

# Materials Property Chart

Additional specialty materials may be available upon request

			Alumina			
Property	ASTM Method	Units	AL74 74%	AL94 94%	AL96 96%	AL98 98%
Crystal Size (Average)	Thin Section	Microns	13	11	8	7
Color	--	--	White	Ivory	White or Purple	White
Gas Permeability	F 134	atms-cc/sec	gas tight <10 <sup>-10</sup>	gas tight <10 <sup>-10</sup>	gas tight <10 <sup>-10</sup>	gas tight <10 <sup>-10</sup>
Water Absorption	C 373	%	0	0	0	0
Density	C 373	g/cc	3.03	3.70	3.71	3.82
Hardness	C 1327	GPa (kg/mm <sup>2</sup> )	10.5 (1075)	10.1 (1012)	12.7 (1300)	12.7 (1300)
Fracture Toughness	C 1421 Notch	MPam <sup>1/2</sup>	2 - 5	4 - 5	3 - 5	3 - 5
Flexural Strength (MOR) (4 point) @ 25 °C	C 1161	MPa (psi x 10 <sup>3</sup> )	241 (35)	319 (46)	305 (44)	316 (46)
Compressive Strength @ 25 °C	C 773	MPa (psi x 10 <sup>3</sup> )	1378 (200)	1753 (254)	2068 (300)	2241 (325)
Elastic Modulus	C 1259	GPa (psi x 10 <sup>6</sup> )	172 (25)	312 (45)	307 (45)	346 (50)
Poisson's Ratio	C 1259	--	0.22	0.22	0.18	0.19
C.T.E. 40 - 200 °C	E 228	x 10 <sup>-6</sup> /C	5.5	6.5	6.7	6.9
C.T.E. 40 - 500 °C	E 228	x 10 <sup>-6</sup> /C	5.8	7.2	7.6	7.8
C.T.E. 40 - 800 °C	E 228	x 10 <sup>-6</sup> /C	6.3	8.1	8.4	8.4
Thermal Conductivity @ 25 °C	E 1461	W/m K	4	24	24	28
Dielectric Strength (.125" Thick)	D 149	V/mil	225	250	260	300
Dielectric Constant @ 1 MHz	D 150	--	7	9.2	9.0	9.6
Dielectric Loss @ 1 MHz	D 150	--	0.0012	0.0003	0.0003	0.0004
Volume Resistivity, 25° C	D 257	ohms-cm	< 1 x 10 <sup>13</sup>	1 x 10 <sup>13</sup>	1 x 10 <sup>13</sup>	1 x 10 <sup>13</sup>

High Purity Alumina	Zirconia Toughened Alumina	Zirconia	
AL998 99.8%	ZTA-14	MSZ (Magnesia Stabilized)	YTZP (Yttria Stabilized)
6	6	30	1
Ivory	White	Ivory or Yellow	Ivory
gas tight <10 <sup>-10</sup>	gas tight <10 <sup>-10</sup>	gas tight <10 <sup>-10</sup>	gas tight <10 <sup>-10</sup>
0	0	0	0
3.91	4.17	5.72	6.02
13.5 (1354)	14.5 (1478)	11.7 (1200)	12.5 (1250)
3 - 5	6	12	10
298 (43)	586 (85)	620 (90)	951 (138)
1668 (242)	2758 (400)	1862 (270)	2485 (360)
383 (56)	338 (49)	206 (29.8)	210 (30)
0.21	0.23	0.28	0.3
6.3	6.0	8.9	6.9
7.1	7.0	9.7	8.1
7.6	7.1	10	10.5
32	24	3	2.2
305	250	300	240
9.9	12.5	22.7	30
0.0005	0.0006	0.0016	0.001
2 x 10 <sup>13</sup>	> 1 x 10 <sup>14</sup>	> 1 x 10 <sup>13</sup>	> 1 x 10 <sup>13</sup>

Silicates					Units
Steatite L-4	Steatite L-5	Cordierite	Mullite	Lava Grade A Fired	
7	7	--	7	--	Microns
Tan	Gray-Green	Orange-Tan	White	Gray-Tan	--
--	--	Porous	--	Porous	atms-cc/sec
0	0	13	0	3	%
2.65	2.75	2.10	2.96	2.3	g/cc
4.9 (500)	4.9 (500)	5.8 (590)	10 (1000)	4.4 (450)	GPa (kg/mm <sup>2</sup> )
--	--	--	3	--	MPam <sup>1/2</sup>
117 (17)	138 (20)	66 (9.5)	206 (30)	69 (10)	MPa (psi x 10 <sup>3</sup> )
551 (80)	586 (85)	165 (24)	1034 (150)	172 (25)	MPa (psi x 10 <sup>3</sup> )
103 (15)	103 (15)	103 (15)	179 (26)	--	GPa (psi x 10 <sup>6</sup> )
0.24	0.24	0.31	0.24	--	--
7.3	8.5	2.0	4.8	2.9	x 10 <sup>-6</sup> /C
7.4	8.6	2.5	5.4	3.3	x 10 <sup>-6</sup> /C
7.5	8.6	3.0	5.8	3.6	x 10 <sup>-6</sup> /C
3	3	3	4	2	W/m K
260	270	120	250	100	V/mil
5.6	5.7	5.5	6.7	5.3	--
0.003	0.0014	--	0.003	--	--
> 1 x 10 <sup>14</sup>	--	ohms-cm			

Note: The information in this data sheet is for design guidance only and does not include all available materials. STC does not warrant this data as absolute values. Forming methods and specific geometry could affect properties. Slight adjustments can be made to some of the properties to accommodate specific customer requirements. Most of the dense materials in the table are resistant to mechanical erosion and chemical attack. STC has performed ASTM testing qualification for certain compositions, in accordance with ASTM D2442. Please consult our technical staff for appropriate material and specific test results.