Superior Technical Ceramics

PROVIDING ADVANCED CERAMIC SOLUTIONS WORLDWIDE SINCE 1898

MAGNESIA STABILIZED ZIRCONIA (MSZ)

Transformation toughened zirconias such a Magnesia-Stabilized Zirconia have small precipitates of tetragonal phase which are formed inside of the cubic phase grains. These precipitates transform from the meta-stable tetragonal phase to the stable monoclinic phase when a crack attempts to propagate through the material. The result promotes toughness. Compared to YTZP, MSZ is more stable in high temperature (220C and above), high moisture environments.

PRIME FEATURES

- High mechanical strength
- High temperature resistance
- Very high wear resistence
- Very high impact resistence
- Very low thermal conductivity
- Thermal expansion suitable for ceramic-to-metal assemblies
- High chemical resistence (acids/bases)

TYPICAL APPLICATIONS

- Deep well, down hole components
- Wear parts
- Structural ceramics
- Precision valve seats and seals
- Roller guides for tube forming
- MWD tools
- Bushings
- Wear sleeves
- Pump pistons
- Pump sleeves
- Spray nozzles
- Ceramic bearings

Superior Technical Ceramics

PROVIDING ADVANCED CERAMIC SOLUTIONS WORLDWIDE SINCE 1898

MSZ SPECIFICATIONS

	Property	ASTM Method	Units	MSZ (Magnesia Stabilized) MSZ-200	MSZ (Magnesia Stabilized) MSZ-300
General	Crystal Size (Average)	Thin Section	Microns	30	30
	Color	--	--	Ivory	Yellow
	Gas Permeability	--	atms-cc/sec	gas tight $<10^{-10}$	gas tight $<10^{-10}$
	Water Absorption	C 20-97	%	0	0
Mechanical	Density	C 20-97	g/cc	5.72	5.72
	Hardness	Vickers 500 gm	GPa (kg/mm^2)	11.7 (1200)	11.7 (1200)
	Hardness	--	R45N	78	78
	Fracture Toughness	Notched Beam	MPam$^{1/2}$	12	12
	Flexural Strength (MOR) (3 point) @ RT°	F417-87	MPa (psi x 10^3)	620 (90)	586 (85)
	Tensile Strength @ RT°	--	MPa (psi x 10^3)	310 (45)	310 (45)
	Compressive Strength @ RT°	--	MPa (psi x 10^3)	1862 (270)	1862 (270)
	Elastic Modulus	C848	GPa (psi x 10^6)	206 (29.8)	206 (29.8)
	Poisson's Ratio	C848	--	0.28	0.28
Thermal	C.T.E. 25 - 100° C	C 372-96	x 10^{-6}/C	8.9	8.9
	C.T.E. 25 - 300° C	C 372-96	x 10^{-6}/C	9.7	9.7
	C.T.E. 25 - 600° C	C 372-96	x 10^{-6}/C	10.0	10.0
	Thermal Conductivity @ RT°	C 408	W/m K	3	3
	Max Use Temp (non-loading) (at high strength)	--	Farenheit (°F)	2200	2200
		--	Celcius (°C)	1200	1200
Electrical	Dielectric Strength (.125" Thick)	D 149-97A	V/mil	300	300
	Dielectric Constant @ 1 MHz	D 150-98	--	22.7	22.7
	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
	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}
	Volume Resistivity, 300° C	D 1829	ohms-cm	5 x 10^7	5 x 10^7
	Volume Resistivity, 500° C	D 1829	ohms-cm	1 x 10^7	1 x 10^7
	Volume Resistivity, 700° C	D 1829	ohms-cm	2 x 10^6	2 x 10^6
	Volume Resistivity, 1000° C	D 1829	ohms-cm	--	--

Form Revised: 8/11/2014

CONTACT US

Superior Technical Ceramics | 600 Industrial Park Rd. | St. Albans, VT 05478 | www.ceramics.net
Telephone: (802) 527-7726 | Fax: (802) 527-1181 | Email: sales@ceramics.net