

## Silicon Nitride-based Ceramics

		Grades						
Properties *	Units	SP1300	TK4	BTN003	Ky1320	N51	N55	
Main Phase		$\alpha$ , $\beta$ sialon	$\alpha$ , $\beta$ sialon	$\beta$ -Si <sub>3</sub> N <sub>4</sub>	$\beta$ -Si <sub>3</sub> N <sub>4</sub>	$\beta$ -Si <sub>3</sub> N <sub>4</sub>	$\beta$ -Si <sub>3</sub> N <sub>4</sub>	
Density	g/cm <sup>3</sup>	3.28	3.35	3.29	3.23	3.3	3.2	
Mechanical	Vickers Hardness (HV10)	daN/mm <sup>2</sup>	-	-	-	1600	1620	
	Vickers Hardness (18.5kg)	GPa	18.2	20.2	15	15.5	-	
	Fracture Toughness	MPa.m <sup>1/2</sup>	7	7.6	8.5	7.6	7	8
	Bending Strength, 3-pt	MPa	-	-	-	-	700	1200
	Bending Strength, 4-pt	MPa	908	935	946	778	-	-
	Compressive Strength	MPa	-	-	-	-	3000	3000
	Young's Modulus	GPa	326	336	312	323	300	320
Thermal	Coeff. of Thermal Expansion, 25-1000 °C	x10 <sup>-6</sup> / K	3.6	3.57	3.96	-	3.8	3.2
	Thermal Conductivity	W/m.K	10.7	11	55.3	41.1	32	47
	Thermal Shock Resistance ( $\Delta T_C$ )	°C	415	357	832	559	-	-
	Max. Use Temperature	°C	1250	1250	1100	1100	1100	1100

\* The property data in this chart are representative of those grades. However, the property values may vary with processing method, size and shape of the part.

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## Oxide-based Ceramics

Properties *		Units	A61	Ky1615	AC5	Ky4300	Z55	Z56
Main Phase			Al <sub>2</sub> O <sub>3</sub>	Al <sub>2</sub> O <sub>3</sub> TiC/N ZrO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub> ZrO <sub>2</sub>	Al <sub>2</sub> O <sub>3</sub> SiC <sub>w</sub>	ZrO <sub>2</sub> Y <sub>2</sub> O <sub>3</sub>	ZrO <sub>2</sub> Al <sub>2</sub> O <sub>3</sub> Y <sub>2</sub> O <sub>3</sub>
Density	g/cm <sup>3</sup>		3.9	4.4	4	3.74	6.05	5.5
Vickers Hardness (HV10)	daN/mm <sup>2</sup>		1900	2000	1800	2000	1200	1450
Vickers Hardness (18.5kg)	GPa		-	-	-	-	-	-
Fracture Toughness	MPa.m <sup>1/2</sup>		4	6.5	6	7.7	10	8
Bending Strength, 3-pt	MPa		400	600	500	700	1200	1800
Bending Strength, 4-pt	MPa		-	-	-	-	-	-
Compressive Strength	MPa		2500	4300	4000	4300	2200	2300
Young's Modulus	GPa		390	380	360	400	200	260
Coeff. of Thermal Expansion, 25-1000 °C	x10 <sup>-6</sup> / K		7.8	7.7	7.8	7.5	10	9.5
Thermal Conductivity	W/m.K		25	35	23	36	2	3
Thermal Shock Resistance (ΔT <sub>C</sub> )	°C		-	-	-	-	-	-
Max. Use Temperature	°C		1600	600	1500	1600	1500	1500

\* The property data in this chart are representative of those grades. However, the property values may vary with processing method, size and shape of the part.

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