

Alumina Property Chart

			Alumina				High Purity Alumina			
Property			AL74 74%	AL95 95%	AL96 96%	AL98 98%	AL995 99.5%	AL9980 99.8%	AL9996 99.96%	
ASTM Method			Units							
General	Crystal Size (Average)	Thin Section	Microns	13	11	8	7	6	6	2
	Color	--	--	White	Ivory	White or Purple	White	Ivory-White	Ivory	Off White/Blush
	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	gas tight <10 ⁻¹⁰	gas tight <10 ⁻¹⁰
	Water Absorption	C 20-97	%	0	0	0	0	0	0	0
	Density	C 20-97	g/cc	3.03	3.65	3.71	3.78	3.88	3.91	3.93
Mechanical	Hardness	Vickers 500 gm	GPa (kg/mm ²)	10.5 (1075)	11.5 (1175)	12.7 (1300)	12.7 (1300)	14.3 (1459)	15 (1530)	19.6 (2000)
	Hardness	--	R45N	78	79	81	81	82	86	90
	Fracture Toughness	Notched Beam	MPam ^{1/2}	2 - 5	3 - 4	4 - 5	4 - 5	4 - 5	3 - 4	5 - 6
	Flexural Strength (MOR) (3 point) @ RT	F417-87	MPa (psi x 10 ³)	241 (35)	310 (45)	358 (52)	393 (57)	338 (49)	379 (55)	455 (66)
	Tensile Strength @ RT	--	MPa (psi x 10 ³)	117 (17)	151 (22)	200 (29)	221 (32)	172 (25)	200 (29)	275 (40)
	Compressive Strength @ RT	--	MPa (psi x 10 ³)	1378 (200)	1827 (265)	2068 (300)	2241 (325)	2137 (310)	2240 (325)	2413 (350)
	Elastic Modulus	C848	GPa (psi x 10 ⁶)	172 (25)	303 (44)	310 (45)	345 (50)	379 (55)	379 (55)	393 (57)
	Poisson's Ratio	C848	--	0.22	0.22	0.22	0.23	0.23	0.23	0.23
Thermal	C.T.E. 25 - 100° C	C 372-96	x 10 ⁻⁶ /C	5.5	6.1	6.0	6.2	6.3	6.5	6.5
	C.T.E. 25 - 300° C	C 372-96	x 10 ⁻⁶ /C	5.8	7.0	6.8	6.8	6.9	7.9	7.9
	C.T.E. 25 - 600° C	C 372-96	x 10 ⁻⁶ /C	6.3	7.7	7.5	7.6	7.6	8.1	8.2
	Thermal Conductivity @ RT	C 408	W/m K	4	19	23	29	30	30	35
	Max Use Temp	--	Fahrenheit (°F)	2800	3000	3100	3100	3047	3047	3100
--		Celsius (°C)	1540	1650	1700	1700	1675	1675	1700	
Electrical	Dielectric Strength (.125" Thick)	D 149-97A	V/mil	225	250	250	260	270	290	422
	Dielectric Constant @ 1 MHz	D 150-98	--	7.0	9.0	9.1	9.5	9.8	9.8	9.9
	Dielectric Constant @ Gigahertz	D 2520-95	--	--	9.2	9.1	9.4	9.7	10	--
				--	11.0	10.9	9.8	9.8	9.6	--
	Dielectric Loss @ 1 MHz	D 150-98	--	0.0012	0.0006	0.0004	0.0006	0.0002	< .0001	< .0001
	Dielectric Loss @ Gigahertz	D 2520-95	--	--	0.0009	0.0007	0.0005	< .0001	< .0001	--
				--	12.5	10.9	9.8	9.8	9.6	--
	Volume Resistivity, 25°C	D 257	ohms-cm	> 1 x 10 ¹³	> 1 x 10 ¹⁴	> 1 x 10 ¹⁴	> 1 x 10 ¹⁴	> 1 x 10 ¹⁴	> 1 x 10 ¹⁴	> 1 x 10 ¹⁴
	Volume Resistivity, 300° C	D 1829	ohms-cm	4 x 10 ¹⁰	5 x 10 ¹²	3 x 10 ¹²	8 x 10 ¹¹	1 x 10 ¹²	3 x 10 ¹²	1 x 10 ¹³
Volume Resistivity, 500° C	D 1829	ohms-cm	3 x 10 ⁷	3 x 10 ⁹	7 x 10 ⁹	2 x 10 ⁹	5 x 10 ¹⁰	6 x 10 ¹⁰	5 x 10 ¹²	
Volume Resistivity, 700° C	D 1829	ohms-cm	2 x 10 ⁶	3 x 10 ⁸	4 x 10 ⁸	2 x 10 ⁸	2 x 10 ⁹	6 x 10 ⁹	1 x 10 ¹²	