Superior Technical Ceramics
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Materials Property Chart

				Zirconia				
	Property	ASTM Method	Units	MSZ (Magnesia Stabilized) MSZ-200	MSZ (Magnesia Stabilized) MSZ-300	YTZP 2000 (Yttria Stabilized)	YTZP 4000 (Yttria Stabilized)	CSZ (Ceria Stabilized)
General	Crystal Size (Average)	Thin Section	Microns	30	30	1	1	3
	Color	--	--	Ivory	Yellow	Ivory	Ivory	Yellow
	Gas Permeability	--	atms-cc/sec	gas tight $<10^{-10}$	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	0
Mechanical	Density	C 20-97	g/cc	5.72	5.72	6.02	6.07	6.20
	Hardness	Vickers 500 gm	GPa (kg/mm^2)	11.7 (1200)	11.7 (1200)	12.5 (1250)	12.5 (1250)	11.7 (1200)
	Hardness	--	R45N	78	78	80	80	78
	Fracture Toughness	Notched Beam	MPam$^{1/2}$	12	12	10	10	12
	Flexural Strength (MOR) (3 point) @ RT°	F417-87	MPa (psi x 10^3)	620 (90)	586 (85)	951 (138)	1380 (200)	551 (80)
	Tensile Strength @ RT°	--	MPa (psi x 10^3)	310 (45)	310 (45)	550 (80)	690 (100)	337 (49)
	Compressive Strength @ RT°	--	MPa (psi x 10^3)	1862 (270)	1862 (270)	2485 (360)	2485 (360)	2000 (290)
	Elastic Modulus	C848	GPa (psi x 10^6)	206 (29.8)	206 (29.8)	210 (30)	210 (30)	200 (29)
	Poisson's Ratio	C848	--	0.28	0.28	0.30	0.30	0.25
Thermal	C.T.E. 25 - 100° C	C 372-96	x 10^{-6}/C	8.9	8.9	6.9	6.9	6.9
	C.T.E. 25 - 300° C	C 372-96	x 10^{-6}/C	9.7	9.7	8.1	8.1	8.1
	C.T.E. 25 - 600° C	C 372-96	x 10^{-6}/C	10.0	10.0	10.5	10.5	10.5
	Thermal Conductivity @ RT°	C 408	W/m K	3	3	2.2	2.2	3.5
	Max Use Temp (non-loading) (at high strength)	--	Fahrenheit (°F)	2200	2200	932	932	1000
		--	Celsius (°C)	1200	1200	500	500	537
Electrical	Dielectric Strength (.125" Thick)	D 149-97A	V/mil	300	300	240	240	250
	Dielectric Constant @ 1 MHz	D 150-98	--	22.7	22.7	30.0	30.0	30.0
	Dielectric Constant	D 2520-95	--	29.2	29.2	--	--	--
	@ Gigahertz			6.2	6.2	--	--	--
	Dielectric Loss @ 1 MHz	D 150-98	--	0.0016	0.0016	0.0010	0.0010	0.0010
	Dielectric Loss	D 2520-95	--	0.0018	0.0018	--	--	--
	@ Gigahertz			6.2	6.2	--	--	--
	Volume Resistivity, 25°C	D 257	ohms-cm	> 1 x 10^{13}	> 1 x 10^{13}	> 1 x 10^{13}	> 1 x 10^{13}	> 1 x 10^{13}
	Volume Resistivity, 300° C	D 1829	ohms-cm	5 x 10^7	5 x 10^7	1 x 10^{10}	1 x 10^{10}	1 x 10^{10}
	Volume Resistivity, 500° C	D 1829	ohms-cm	1 x 10^7	1 x 10^7	1 x 10^6	1 x 10^6	1 x 10^6
	Volume Resistivity, 700° C	D 1829	ohms-cm	2 x 10^6	2 x 10^6	5 x 10^3	5 x 10^3	5 x 10^3
	Volume Resistivity, 1000° C	D 1829	ohms-cm	--	--	--	--	--

Note: The information in this data sheet is for design guidance only. 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.

Note: In addition to the above compositions, STC offers a wide range of alternative materials. Please contact one of our applications engineers for material requirements that may not be shown above.

NSF STC AL998 is NSF 51 certified as suitable for use in commercial food equipment. US Patent 8679995 Addition of Magnesium Oxide to Zirconia Toughened Alumina