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CERAMIC NANO TECHNOLOGY



We are so close to you, now!

Grinding Media & Advanced Ceramic Material

CENOTEC Co., Ltd. a company that believes in the harmonious coexistence of humanity and nature, are proud to take on our corporate responsibilities as a part of society, and promise to fulfill our duties to those who are less fortunate.

We appreciate your interest and support in the efforts and passion of CENOTEC Co., Ltd. the company of Human Technology.

cenotec

Since 1999,

Drawing our dream together

History

Since our establishment in 1999, CENOTEC CO., Ltd. has grown to be the world's top expert in Grinding Media, through innovative R&D and persistent efforts in Quality Management.

1999

Established as intramural venture company (Ceramic Research and Development co., Ltd)

2000

Beads, paint/ink market supply

2001

Company name change to CENOTEC

2003

First supplied to CaCO₃ industry

2006

Head Office relocation And expansion

2009

Beads supplied to silver mine, Turkey

2010

Powder Division established
Flux Division established

2012

2nd and 3rd plants and R&D CENTER established
Flux supplied to market oversea

2015

World's Best Products Certification
Nano powder commercialization
Ultra-small bead commercialization

2016

4th Plant established
Public listed in KOSDAQ

2019

Main office & plant established



Core Technology

PRODUCTS - CERAMIC BEADS

Ceramic bead used for fine grinding/dispersing in various industries

Mine Industry

Mineral Grinding
Pt, Au, Ag, Cu, ETC Mine



CAS32
(SG3.2)



CAS37
(SG3.7)



CAZ40
(SG4.0)



CZA45
(SG4.5)



CZA50
(SG5.0)



CZC60
(SG6.0)



CZY60
(SG6.0)



CAS32
(SG3.2)



CAS37
(SG3.7)



CZS40
(SG4.0)



CAZ40
(SG4.0)



CZA45
(SG4.5)



CZC60
(SG6.0)



CZY60
(SG6.0)



CZY60
Ultra small size Beads

※ For fine grinding of raw material
used for secondary cell and MLCC

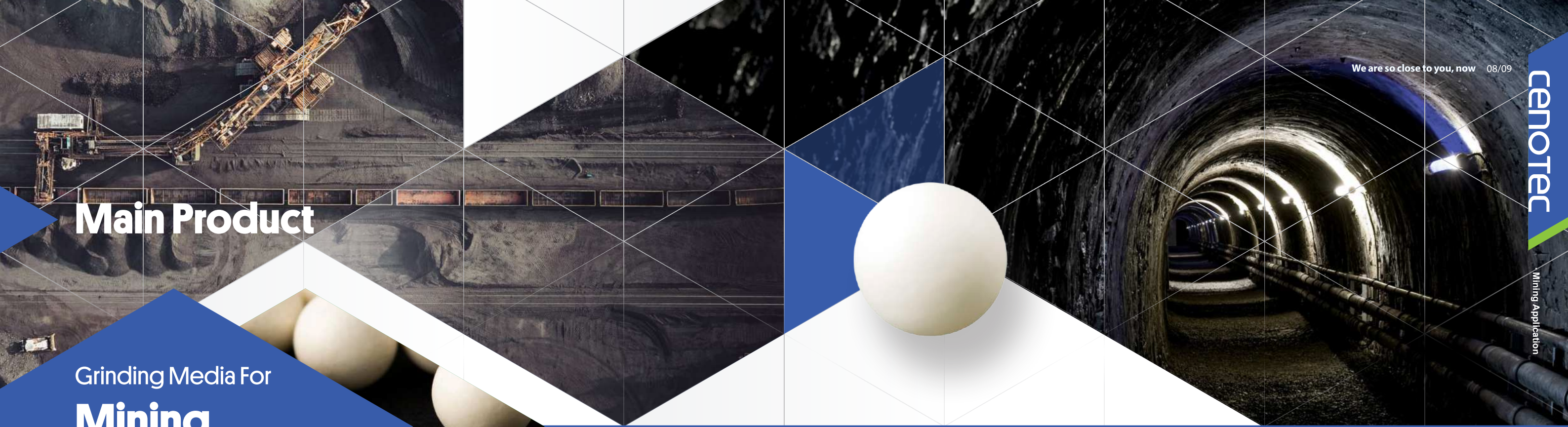
Paper/Paint/Ink

Grinding CaCO_3 for Paper maker
Fine Grinding/Dispersing for Paint/Ink

▶ New Product

Electronic

Beads for fine grinding of secondary cell
Ultra small bead for 0.1 mm MLCC



Main Product

Grinding Media For Mining Application

General

Cenotec has been providing mining customers located in over 70 sites across the world with not only grinding media but also technical assistance and experience.

Features & Application

CENOBEAD is the best grinding media in terms of wear-resistance and grinding efficiency for mining industries.

- Superior strength and hardness
- Uniform size and shape with excellent sphericity and High grind efficiency
- Requires less energy than steel or iron balls
- Reduces equipment wear and maintenance costs
- Special product and application for mining

Characteristic

	CAS32	CAS37	CAZ40	CZA45	CZA50	CZC60	CZY60
Specific Density (g/cm³)	≥ 3.20	≥ 3.70	≥ 4.00	≥ 4.50	≥ 5.00	≥ 6.10	≥ 6.00
Bulk Density (g/cm³)	≥ 1.80	≥ 2.30	≥ 2.30	≥ 2.70	≥ 2.70	≥ 3.70	≥ 3.60
Hardness (HV)	≥ 950	≥ 1300	≥ 1230	≥ 1180	≥ 1050	≥ 1050	≥ 1250
Sphericity(%)	≥ 98	≥ 98	≥ 98	≥ 98	≥ 98	≥ 92	≥ 98
Packing(kg)	25kg Plastic Pails or 1,000kg Big bag						
Size(mm)	0.4 - 7.0	0.4 - 13.0	0.4 - 7.0	0.4 - 7.0	0.4 - 7.0	0.4 - 2.2	0.05 - 7.0



CAS32



CAS37



CAZ40



CZA45



CZA50



CZC60



CZY60

Main Product

Grinding Media For Paint / Ink Application

General

Cenotec has been providing paint/ink customers located in all around the world, with grinding media technical assistance and experience.

Features & Application

- Superior strength and hardness
- Uniform size and shape with excellent sphericity and High grind efficiency
- Production of large-capacity
- Vertical type mills
- High-efficiency horizontal mills
- Special product and application for paint/ink

Characteristic

	CZS40	CZC60	CZY60
Specific Density (g/cm ³)	≥ 4.00	≥ 6.10	≥ 6.00
Bulk Density (g/cm ³)	≥ 2.40	≥ 3.70	≥ 3.60
Hardness (HV)	≥ 900	≥ 1050	≥ 1250
Sphericity(%)	≥ 98	≥ 92	≥ 98
Packing(kg)	25kg Plastic Pails or 1,000kg Big bag		
Size(mm)	0.4 - 7.0	0.4 - 2.2	0.05 - 7.0



CZS40



CZC60



CZY60

Main Product

Grinding Media For Paper Application

General

Cenotec has been providing paper application's customers located in all around the world, with grinding media technical assistance and experience.

Features & Application

- Superior strength and hardness
- Uniform size and shape with excellent sphericity
- Large capacity vertical mills
- High efficiency horizontal mills
- Production of high-viscosity products
- High wear-resistance
- High grind efficiency
- Special product and application for paper

Characteristic

	CAS32	CAS37	CAZ40	CZS40	CZA45	CZC60	CZY60
Specific Density (g/cm³)	≥ 3.20	≥ 3.70	≥ 4.00	≥ 4.00	≥ 4.50	≥ 6.10	≥ 6.00
Bulk Density (g/cm³)	≥ 1.80	≥ 2.30	≥ 2.30	≥ 2.40	≥ 2.70	≥ 3.70	≥ 3.60
Hardness (HV)	≥ 950	≥ 1300	≥ 1230	≥ 900	≥ 1180	≥ 1050	≥ 1250
Sphericity(%)	≥ 98	≥ 98	≥ 98	≥ 98	≥ 98	≥ 92	≥ 98
Packing(kg)	25kg Plastic Pails or 1,000kg Big bag						
Size(mm)	0.4 - 7.0	0.4 - 13.0	0.4 - 7.0	0.4 - 7.0	0.4 - 7.0	0.4 - 2.2	0.05 - 7.0



CAS32



CAS37



CAZ40



CZS40



CZA45



CZC60



CZY60

Main Product

Grinding Media For Electronic Application

General

CENOBEAD CZY60 is a grinding media of the highest quality that meets customer's needs.

Features & Application

- Superior strength and hardness
- Uniform size and shape with excellent sphericity
- High density and hardness
- High wear-resistance and no contamination
- High grind efficiency
- Special product and application for electronic

Characteristic

	CZY60
Specific Density (g/cm ³)	≥ 6.00
Bulk Density (g/cm ³)	≥ 3.60
Hardness (HV)	≥ 1250
Sphericity(%)	≥ 98
Packing(kg)	25kg Plastic Pails or 1,000kg Big bag
Size(mm)	0.05 - 7.0



CZY60

Main Product

SUPER WHITE TOTAL SOLUTION

CenoFlour CenoSilicate

Zirconium Silicate

1. The chemical and Physical stability of Zirconium Silicate under firing circumstances enhances the binding property of ceramic glaze and the hardness of the glazed-ceramic bodies.
2. ZrSiO_4 opacified and whitened by ZrO_2 that was formed after firing causes ceramics to scatter incident light and to be opaque. In order to ramp up the whitening effect, its production process needs to maintain the size of ZrSiO_4 to be distributed within the narrow range.
3. Thanks to high-quality and low-cost characteristics, as an emulsifying agent, ZrSiO_4 has been preferred to produce tiles, sanitary ceramics, porcelains and the other various products and is widening its applicable fields even further.
4. The high melting point of ZrSiO_4 has been applied to the ramming materials for glass furnaces and casting materials in the form of powder or emulsion.

Physical Properties

In order for the stable production of highly-qualified ZrSiO_4 , Cenotec throughly implements its quality control system from the incoming raw materials to the outgoing end-products, which are branded by two powders and one flour, timely responding to a variety of customers' needs.

- CenoFlour - Zircon Flour
- CenoSilicate (Premium) - Zirconium Silicate Powder
- CenoSilicate (Ultra Premium) - Zirconium Silicate Powder

Composition

Zirconia + Hafnia ($\text{ZrO}_2 + \text{HfO}_2$)	> 62.0%
Silica (SiO_2)	< 36.5%
Alumina (Al_2O_3)	< 3.0%
Titania (TiO_2)	< 0.8%
Ferric Oxide (Fe_2O_3)	< 0.2%

Typical Physical Constants

Chemical Formula	ZrSiO_4
Molecular Weight (g/mol.)	183.1
Bulk Density (lbs./fr. ³)	1.20~1.50, 1.50~1.80
Specific Gravity (g/cm ³)	4.2~4.8
Solid Specific Heat	0.132
Melting Point (°C)	2,200~2,550
Mohs Hardness @ 20°C	7.5~8
Color	off-white

Particle Size Distribution

Brand	CenoSilicate (Ultra Premium)	CenoSilicate (Premium)	CenoFlour
Particle Size (D50)	1.0±0.2μm	1.3±0.3μm	5~30μm(adjustable)
Packing(kg)	25, 1000	25, 1000	25, 1000, 2000

Main Product 主营产品

High Functional Welding Flux

CenoFlux

General

- CenoFlux specializes in ceramic products and produces all of the welding flux materials for flux cored wire(FCW). Arc welding rod, etc.
- CenoFlux product is able to tailor-made for customer's special needs.

H-PT

- High Purity Titanium Dioxide(TiO_2)
- Mineralogical Name : Rutile
- V.Nb free
- $\text{TiO}_2 \geq 99\%$

TNS-60

- Sodium Flux Prefused
- TiO_2 (50~60%), Na_2O (10~15%), SiO_2 (20~30%)

BT-75

- Bismuth Titanate
- TiO_2 (20~30%), Bi_2O_3 (70~80%)

Z-98

- High Purity Zirconium Dioxide (ZrO_2)
- ZrO_2 (+ HfO_2) $\geq 98\%$

CENOTEC Quality Management

- International Quality Standard
- ISO9001:2008
- ISO14001:2015



Type of Technical Assistance

Our Services

- CENOTEC R&D provides our Clients with an advanced Grinding Solution for applications.
- Based on experience serving the Mineral Processing Industries, CENOTEC R&D understands that customer needs.
- CENOTEC R&D provides not only a high-quality product, but also professional technical service to assist the most cost-effective grinding solution for Ultra Fine Grinding.
- CENOTEC R&D has expanded technical team to provide comprehensive Laboratory and Pilot Scale Media Testing facilities at their factory, together with on-site Consultancy Services.

Media analysis

CENOTEC offers objective information that customer may want to know by testing media performance with a variety of grinding media under similar operation condition of customer.

We help customer to figure out the benefits of our products and to find optimal grinding media.

- Chemical composition & Physical properties
- Wear rate & Performance test (STM HIG5, ISA M4, Planetary Mill etc.)
- Ore grinding Performance test (Upon request)

Media selection & Optimization

With accumulated technical knowledge and understanding needs of customer, CENOTEC suggest optimal selection of grinding media according to their application and mill machine.

- Reduce media consumption
- Reduce maintenance costs
- Enhance grinding efficiency
- Reduce purchase costs
- Minimize machine wear

On-site technical service

Special experts with on-site commissioning and the optimization for Ultra Fine Grinding machines ensure the optimal performance of Grinding Media

Incoming Quality Control

Raw material Analysis

- Chemical Composition (XRF)
- Crystal Phase (XRD)
- Particle Size distribution (PSD)
- Specific Surface Area (BET)
- Water content (LOD)
- Density (Pycnometer)

Line Quality Control

Milling process

- Chemical Composition (XRF)
- Particle Size distribution (PSD)
- Specific Surface Area (BET)
- Viscosity (Rheometer)
- Water content (LOD)

Sintering process

- Beads Size Distribution (Camsizer)
- Beads inner structure (Optical microscope)
- Apparent Density / Specific Gravity (Digital specific gravity meter)

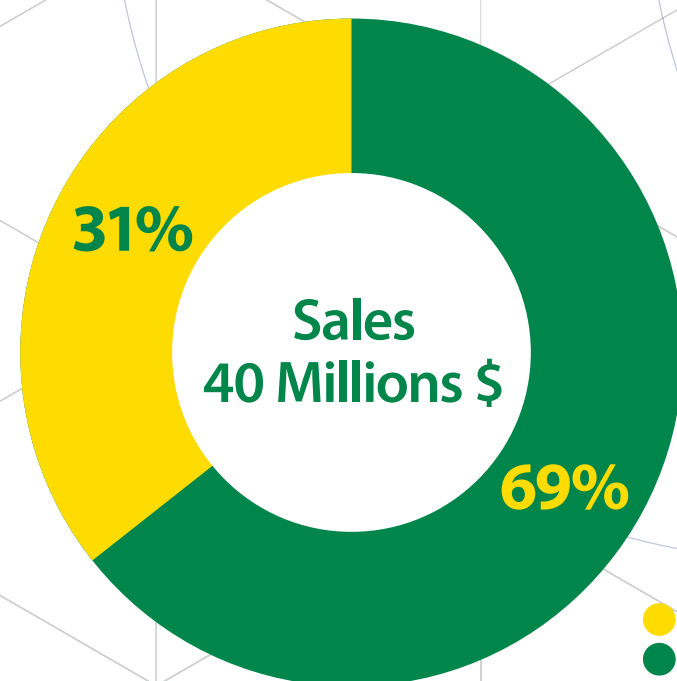
Outgoing of Quality Control

- Chemical Composition (XRF)
- Beads Size Distribution (Camsizer)
- Beads inner structure (Optical microscope)
- Apparent Density / Specific Gravity (Digital specific gravity meter)
- Vicker Hardness
- Compressive Strength (Universal testing machine)
- Wear rate (Energy mill)
- Morphology (SEM)

Global Network

Sales to over 200 customers
Worldwide

CENOTEC positions itself as one of the best manufacturer in the world



Domestic
Export

Main Customers