



ALUMINA

Aluminium Oxide (Al_2O_3), commonly known as alumina, is extensively used as an engineering ceramic due to its high performance at a cost effective price. Typically, alumina is available in grades from 88% to 99.99% purity with properties varying accordingly. Zirconia toughened alumina is a modified, stronger grade of alumina.

Alumina components can be manufactured by a number of different methods including pressing, extruding, slip casting and injection moulding. The method of manufacture generally depending on the size and quantity of components required.

Alumina starts the manufacturing process as a powder which, once compressed, can be machined if required (known as "green machining") before being fired. After firing, further processing can only be carried out using diamond tooling.

Advantages: Excellent wear resistance
 Excellent electrical insulation
 Good thermal conductivity
 High hardness and compression strength
 Good corrosion resistance

Applications: Ballistic armour
 Electronic substrates
 Element formers/thread guides
 Feedthroughs
 High voltage insulators
 Laser cavities
 Radomes
 Wear components (including blades, valves & guides)



ALUMINA (Continued)

PROPERTIES OF ALUMINA

Other grades of alumina are available.

	PROPERTY	UNITS			
GENERAL	Chemical formula	n/a	Al ₂ O ₃	Al ₂ O ₃	Zirconia toughened alumina
	Alumina content	%	96	99.5	-
	Density	g/cm ³	3.69	3.86	4.6
MECHANICAL	Compressive Strength	MPa	>2100	>2100	2500
	Flexural Strength	MPa	370	315	675
	Young's Modulus	GPa	275	375	330
THERMAL	Max. use temperature	°C	1620	1725	1500
	Thermal Conductivity	W/m ^{°K}	25.5	29.3	17
	Coefficient of Linear Thermal Expansion	10 ⁻⁶ /°C	6.4	6.9	8
ELECTRICAL	Volume Resistance	Ωcm	>10 ¹⁴	>10 ¹⁴	>10 ¹⁴
	Dielectric Constant		9.3	9.6	-
	Dielectric Strength	kV/mm	26	31	-

Properties shown are typical values, they are not absolute material properties, and should be used for guidance only. It is recommended that materials and components are tested for their suitability for a specific application.

For more information and advice please discuss your application with our sales staff.