



MAGNESIA STABILIZED ZIRCONIA (MSZ)

Transformation toughened zirconias such as 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



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 @ Gigahertz	D 2520-95	--	29.2
	Dielectric Loss @ 1 MHz	D 150-98	--	0.0016
	Dielectric Loss @ Gigahertz	D 2520-95	--	0.0018
	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

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

Superior Technical Ceramics products and services are subject to the Company's standard terms and conditions, available on request or at ceramics.net. For more information contact an authorized Superior Technical Ceramics representative. Unless noted otherwise, trademarks and service marks herein are the property of Superior Technical Ceramics and may be registered in the United States and/or other countries. Superior Technical Ceramics products named herein may be protected by one or more U.S. and/or foreign patents. For more information, contact sales@ceramics.net. Specifications are subject to change without notice. Superior Technical Ceramics sells its products and services in accordance with the terms and conditions set forth in the applicable contract between Superior Technical Ceramics and the client.