Superior Technical Ceramics
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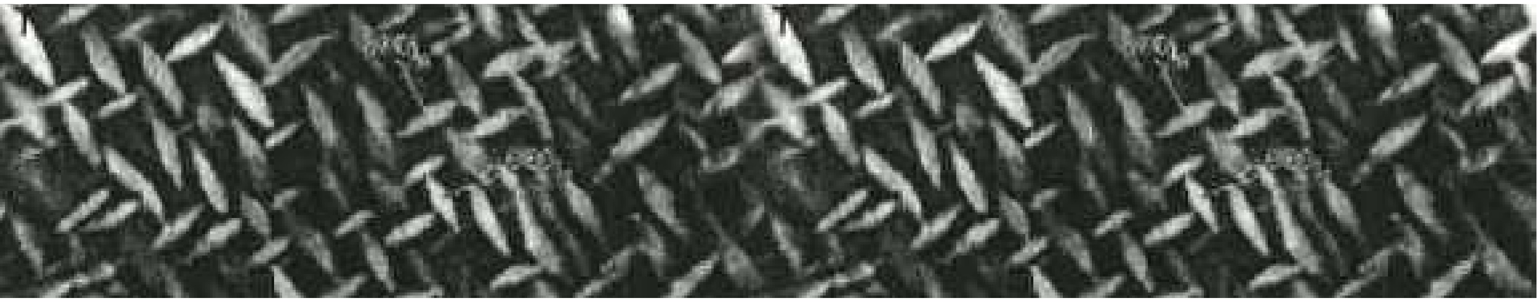
MAGNESIA STABILIZED ZIRCONIA (MSZ)

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 resistance
- Very high impact resistance
- Very low thermal conductivity
- Thermal expansion suitable for ceramic-to-metal assemblies
- High chemical resistance (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
- Solid oxide fuel cell components

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MAGNESIA STABILIZED ZIRCONIA SPECIFICATIONS

	Property	ASTM Method	Units	MSZ (Magnesia Stabilized)
General	Crystal Size (Average)	Thin Section	Microns	30
	Color	--	--	Ivory or Yellow
	Gas Permeability	--	atms-cc/sec	gas tight $<10^{-10}$
	Water Absorption	C 20-97	%	0
Mechanical	Density	C 20-97	g/cc	5.72
	Hardness	Vickers 500 gm	GPa (kg/mm^2)	11.7 (1200)
	Hardness	--	R45N	78
	Fracture Toughness	Notched Beam	MPam$^{1/2}$	12
	Flexural Strength (MOR) (3 point) @ RT	F417-87	MPa (psi x 10^3)	620 (90)
	Tensile Strength @ RT	--	MPa (psi x 10^3)	310 (45)
	Compressive Strength @ RT	--	MPa (psi x 10^3)	1862 (270)
	Elastic Modulus	C848	GPa (psi x 10^6)	206 (29.8)
	Poisson's Ratio	C848	--	0.28
Thermal	C.T.E. 25 - 100° C	C 372-96	x 10^{-6}/C	8.9
	C.T.E. 25 - 300° C	C 372-96	x 10^{-6}/C	9.7
	C.T.E. 25 - 600° C	C 372-96	x 10^{-6}/C	10.0
	Thermal Conductivity @ RT	C 408	W/m K	3
	Max Use Temp	--	Fahrenheit (°F)	2200
		--	Celsius (°C)	1200
Electrical	Dielectric Strength (.125" Thick)	D 149-97A	V/mil	300
	Dielectric Constant @ 1 MHz	D 150-98	--	22.7
	Dielectric Constant	D 2520-95	--	29.2
	@ Gigahertz			6.2
	Dielectric Loss @ 1 MHz	D 150-98	--	0.0016
	Dielectric Loss	D 2520-95	--	0.0018
	@ Gigahertz			6.2
	Volume Resistivity, 25°C	D 257	ohms-cm	> 1 x 10^{13}
	Volume Resistivity, 300° C	D 1829	ohms-cm	5 x 10^7
	Volume Resistivity, 500° C	D 1829	ohms-cm	1 x 10^7
	Volume Resistivity, 700° C	D 1829	ohms-cm	2 x 10^6

CONTACT US

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