

## ALUMINUM OXIDE (AL<sub>2</sub>O<sub>3</sub>) (ALUMINA)

Aluminum Oxide is a tough, hard material often referred to by a number of other names including, Alumina, and Corundum. With a Mohs hardness of 9, Aluminum Oxide is a high strength, wear-resistant material possessing a strong ability to resist vigorous chemical attacks (such as acid and alkali) at extreme temperatures. Its high degree of refractoriness, along with its superior electrical insulating properties, dielectric properties, and high melting point make Aluminum Oxide a desirable material choice for a diverse range of applications.

Aluminum Oxide is typically produced by extracting crushed Bauxite via the Bayer Process.

Through various processes Aluminum Oxide has the related forms of Fused Aluminum Oxide, Calcined Alumina, Reactive alumina, activated alumina, and bubble alumina. Each of these forms of alumina vary in their distinct properties and have a wide range of applicable uses.

Panadyne offers a full range of aluminas to meet your application. Our Aluminum Oxide is offered in standard or custom sizing as well as spheres.



### TYPICAL APPLICATIONS

Refractories	Lapping	Filtration
Body and Vehicle Armor	Metal Preparation	Abrasives
Blasting Media	Ceramic Shapes	Refractory
Microdermabrasion	Anti-Slip	Polishing
Grinding	Laminates	Milling
Polishing	Coatings	Filler
		Electrical Insulator

### TYPICAL PROPERTIES

High Hardness
High Compression Strength
Abrasive Wear-Resistance
Ability to Resist Vigorous Chemical Attacks at Extreme Temperatures
High Degree of Refractoriness
Superior Electrical Insulating Properties
Dielectric Properties
High Melting Point

## TYPICAL ANALYSIS

PROPERTIES	UNITS	TEST	VALUE
<b>Physical</b>			
Chemical Formula	-	-	Al <sub>2</sub> O <sub>3</sub>
Density, $\rho$	g/cm <sup>3</sup>	ASTM C20	3.21
Color	-	-	ivory/white
Crystal Structure	-	-	hexagonal
Water Absorption	% @R.T.	ASTM C373	0.0
Hardness	Mohs	-	9
Hardness	knoop (kg/mm <sup>2</sup> )	Knoop 100g	2000
<b>Mechanical</b>			
Compressive Strength	MPa @ R.T.	ASTM C773	2070-2620
Tensile Strength	MPa @ R.T.	ACMA Test #4	206-300
Modulus of Elasticity (Young's Modulus)	GPa	ASTM C848	393
Flexural Strength (MOR)	MPa @ R.T.	ASTM F417	310-379
Poisson's Ratio, $\nu$		ASTM C818	0.27
Fracture Toughness, $K_{IC}$	MPa x m <sup>1/2</sup>	Notched Beam Test	4.5
<b>Thermal</b>			
Max. Use Temperature (* denotes inert atm.)	°C	No load cond.	1750
Thermal Shock Resistance	$\Delta T$ (°C)	Quenching	200
Thermal Conductivity	W/m-K @ R.T.	ASTM C408	35
Coefficient of Linear Thermal Expansion, $\alpha_l$	$\mu\text{m}/\text{m}\cdot^\circ\text{C}$ (~-25°C through $\pm 1000^\circ\text{C}$ )	ASTM C372	8.4
Specific Heat, $c_p$	cal/g-°C @ R.T.	ASTM C351	0.21
<b>Electrical</b>			
Dielectric Constant	1MHz @ R.T.	ASTM D150	9.6
Dielectric Strength	kV/mm	ASTM D116	15
Electrical Resistivity	$\Omega\text{cm}$ @ R.T.	ASTM D1829	$>10^{14}$