

	Properties	Units	Test	99.5% Alumina	Aluminum Nitride	Boron Nitride	Cordierite	Graphite	Lava, Grade A	Corning Macor®	Mullite	Corning Pyrex® (7740)	Quartz (GE124)	Sapphire	Silicon	Silicon Carbide	Silicon Nitride (Hot Pressed)	Steatite L-5	Tool Steel	Zirconia	
Physical	Chemical Formula	-	-	Al ₂ O ₃	AlN	BN	2MgO2Al ₂ O ₃ -5SiO ₂	C	Al ₂ (Si ₄ O ₁₀)(OH) ₂	glass ceramic	3Al ₂ O ₃ -SiO ₂	borosilicate glass	SiO ₂	α-Al ₂ O ₃	Si	α-SiC	Si ₃ N ₄	H ₂ Mg ₃ (SiO ₃) ₄	iron, carbon alloy	ZrO ₂	
	Density	g/cm ³	ASTM C20	3.7 - 3.97	3.25	2.28	2.60	2.25	2.30	2.52	2.80	2.23	2.21	3.97	2.33	3.21	3.31	2.71	7.83	6.04	
	Color	-	-	ivory/white	white/tan/gray	white	tan	black	pink	white	tan	white / transparent	white / transparent	white / transparent	Gray	dark gray	dark gray	buff	gray	gray	white
	Crystal Structure	-	-	hexagonal	hexagonal	hexagonal	orthorhombic	hexagonal	random	random	orthorhombic	random	hexagonal	trigonal	cubic	hexagonal	hexagonal (α & β)	hexagonal	∅	tetragonal	
	Water Absorption	% @ R.T.	ASTM C373	0.0	0.0	0.0-1.0	0.02-3.2	0.5-3.0	2.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0-0.02	-	0.0
	Hardness	Moh's	-	9	5	2	7	1.0-1.5	6	4.5	8	-	7	9	7	10-Sep	9	7.5	6.5	6.5	
	Hardness	knoop(kg/mm1)	Knoop 100g	2000	1170	25-205	-	-	500	250	1450	418	>600	2200	1150	2800	2200	-	605	1600	
Mechanical	Compressive Strength	MPa @ R.T.	ASTM C773	2070-2620	2068	23.5	350	96	172.5	345	551	N/A	650-1100	2000	120	1725-2500	689-2760	621	1000-2000	2500	
	Tensile Strength	MPa @ R.T.	ACMA Test #4	260-300	-	2.41 (1000;C)	25.5	4.8	20.7	90	103.5	N/A	48	250-400	113	310	360-434	62	1800	248	
	Modulus of Elasticity (Young'sMod.)	GPa	ASTM C848	394	308	675	70	4.8	-	66.9	150	64	70	250-400	112	476	317	138	207	207	
	Flexural Strength (MOR)	MPa @ R.T.	ASTM F417	310-379	428	51.8	117	50	69	94	170	69	80	760-1035	~300	324	679-896	140	276	900	
	Poisson's Ratio	-	ASTM C818	0.27	0.25	0.05	0.21	-	-	0.29	0.25	0.20	0.17	0.29	0.28	0.19	0.23	-	0.30	0.32	
	Fracture Toughness	Mpa x m ^{1/2}	Notched Beam Test	4.50	3.50	2.60	-	-	-	1.53	2.00	0.77	-	1.89	3.0-6.0	4.0	5.0-8.0	-	50-80	13.0	
Thermal	Max. Use Temperature (*denotes inert atm.)	°C	No load cond.	1750	1600	985	1370	3650*	1150	1000	1700	490	1200	~2000	1350	1400	1500	1425	760	500	
	Thermal Shock Resistance	ΔT (°C)	Quenching	200	400	>1500	500	200-250	-	25-100	300	100	>1400	200	-	350-500	750	190	230	280-360	
	Thermal Conductivity	W/m=K @ R.T.	ASTM C408	35.00	82.30	20.00	3.00	24.00	1.98	1.46	3.50	1.10	1.40	40.00	125.00	41.00	27.00	2.90	25.00	2.70	
	Coefficient of Linear Thermal Expansion	μm/m-°C (-25;C through 1000;C)	ASTM C372	8.40	4.6-5.7	1.0-2.0	1.70	8.39	3.60	6.3-9.7	5.30	3.25 (through 300;C)	0.45	7.9-8.8	2.49-4.44	5.12	3.40	7.00	6.00	11.00	
	Specific Heat	cal/g-°C @ R.T.	ASTM C351	0.21	0.25	0.19	0.35	0.16	0.20	0.19	0.23	0.18	0.16	0.18	0.18	0.15	0.17	0.22	0.12	0.10	
Electrical	Dielectric Constant	1Mhz @ R.T.	ASTM D150	9.60	8.0-9.1	4.08	4.70	-	5.30	6.03	6.00	4.60	3.80	9.3-11.4	11.80	10.20	7.00	6.30	-	26@1000kHz	
	Dielectric Strength	kV/mm	ASTM D116	15.0	15.0	374.0	5.1	-	0.1	40.0	9.8	0.5	25-40	15-50	-	-	17.7	9.3	-	9.0	
	Electrical Resistivity	Wcm @ R.T.	ASTM D1829	10 ¹⁴	10 ¹⁴	10 ¹³	10 ¹⁴	7x10 ³	10 ¹⁴	>10 ¹⁷	10 ¹³	8x10 ¹⁰	6 x 10 ¹⁰	10 ¹⁷	10 ³	10 ⁸	10 ¹³	10 ⁴	7.5x10 ⁷	>10 ¹³	