

Materials Property Chart

				High Purity Alumina				
		Property	ASTM Method	Units	AL995 99.5%	AL998 NSF51 Certified 99.8%	AL9980 99.8%	AL999 99.9%
General	Crystal Size (Average)	Thin Section	Microns	6	6	6	2	
	Color	--	--	Ivory-White	Ivory	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	
	Water Absorption	C 20-97	%	0	0	0	0	
Mechanical	Density	C 20-97	g/cc	3.88	3.91	3.91	3.93	
	Hardness	Vickers 500 gm	GPa (kg/mm ²)	14.3 (1459)	15 (1530)	15 (1530)	19.6 (2000)	
	Hardness	--	R45N	82	86	86	90	
	Fracture Toughness	Notched Beam	MPam ^{1/2}	4 - 5	3 - 4	3 - 4	5 - 6	
	Flexural Strength (MOR) (3 point) @ RT°	F417-87	MPa (psi x 10 ³)	338 (49)	379 (55)	379 (55)	455 (66)	
	Tensile Strength @ RT°	--	MPa (psi x 10 ³)	172 (25)	200 (29)	200 (29)	275 (40)	
	Compressive Strength @ RT°	--	MPa (psi x 10 ³)	2137 (310)	2240 (325)	2240 (325)	2413 (350)	
	Elastic Modulus	C848	GPa (psi x 10 ⁶)	379 (55)	379 (55)	379 (55)	393 (57)	
	Poisson's Ratio	C848	--	0.23	0.23	0.23	0.23	
Thermal	C.T.E. 25 - 100° C	C 372-96	x 10 ⁻⁶ /C	6.3	6.5	6.5	6.5	
	C.T.E. 25 - 300° C	C 372-96	x 10 ⁻⁶ /C	6.9	7.9	7.9	7.9	
	C.T.E. 25 - 600° C	C 372-96	x 10 ⁻⁶ /C	7.6	8.1	8.1	8.2	
	Thermal Conductivity @ RT°	C 408	W/m K	30	30	30	35	
	Max Use Temp (non-loading) (at high strength)	--	Fahrenheit (°F)	3047	3047	3047	3100	
		--	Celsius (°C)	1675	1675	1675	1700	
Electrical	Dielectric Strength (.125" Thick)	D 149-97A	V/mil	270	290	290	422	
	Dielectric Constant @ 1 MHz	D 150-98	--	9.8	9.8	9.8	9.9	
	Dielectric Constant @ Gigahertz	D 2520-95	--	9.7	10	10	--	
				9.8	9.6	9.6	--	
	Dielectric Loss @ 1 MHz	D 150-98	--	0.0002	< .0001	< .0001	< .0001	
	Dielectric Loss @ Gigahertz	D 2520-95	--	< .0001	< .0001	< .0001	--	
				9.8	9.6	9.6	--	
	Volume Resistivity, 25°C	D 257	ohms-cm	> 1 x 10 ¹⁴	> 1 x 10 ¹⁴	> 1 x 10 ¹⁴	> 1 x 10 ¹⁴	
	Volume Resistivity, 300° C	D 1829	ohms-cm	1 x 10 ¹²	3 x 10 ¹²	3 x 10 ¹²	1 x 10 ¹³	
	Volume Resistivity, 500° C	D 1829	ohms-cm	5 x 10 ¹⁰	6 x 10 ¹⁰	6 x 10 ¹⁰	5 x 10 ¹²	
	Volume Resistivity, 700° C	D 1829	ohms-cm	2 x 10 ⁹	6 x 10 ⁹	6 x 10 ⁹	1 x 10 ¹²	
Volume Resistivity, 1000° C	D 1829	ohms-cm	--	--	--	--		