^8$



## CE-TZP Grinding Media(CZ)

CZ grinding media, produce from high grade ceria stabilized zirconia powder. It have high hardness, density and low wear resistance because of the fine and homogenous tetragonal zirconia crystal structure. It is suitable for ultrafine grinding high viscosity pastes such as screen printing inks, offset inks, GCC, and electronic ceramics, magnetic materials, metal mine etc.



### Size:

B series: 0.4-5mm (Ultrafine grinding).

L Series: 5-100mm (Coarse grinding).

Allowable requests for different sizes.

### Product Features:

- 1 Excellent cost and performance.
- 2 Smooth surface, good sphericity.
- 3 High cost-effective grinding bead with high-density.
- 4 High fracture toughness and nice impact resistance that causes no break under high speed impact.

### Specifications:

Type	Density (g/cm <sup>3</sup> )	Bulk density (g/cm <sup>3</sup> )	Major composition(%)	Crush strength (N)	V-Hardness (HV10)	Color
CZ	≥6.0	≥3.6	ZrO <sub>2</sub> ≥80 CeO <sub>2</sub> ≥18 Other≤2	≥1100 (Φ2mm)	≥1100	Yellow



## Compound Beads (AZ/ZA)

AZ/ZA toughened grinding media, produce from high quality and ultrafine YTZP and alumina powder. They exhibit high wear resistance and high strength because of high toughness by zirconia. The qualities and properties reach the international advanced level. They are specifically suitable for grinding metal and non-metal ore such as gold, silver, nickel, zinc and lead; GCC, zirconium silicate and titanium dioxide; pigment, inks, paint and coating materials.

### Size:

B series:  $\Phi 0.4-5\text{mm}$  (Ultrafine grinding).

L series:  $\Phi 5\text{mm}$ ,  $\Phi 6\text{mm}$ ,  $\Phi 8\text{mm}$ ,  $\Phi 10\text{mm}$ ,  $\Phi 15\text{mm}$   
(Coarse grinding).

Allowable requests for different sizes.



### Product Features:

- 1 Significant cost and excellent performance.
- 2 High wear resistance and longer service life.
- 3 High crush strength and no break under high speed impact.
- 4 Smooth surface, good sphericity.

### Specifications:

Type	Density (g/cm <sup>3</sup> )	Bulk density (g/cm <sup>3</sup> )	Major composition (%)	Crush strength (N)	V-Hardness (HV10)
ZA38	≥3.8	≥2.2	ZrO <sub>2</sub> ≥10 Al <sub>2</sub> O <sub>3</sub> ≥85 Other≤5	≥1100 ( $\Phi 2\text{mm}$ )	≥1100
ZA42	≥4.2	≥2.4	ZrO <sub>2</sub> ≥15 Al <sub>2</sub> O <sub>3</sub> ≥80 Other≤5	≥1100 ( $\Phi 2\text{mm}$ )	≥1100
ZA45	≥4.5	≥2.7	ZrO <sub>2</sub> ≥50 Al <sub>2</sub> O <sub>3</sub> ≥45 Other≤5	≥1100 ( $\Phi 2\text{mm}$ )	≥1100
AZ	≥5.2	≥3.1	ZrO <sub>2</sub> ≥75 Al <sub>2</sub> O <sub>3</sub> ≥20 Other≤5	≥2000 ( $\Phi 2\text{mm}$ )	≥1200



## Zirconium Silicate Beads (ZS/MX)

ZS/MX grinding media are produced from high purity and ultra-fine zircon powder. They have homogenous microstructure and no hollow. ZS/MX exhibit high strength and excellent cost effective performance compared against fused zirconium silicate bead and others. The qualities and properties reach the international advanced level. They are specifically suitable for ultrafine grinding metal and non-metal ore such as gold, silver, nickel, zinc and lead; GCC, zirconium silicate and titanium dioxide; pigment, inks, paint and coating materials.



### Size:

B series:  $\Phi 0.4-5\text{mm}$  (Ultrafine grinding).

L series:  $\Phi 5\text{mm}, \Phi 6\text{mm}, \Phi 8\text{mm}, \Phi 10\text{mm}, \Phi 15\text{mm}$   
(Coarse grinding).

Allowable requests for different sizes.

### Product Features:

- 1 No air pockets and no break under high speed impact.
- 2 Smooth surface, good sphericity.
- 3 High crush strength and wear resistance.
- 4 Longer service life, 2 times than fused zirconium silicate beads.

### Specifications:

Type	Density (g/cm <sup>3</sup> )	Bulk density (g/cm <sup>3</sup> )	Major composition (%)	Crush strength (N)	V-Hardness (HV10)	Color
ZS	≥4.0	≥2.4	ZrO <sub>2</sub> ≥65 SiO <sub>2</sub> ≥35	≥1000 (Ø2mm)	≥900	White
MX-1	≥4.0	≥2.4	Al <sub>2</sub> O <sub>3</sub> ≥60 ZrO <sub>2</sub> ≥30 Other≤8	≥1100 (Ø2mm)	≥1000	Light Yellow
MX-2	≥3.2	≥1.9	Al <sub>2</sub> O <sub>3</sub> ≥25 ZrO <sub>2</sub> ≥25 Other≤45	≥900 (Ø2mm)	≥900	White



## Alumina Beads (AO)

AO microcrystalline alumina grinding media are produced from the ultrafine alumina and other super whiteness raw material. It exhibit super whiteness and high grinding efficiency because of highest crushing strength, lowest wear loss. The qualities and properties reach the international advanced level. It is suitable for grinding industrial minerals and mine. Such as alumina, Kaolin, GCC, Silica, Zirconium Silicate, Gold, Silver, Nickel, Zinc and lead mine. It's specifically useful for white color minerals.



### Size:

B series: 0.3–5mm (Ultrafine grinding).

L Series: 5–100mm (Coarse grinding).

Allowable requests for different sizes.

### Product Features:

- 1 Whiteness, Ultra-low wear loss.
- 2 Smooth surface, good sphericity.
- 3 Excellent cost, Effective performance.
- 4 High crush strength which has no any break under high speed impact.

### Specifications:

Type	Density (g/cm <sup>3</sup> )	Bulk density (g/cm <sup>3</sup> )	Major composition (%)	Crush strength (N)	V-Hardness (HV10)
AO	≥3.65	≥2.2	Al <sub>2</sub> O <sub>3</sub> ≥92	≥1100 (Ø2mm)	≥1100
A5	≥3.7	≥2.2	Al <sub>2</sub> O <sub>3</sub> ≥95	≥1200 (Ø2mm)	≥1200





## Zirconia Balls (ZBB)

zirconia balls are mainly used as valve balls, fully ceramic bearings, force measurement balls, trackballs, fine mill balls, and can be used in such situations: high temperature, anti-corrosion, electric insulation, anti-magnet, non-lubrication, it's the ideal material for replacing steel balls under corrosive situation.

### Size:

Density can reach  $6.05\text{g/cm}^3$ .

Product standard:  $0.4\text{mm}\sim 50.8\text{mm}$  ( $1/64''\sim 2''$ ), can provide other different kinds.

Provide grade: G5~G100



### Product Features:

- 1 The color is white, if necessary, we can provide yellow ones.
- 2 We have mass stock, can deliver anytime you want.
- 3 Can meet the requirements of various non-standard sizes.
- 4 Coefficient of thermal expansion of zirconic is  $10.5 \times 10^{-6}/^{\circ}\text{C}$ , close to the coefficient of thermal expansion of metal, match up with metal but dimensional changes a lot under different temperature, so in some critical situations it's not as stable as silicon nitride.

### Ceramic ball accuracy class standard (international standard ISO3290~2001)

Grade	Primary particle difference	Circular edegre	Roughmess	Color difference	Distance between gauge	Gauge	Distance between subgauge	Subgauge
3	0.08	0.08	0.01	0.13	0.5	-5,...0.5,0.05...+5	0.1	-0.2,-0.1,0,+0.1,+0.2
5	0.13	0.13	0.014	0.25	1	-5,...0.5,0.05...+5	0.2	-0.4,-0.2,0,+0.2,+0.4
10	0.25	0.25	0.02	0.5	1	-9,...-1,0,+1...+9	0.2	-0.4,-0.2,0,+0.2,+0.4
16	0.4	0.4	0.025	0.8	2	-10,...-2,0,+2...+10	0.4	-0.8,-0.4,0,+0.4,+0.8
20	0.5	0.5	0.032	1	2	-10,...-2,0,+2...+10	0.4	-0.8,-0.4,0,+0.4,+0.8
28	0.7	0.7	0.05	1.4	2	-12,...-2,0,+2...+12	0.4	-0.8,-0.4,0,+0.4,+0.8
40	1	1	0.06	2	4	-16,...-4,0,+4...+16	0.8	-1.6,-0.8,0,+0.8,+1.6
60	1.5	1.5	0.08	3	6	-18,...-6,0,+6...+18	1.2	-2,-1.2,0,+1.2,+2
100	2.5	2.5	0.1	5	10	-40,...-10,0,+10...+40	2	-4,-2,0,+2,+4
200	5	5	0.15	10	15	-60,...-15,0,+15...+60	3	-6,-3,0,+3,+6
500	12.5	12.5		25				
1000	25	25		50				



## Silicon Nitride Balls (SNB)

Silicon nitride balls can be used in bearings which need Extreme performance requirements: highspeed/ superspeed bearings, high precision bearings, vacuum bearings, high/ low temperature bearings, non-magnet bearings, high-precision ball screw; also can be used as valve ball, measurement ball in chemical pump ,high-temperature pump, metering pump. And it can be used in slide and measurement such as: high temperature slide trail and anti-corrosion slide trail.



### Size:

Product feature: stable performance,good consistency.  
 Product standard: 0.4mm~100mm  
 Provide grade: G5~G100

### Notes:

- 1 Most are black sillcon nitride balls, if necessary, we can also provide gray ones.
- 2 We have mass stock, can dellver anytime you want.
- 3 Can meet the requirements of various specifications and non-standard sizes.

### Ceramic ball accuracy class standard( international standard IS03290~2001)

Grade	Primary particle difference	Circular edegre	Roughmess	Color difference	Distance between gauge	Gauge	Distance between subgauge	Subgauge
3	0.08	0.08	0.01	0.13	0.5	-5,...0.5,0.05...+5	0.1	-0.2,-0.1,0,+0.1,+0.2
5	0.13	0.13	0.014	0.25	1	-5,...0.5,0.05...+5	0.2	-0.4,-0.2,0,+0.2,+0.4
10	0.25	0.25	0.02	0.5	1	-9,...-1,0,+1...+9	0.2	-0.4,-0.2,0,+0.2,+0.4
16	0.4	0.4	0.025	0.8	2	-10,...-2,0,+2...+10	0.4	-0.8,-0.4,0,+0.4,+0.8
20	0.5	0.5	0.032	1	2	-10,...-2,0,+2...+10	0.4	-0.8,-0.4,0,+0.4,+0.8
28	0.7	0.7	0.05	1.4	2	-12,...-2,0,+2...+12	0.4	-0.8,-0.4,0,+0.4,+0.8
40	1	1	0.06	2	4	-16,...-4,0,+4...+16	0.8	-1.6,-0.8,0,+0.8,+1.6
60	1.5	1.5	0.08	3	6	-18,...-6,0,+6...+18	1.2	-2,-1.2,0,+1.2,+2
100	2.5	2.5	0.1	5	10	-40,...-10,0,+10...+40	2	-4,-2,0,+2,+4
200	5	5	0.15	10	15	-60,...-15,0,+15...+60	3	-6,-3,0,+3,+6
500	12.5	12.5		25				
1000	25	25		50				



## Ceramic/Rubber Liner(WCL/CRL)

The Wear-resistant ceramic liner (WCL) and ceramic Rubber liner (CRL) are compounded of alumina, zirconia and rubber. They are an extremely dense ceramic material that has excellent resistance to both sliding and impact abrasion. Mainly used as lining materials for applications like coal conveying in power stations, slag conveying pipelines, material conveying for mines and docks, cement powder selecting equipment and crushing equipment for fine ceramic materials. They are featured by high wear resistance and easy for installation.



### Specifications:

Rubber Spec	Index	Ceramic Technical Data	WCT-92	WCT-95	WCT-ZA
Tensile strength (MPa)	≥12	Al <sub>2</sub> O <sub>3</sub> %	≥92	≥95	≥80
Tensile elongation(%)	≥250	Fe <sub>2</sub> O <sub>3</sub> %	≤0.2	≤0.2	≤0.2
Shore hardness	55-65	ZrO <sub>2</sub> %	-	-	≥20
Bond strength of rubber and ceramic(Shear modulus (MPa)	≥3.5	Mohs Hardness	≥9	≥9	≥9
Temperature range	≤100℃	Water Absorption (%)	≤0.2	≤0.2	≤0.2
Aging time (Years)	≥5	Density (g/cm <sup>3</sup> )	≥3.60	≥3.70	≥4.10



## Ceramics Structure Parts



Attribute	Spec		SiC	Si <sub>3</sub> N <sub>4</sub>
Composition	ZrO <sub>2</sub> 94.5%	ZrO <sub>2</sub> 97%	≥98%	≥95%
	Y <sub>2</sub> O <sub>3</sub> 5.5%	MgO3%		
Density	6.0g/cm <sup>3</sup>	5.5g/cm <sup>3</sup>	3.1g/cm <sup>3</sup>	3.2g/cm <sup>3</sup>
Hardness(HV)	> 11Gpa	> 10Gpa	> 25Gpa	> 15Gpa
Bending Strength	> 1100Mpa	> 1000Mpa	> 550Mpa	> 720Mpa
Fracture TOUghness	9Mpa.m <sup>1/2</sup>	8.5Mpa.m <sup>1/2</sup>	4.6Mpa.m <sup>1/2</sup>	6.2Mpa.m <sup>1/2</sup>
Elastic Modulus	200Gpa	180Gpa	410Gpa	300Gpa
Thermal Conductivity	3W/(m.k)	2.8W/(m.k)	120W/(m.k)	25W/(m.k)
Thermal Expansion Coefficient (20-400)	10×10 <sup>-6</sup> /K	9.5×10 <sup>-6</sup> /K	4.0(10 <sup>-6</sup> /°C)	3.2(10 <sup>-6</sup> /°C)



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