



CerCo, Inc., Ceramics - Diamonite Plant - Phone: 800-342-9327

Industrial Ceramic Component Material Selection Criteria											
		Aluminum Oxide						Zirconite		Silicon Nitride	SiConite
Properties	Units	P90	B890	P3640	P3142	P96	P99	200	1000	SN11M	SiC
Nominal Aluminum	Percent	90	92	94	94	96	99.5	ZTA	TZP	Si3N4	SiC
Oxide Content	Alumina										
Density (Apparent)	gm/cc	3.6	3.57	3.67	3.7	3.75	3.90-3.94	4.48	6.05	3.16	3.12
Specific Gravity)											
Phases	Major	alpha Al2O3	alpha Al2O3	alpha Al2O3	alpha Al2O3	alpha Al2O3	alpha Al2O3	alpha Al2O3	t-ZrO2	-	alpha SiC
	Minor	Amorphous	Amorphous	Amorphous	Amorphous	Amorphous	Spinel	-	t-ZrO2	-	-
	Trace	-	-	-	-	-	Ca, Mg	M-ZrO2	M-ZrO2	-	-
Hardness HV5 (Vickers)	kg/mm2	985	1050	1120	1100	1255	1530	1650	1150	1450	2600
(KHN5) (Knoop)		(880)	(880)	(970)	(990)	(1185)	(1400)	(1500)	(1035)	(1300)	(2400)
Flexural Strength	kpsi	42	46.5	47	50	50	55	110	120	85	72
(3 Point)	MPa	290	320	324	345	345	379	756	825	583	500
Weibull Modulus	-	6	11	9	16	12	10	11	19	11	-
Tensile Strength	kpsi	18	18.5	24	28.5	22	31.2	70	85	-	-
(ACMA Test #4)	MPa	124	127	165	196	151	215	481	584	-	-
Compressive Strength	kpsi	235	280	350	350	325	260	425	425	-	362
(ASTMC-773-74)	MPa	1600	1900	2400	2400	2241	1800	2930	2930	-	2500
Fracture Toughness,	MPa m 1/2	3.9	-	3.9	4.5	3.7	4.3	6.5	8.6	4	3.5-4
Kic (Indentation)											
Young's Modulus	psi	3.60E+07	4.25E+07	4.00E+07	4.61E+07	4.50E+07	4.80E+07	4.03E+07	2.50E+07	4.30E+07	6.30E+07
(Ultrasonic)											
Shear Modulus	psi	1.50E+07	1.75E+07	1.65E+07	1.90E+07	1.80E+07	1.90E+07	1.65E+07	1.10E+07	-	-
(Ultrasonic)											
Poisson's Ratio		0.2	0.21	0.21	0.21	0.25	0.26	0.22	0.33	0.28	0.16
(ASSTMC-623)											
Coefficient of Linear	25-200C	5.10E-06	5.10E-06	5.40E-06	5.20E-06	5.40E-06	5.10E-06	7.80E-06	5.90E-06	-	4.40E-06
Thermal Expansion	25-500C	6.50E-06	6.70E-06	6.70E-06	7.30E-06	7.40E-06	7.40E-06	8.50E-06	9.90E-06	-	-
(x per degree C)	25-800C	7.50E-06	7.50E-06	7.70E-06	8.00E-06	8.10E-06	8.10E-06	9.10E-06	1.07E-05	-	-
(ASTMC-32)	25-1000C	8.00E-06	7.80E-06	8.10E-06	8.50E-06	8.50E-06	8.50E-06	9.10E-06	1.09E-05	3.00E-06	-
	25C	21	17	28.1	20	28.5	35.4	15.8	2.9	16.7	110
Thermal Conductivity	400C	-	-	-	-	10.1	12.1	-	-	-	-
W/m/degree K	800C	-	-	-	-	6.3	7.5	-	-	-	-
	1000C	-	-	-	-	5.4	6.4	-	-	-	-
Dielectric Strength	V/mil	-	211	204	212	207	215	-	-	-	-
(ASTMD-149 6.35mm)											
Dielectric Constant	1KHz	-	-	-	-	-	-	-	-	-	-
at 25° C	1MHz	-	8.8	9.2	9.3	9.5	9.8	-	-	-	-
(ASTMD-116)	1GHz	-	-	-	-	-	-	-	-	-	-
Dielectric Loss Index	1KHz	-	-	-	-	-	-	-	-	-	-
at 25° C	1MHz	-	0.008	0.007	0.002	0.016	0.002	-	-	-	-
(ASTMD-116)	1GHz	-	-	-	-	-	-	-	-	-	-
Volume Resistivity	100C	-	-	9.50E+14	-	1.80E+14	1.50E+15	-	-	1.00E+14	-
Ohm-cm	300C	-	1.00E+13	1.20E+12	1.00E+08	1.40E+10	2.50E+11	-	-	1.00E+12	-
(ASTMD-257)	500C	-	1.00E+10	1.20E+09	1.00E+07	5.80E+07	5.50E+08	-	-	1.00E+09	-
	700C	-	-	2.50E+07	-	3.50E+06	1.60E+07	-	-	-	-
Thermal Shock	Degrees C	200	200	200	200	200	200	250	320	-	-
(Hasselman)											
Porosity (Helium		Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas	Gas
Mass Spectrometer)		Tight	Tight	Tight	Tight	Tight	Tight	Tight	Tight	Tight	Tight
Water Absorption		None	None	None	None	None	None	None	None	None	None
Color		Off White	White	White	Pink	White	Off White	White	Gold	Gray	Gray
Defense Department		-	L525C	L525C	L725C	L425C	L726C	-	-	-	-
Qualification											
(MIL-I-10-B)											

Note: Values quoted are typical of test results and should be used for guidance purposes only. If further information is needed, contact Diamonite for assistance.

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