MODERN CERAMICS
MANUFACTURING, INC.

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Ceramic Properties Standard

	Properties*		Units	Test	**Alumina** A-9985 Semiconductor Grade
					Min. 99.8% Al_2O_3
MECHANICAL	Density		gm/cc	ASTM-C20	3.95
	Crystal Size	Average	MICRONS	THIN-SECTION	1
	Water Absorption		%	ASTM-373	0
	Gas Permeability		–	–	0
	Color		–	–	IVORY
	Flexural Strength (MOR)	20° C	MPa (psi x 10^3)	ASTM-F417	545 (79)
			MPa (psi x 103)	ASTM-1161 "B"	
		80° C	MPa (psi x 10^3)	ASTM C-1161-02C	475 (69)
	Elastic Modulus	20° C	GPa (psi x 10^6)	ASTM-C848	393 (57)
	Poisson's Ratio	20° C	–	ASTM-C848	0.22
	Compressive Strength	20° C	MPa (psi x 10^3)	ASTM-C773	2500 (363)
	Hardness		GPa (kg/mm^2)	KNOOP 1000 gm	16.5 (1680)
			R45N	ROCKWELL 45 N	–
			Rockwell A (HV_{30})		
			GPa (kg/mm^2)	VICKERS 0.5kg	
	Tensile Strength	25° C	MPa (psi x 10^3)	ACMA TEST #4	380 (55)
	Transverse Rupture Strength		MPa (psi X 10^3)		
	Fracture Toughness	K(I c)	Mpa m$^{1/2}$	NOTCHED BEAM	4 - 5
THERMAL	Thermal Conductivity	20° C	W/m °K	ASTM-C408	30.0
	Coefficient of Thermal	25-400° C	1X 10^{-6}/°C		
	Expansion	25-800° C	1X 10^{-6}/°C		
		25-1000° C	1X 10^{-6}/°C	ASTM-C372	8.2
	Specific Heat	100° C	J/kg*K	ASTM-E1269	880
	Thermal Shock Resistance	$^{\Delta}$Tc	°C	NOTE 1	200
	Maximum Use Temperature		°C	NO-LOAD COND.	1700
ELECTRICAL	Dielectric Strength	6.35mm	ac-kV/mm (ac V/mil)	ASTM-D116	18.1 (460)
	Dielectric Constant	1 MHz	25° C	ASTM-D150	–
		5.2 GHZ		NOTE 5	
	Dielectric Loss (tan delta)	1 MHz	25° C	ASTM-D150	–
		5.2 GHz		NOTE 5	
	Volume Resistivity	25° C	ohm-cm	ASTM-D1829	> 10^{14}
		500° C	ohm-cm	ASTM-D1829	2 X 10^{10}
		1000° C	ohm-cm	ASTM-D1829	2 X 10^6
WEAR	Impingement		–	NOTE 2	
	Rubbing		–	NOTE 2	
	Pore Volume Fraction				
	Fired Pre Diameter				
	Pore Distribution				
	Typical Use				
	Manufacturing Location				

Notes:

1.Thermal Shock Resistance – Tests are run by quenching samples into water from various elevated temperatures. The change in temperature where a sharp decrease in flexural strength is observed is listed as DTc.

2. Wear Resistance – Impingement tests are run using a dry fused alumina abrasive. Rubbing tests are run using a dry 240 grit fused alumina abrasive. The indices in the chart are calculated by dividing the material volume loss by the volume loss of an AD-85 alumina control. The lower in the index, the better the wear resistance.

3. Thermal Shock Resistance – Tests are run by quenching samples into water from various elevated temperatures. The change in temperature where a sharp decrease in flexural strength is observed is listed as DTc.

4. Four point bend modulus of rup

5. Microwave Dielectric Properties - Dielectic constant and loss tangent are evaluated by aresonance method utilizing the TE_{011} Mode

* Ceramic property values vary somewhat with method of manufacture, size, and shape of part. Close control of values of most properties can be maintained if specified..