alteo
SMART ALUMINA//

SPECIALTY ALUMINAS FOR

STANDARD CERAMICS

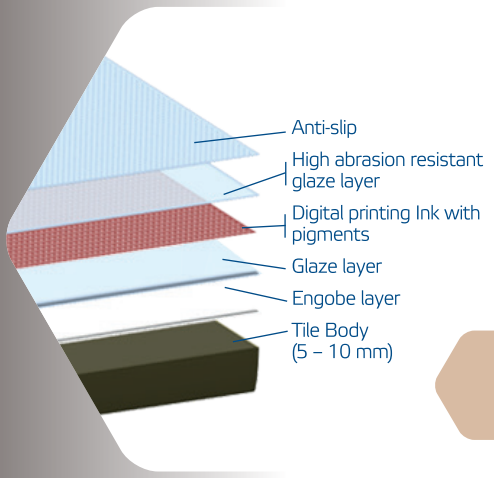
2024

www.alteo-alumina.com

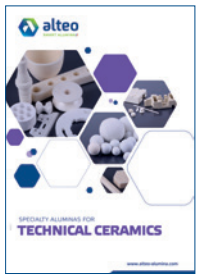
ALUMINAS FOR CERAMICS

Aluminium oxide, alumina, is present in a wide range of ceramic applications including engobes, glazes and frits. It is also extensively used in technical ceramics, please refer to the brochure « Specialty Aluminas for Technical Ceramics » for comprehensive information about Alteo products for these applications.

Alumina offers high mechanical resistance and hardness, as well as surface effects such as a matt, semi-matt or glossy finish, depending on the type of alumina used.
Additionally, alumina ceramics exhibit very favourable thermal properties providing dimensional stability.
Besides chemical purity, other important parameters of alumina for ceramics are the size of its alpha-alumina crystals and alpha-alumina content. For standard ceramics this translates to specific surface area (BET), average particle size (D50), and the degree of calcination.
During the process of calcination, aluminium trihydroxide passes through some transitional structures and finally α alumina crystals appear and grow, while specific surface area decreases.
For unground calcined alumina, there is a relationship between specific surface area and α crystal size.



Alteo offers a continuous and tightly controlled range of crystal sizes for ceramists.



For Technical Ceramics, see our specific brochure

The appropriate alumina-based product by application:

Applications	Dry Hydrate	Calcined alumina		
		Low calcined	Medium calcined	Hard calcined
Engobes & Glazes			●	●
Opacification			●	
Antislip				●
Digital Printing		●	●	●
Frits			●	●
Pigment	●		●	●
Tableware & Sanitary ware				●

ALUMINAS FOR ENGOBES AND GLAZES

Low and hard calcined aluminas for engobes and glazes

The use of alumina in the composition of glazes is essential to provide high mechanical strength, wear resistance, thermal shock and chemical corrosion resistance. The glaze can be matt or glossy, transparent or opaque. Hard calcined alumina gives a shiny effect, while reactive alumina gives a matt and opaque effect. Hard calcined alumina controls thermal expansion of the engobes.

		SEMI MATT	GLOSSY TRANSPARENT
		Unground	
		Semi-reactive	Hard calcined
		ARZ®	**AC90**
Physical properties	**Unit**		
Particle Size Distribution (Cilas)			
D10	µm	50	15
D50	µm	80	80
D90	µm	160	160
Specific Surface Area BET	m^2/g	12	0.50
Loss on ignition (20-1000ºC)	%	0.40	0.10
Chemical properties			
Al_2O_3 - on dry basis	%	99.6	99.6
Na_2O total	ppm	3600	3600
CaO	ppm	150	150
SiO_2	ppm	150	150
Fe_2O_3	ppm	150	150

Typical data

ALUMINAS FOR OPACIFICATION (ZIRCON SUBSTITUTION)

The light scattering properties and high refractive index of medium calcined alumina ARZ® makes it ideal for opacifying in superwhite bodies, engobes and glazes.

Specialty reactive alumina can replace totally, or partially, zircon sand in formulations to give whiteness and opacification. Ground alumina can be used as a whitening agent after the milling of the body to obtain the best whiteness.

		Engobes and glazes	Body
		Medium calcined	
		Unground	Ground
		ARZ®	AFRZ®
Physical properties	**Unit**		
Particle Size Distribution (Cilas)			
D10	µm	50	1.3
D50	µm	80	5.0
D90	µm	160	14.0
Specific Surface Area BET	m^2/g	12	13.0
Loss on ignition (20-1000ºC)	%	0.4	/
Screen Residue >45µm	%	/	0.10
Chemical properties			
Al_2O_3 - on dry basis	%	99.6	99.6
Na_2O total	ppm	3600	3600
CaO	ppm	150	150
SiO_2	ppm	150	150
Fe_2O_3	ppm	150	150

Typical data

ALUMINAS FOR ANTISLIP

Specialty aluminas can be added to increase the coefficient of friction (COF) and therefore anti-slip property of tiles.

In particular this applies to unglazed, mosaic and rough-surfaced tiles for kitchens, bathrooms and swimming pools, as well as for many industrial areas.

Our R&D team is currently developing new products in order to propose alternative high-end solutions.

		Hard calcined
		AC90
Physical properties	**Unit**	
Particle Size Distribution (Cilas)		
D10	µm	15
D50	µm	80
D90	µm	160
Specific Surface Area BET	m^2/g	0.5
Loss on ignition (20-1000ºC)	%	0.1
Chemical properties		
Al_2O_3 - on dry basis	%	99.6
Na_2O total	ppm	3600
CaO	ppm	150
SiO_2	ppm	150
Fe_2O_3	ppm	150

Typical data

ALUMINAS FOR CERAMIC INKS & GLAZES for full digital decoration

DIGITal

DIGITal is a superground alumina range with a very well controlled particle size distribution and top cut. Being very fine permits these aluminas to be used in ink and full digital glazing, providing distinctive and unique colour brightness, texture and surface effects.

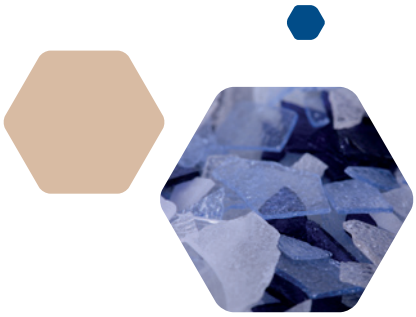
		Low calcined	Hard calcined
		DIGITal® 70	DIGITal® 20
Physical properties	**Unit**		
Particle Size Distribution (Cilas)			
D10	µm	0.2	1.2
D50	µm	0.4	3.1
D90	µm	1.0	7.0
Screen residue >45µm (325 mesh)	%	0	0
Specific Surface Area BET	m^2/g	7.5	1.2
Chemical properties			
Alpha alumina content	%	≈95	-
Al_2O_3 - on dry basis	%	99.9	99.6
Na_2O total	ppm	700	3100
CaO	ppm	200	100
SiO_2	ppm	400	150
Fe_2O_3	ppm	170	150

Typical data

ALUMINAS FOR FRITS

Alumina is a component of the amourphous glass network.

Al_2O_3 is used as a stabilizer in the glass network to avoid recrystallization.



		Unground
		Calcined
		ATS
Physical properties	**Unit**	
Particle Size Distribution (Cilas)		
D10	µm	50
D50	µm	80
D90	µm	160
Specific Surface Area BET	m^2/g	0.4-90
Loss on ignition (20-1000°C)	%	2.0
Chemical properties		
Al_2O_3 - on dry basis	%	99.4
Na_2O total	ppm	4200
CaO	ppm	200
SiO_2	ppm	200
Fe_2O_3	ppm	200

Typical data

ALUMINAS FOR PIGMENTS

Various types of ATH (Aluminium Trihydroxide) and aluminas are used to enhance colour. These build chemical complexes with other metallic oxides and help the development of tints.

From Alteo's wide range of products we have selected ATH and ground calcined aluminas ideal for this application.

		Ground	
		ATH	Hard calcined
		SH80	AC44B4
Physical properties	**Unit**		
Particle Size Distribution (Cilas)			
D10	µm	3.0	1.7
D50	µm	8.5	4.0
D90	µm	18	11.5
Specific Surface Area BET	m^2/g	3.5	1.1
Loss on ignition (20-1000°C)	%	34.6	/
Screen Residue > 45µm	%	/	0.2
Chemical properties			
Al_2O_3 - on dry basis	%	65.0	99.6
Na_2O total	ppm	2300	3600
CaO	ppm	100	150
SiO_2	ppm	60	150
Fe_2O_3	ppm	65	150

Typical data

GROUND CALCINED ALUMINA FOR TABLEWARE & SANITARY WARE

Ground calcined alumina is used in ceramic bodies to adjust mineralogical composition to provide high-performance, which is required for intensive-use hotel ware and domestic tableware

- Improves thermal shock
- Improves scratch and abrasion resistance
- Improves mechanical resistance

These properties are also required for sanitary ware.

		Ground hard calcined		
		AC44B4	AC44B5	GA4C
Physical properties	**Unit**			
Particle Size Distribution (Cilas)				
D10	µm	1.7	2.2	2.1
D50	µm	4.0	5.5	4.9
D90	µm	11.5	14.0	10.2
Screen residue >45µm	%	0.2	2.0	0.01
Specific Surface Area BET	m^2/g	1.1	0.7	0.7
Chemical properties				
Al_2O_3 - on dry basis	%	99.6	99.6	99.6
Na_2O total	ppm	3600	3600	3600
CaO	ppm	150	150	150
SiO_2	ppm	150	150	150
Fe_2O_3	ppm	150	150	150

Typical data

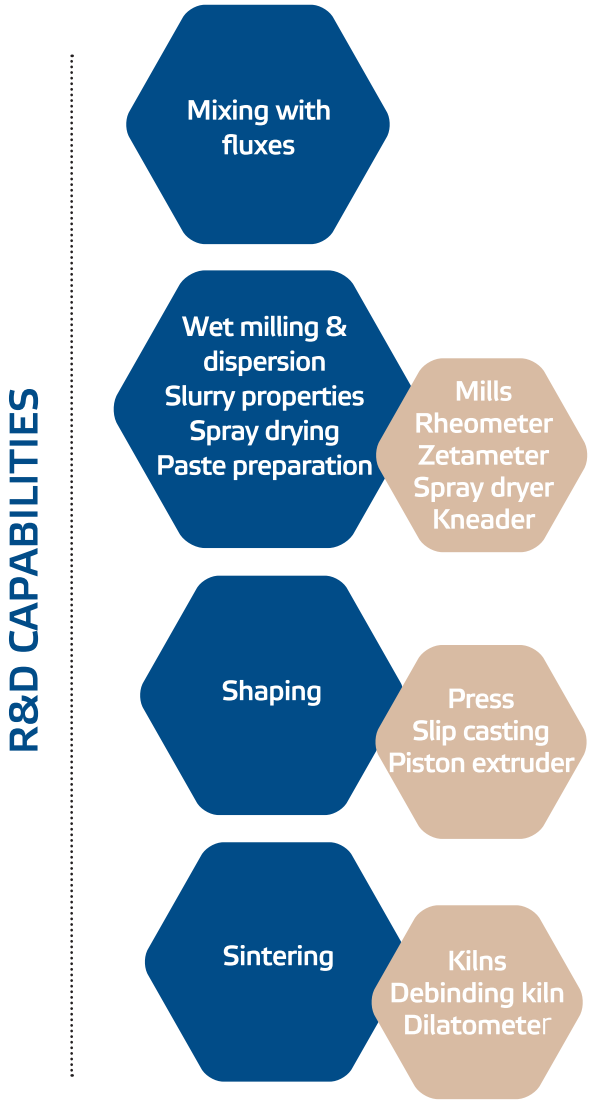
ALTEO R&D

For Alteo, innovation and application R&D are major parts of its growth strategy.

Alteo enhances its R&D capabilities through iits **Innovation and Technical Excellence Center:** the installation of state-of-the-art equipment, the recruitment of technical experts and collaborations with key partners and university laboratories.

Alteo has the know-how and equipment to analyze and evaluate raw materials and finished parts, as well as being able to simulate production processes.

Contact our R&D team now at
www.alteo-alumina.com/contact



CUSTOMER CARE COMMITMENT

To meet your highest expectations, our Customer Care team will always strive to ensure a **first class** service. Our commitment is to provide **full support** from your first call to the delivery of our products; with technical assistance, packing solutions and short lead times.

ALTEO AT A GLANCE

- A leading integrated supplier of specialty products with the largest production capacity worldwide for calcined, pure and fine alumina.
- A global sales network with 4 regional hubs, 16 offices and more than 35 local warehouses around the world.
- A leading raw material supplier to the following industrial markets: Advanced Ceramics, Thermal Management EV-Batteries, Flame retardant, Polishing, Performance Refractories, Glass.

Design : Emeline MARTEL - Communication

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