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(Al_2O_3) Alumina 96% Substrate Material Specifications

Alumina Oxide (Al_2O_3) is a readily available material with reasonable processing cost, possessing excellent mechanical, electrical, and wear properties. Alumina Substrates are used in a wide range of applications not limited to automotive, circuitry, computer, LED's, microwave and military.

Technical Products capabilities include laser cutting, drilling, engraving, fabrication, lapping and polishing.

Physical Properties	Units	Test	Al_2O_3-96%
Density	g/cm³	ASTM-C20	3.72
Color	-	-	white
Water Absorption	%	ASTM-373	0
Hardness (Rockwell)	R45N	Rockwell 45 N	78
Grain Size	Microns	ASTM-E112	6

Mechanical Properties	Units	Test	Al_2O_3-96%
Compressive Strength, 20ºC	MPa /psi • 10^3	ASTM-C773	2068 / 300
Modulus of Elasticity, 20ºC	GPa / psi • 10^6	ASTM-C848	303 / 44
Flexural Strength (MOR), 20ºC	MPa /psi • 10^3	ASTM-F417	358 / 52
Poisson's Ratio, 20ºC	-	ASTM-C848	0.21
Fracture Toughness K (I c)	$MPam^{1/2}$	NOTCHED BEAM	4 – 5
Gas Permeability	-	-	0
Tensile Strength, 25ºC	MPa /psi • 10^3	ACMA TEST #4	221 / 32

Thermal Properties	Units	Test	Al_2O_3-96%
Thermal Conductivity, 20ºC	W/m K	ASTM-C408	24.7
Thermal Expansion 25ºC – 1000ºC	1 X 10^{-6}/ºC	ASTM-C372	8.2
Specific Heat, 100ºC	J/kg*K	ASTM-E1269	880
Thermal Shock Resistance, Δ Tc	ºC	-	250

Electrical Properties	Units		Al_2O_3-96%
Dielectric Constant	1MHz 25ºC	ASTM-D150	9
Dielectric Strength, 6.35mm	ac-kV/mm (ac V/mil)	ASTM-D116	8.3 / 210
Dielectric Loss (tan delta)	1MHz 25ºC	ASTM-D150	0.0002
Volume Resistivity	25ºC ohm-cm 500ºC ohm-cm 1000ºC ohm-cm	ASTM-D1829	$>10^{14}$ 4 X 10^9 1 X 10^6

**The information provided in this table is a compilation of publicly available data. This information is provided for comparison purposes only, and is not intended to be warrantable. Further, *Technical Products, Inc.* disclaims any and all liability from errors, in accuracies, or omissions.