

Materials Property Chart

				Standard Alumina				
				AL74 74%	AL95 95%	AL96 96%	AL96P 95.5%	AL98 98%
Property		ASTM Method	Units					
General	Crystal Size (Average)	Thin Section	Microns	13	11	8	9	7
	Color	--	--	White	Ivory	White	Purple	White
	Gas Permeability	--	atms-cc/sec	gas tight <10 ⁻¹⁰	gas tight <10 ⁻¹⁰	gas tight <10 ⁻¹⁰	gas tight <10 ⁻¹⁰	gas tight <10 ⁻¹⁰
	Water Absorption	C 20-97	%	0	0	0	0	0
Mechanical	Density	C 20-97	g/cc	3.03	3.65	3.71	3.68	3.78
	Hardness	Vickers 500 gm	GPa (kg/mm ²)	10.5 (1075)	11.5 (1175)	12.7 (1300)	12.7 (1300)	12.7 (1300)
	Hardness	--	R45N	78	79	81	81	81
	Fracture Toughness	Notched Beam	MPam ^{1/2}	2 - 5	3 - 4	4 - 5	4 - 5	4 - 5
	Flexural Strength (MOR) (3 point) @ RT°	F417-87	MPa (psi x 10 ³)	241 (35)	310 (45)	358 (52)	331 (48)	393 (57)
	Tensile Strength @ RT°	--	MPa (psi x 10 ³)	117 (17)	151 (22)	200 (29)	159 (23)	221 (32)
	Compressive Strength @ RT°	--	MPa (psi x 10 ³)	1378 (200)	1827 (265)	2068 (300)	1965 (285)	2241 (325)
	Elastic Modulus	C848	GPa (psi x 10 ⁶)	172 (25)	303 (44)	310 (45)	310 (45)	345 (50)
	Poisson's Ratio	C848	--	0.22	0.22	0.22	0.22	0.23
Thermal	C.T.E. 25 - 100° C	C 372-96	x 10 ⁻⁶ /C	5.5	6.1	6.0	6.3	6.2
	C.T.E. 25 - 300° C	C 372-96	x 10 ⁻⁶ /C	5.8	7.0	6.8	6.9	6.8
	C.T.E. 25 - 600° C	C 372-96	x 10 ⁻⁶ /C	6.3	7.7	7.5	7.6	7.6
	Thermal Conductivity @ RT°	C 408	W/m K	4	19	23	21	29
	Max Use Temp (non-loading) (at high strength)	--	Fahrenheit (°F)	2800	3000	3100	3100	3100
		--	Celsius (°C)	1540	1650	1700	1700	1700
Electrical	Dielectric Strength (.125" Thick)	D 149-97A	V/mil	225	250	250	250	260
	Dielectric Constant @ 1 MHz	D 150-98	--	7.0	9.0	9.1	9.0	9.5
	Dielectric Constant @ Gigahertz	D 2520-95	--	--	9.2	9.1	8.9	9.4
				--	11.0	10.9	10.8	9.8
	Dielectric Loss @ 1 MHz	D 150-98	--	0.0012	0.0006	0.0004	0.0006	0.0006
	Dielectric Loss @ Gigahertz	D 2520-95	--	--	0.0009	0.0007	0.0006	0.0005
				--	12.5	10.9	10.8	9.8
	Volume Resistivity, 25°C	D 257	ohms-cm	> 1 x 10 ¹³	> 1 x 10 ¹⁴	> 1 x 10 ¹⁴	> 1 x 10 ¹³	> 1 x 10 ¹⁴
	Volume Resistivity, 300° C	D 1829	ohms-cm	4 x 10 ¹⁰	5 x 10 ¹²	3 x 10 ¹²	1 x 10 ¹¹	8 x 10 ¹¹
	Volume Resistivity, 500° C	D 1829	ohms-cm	3 x 10 ⁷	3 x 10 ⁹	7 x 10 ⁹	5 x 10 ⁹	2 x 10 ⁹
	Volume Resistivity, 700° C	D 1829	ohms-cm	2 x 10 ⁶	3 x 10 ⁸	4 x 10 ⁸	4 x 10 ⁸	2 x 10 ⁸
Volume Resistivity, 1000° C	D 1829	ohms-cm	--	--	--	--	--	