

Properties of Ceramic Materials

Material		Aluminium oxide Al_2O_3 99.7 %	Zirconium oxide $ZrO_2 - Y_2O_3$ PSZ	Silicon nitride SSN	Aluminium nitride AlN	Silicon carbide SiC - LPSSiC
Structure						
Density	g/cm^3	3.9	6.05	3.22	3.24	3.18
Open Porosity	%	0	0	0	0	0
Mechanical Properties						
Bending Test Strength	Mpa	400	1200	700	350	590
Hartness	HV	2100	1300	1550	1400	2990
Fracture Toughness	$Mpa \cdot m^{1/2}$	5.2	8	7	3.4	6.9
Elasticity Module	Gpa	390	200	290	310	
Weibull Module	m	12	22	15	10	12
Thermal Properties						
Maximal Application Temperature at Air	$^{\circ}C$	1700	1200	1450	1400	1600
Thermal conductivity at 100 degrees Celsius	$W/m \cdot ^{\circ}K$	30	2	40	140	30
Expansion Coefficient	$10^{\circ}K$	8,2	10,5	3,2	3,9	4,9
Temperature Variation Stab.	K	120	300	450	500	450
Electrical Properties						
Specific Electric Resistance at 20 degrees Celsius	$Ohm \cdot cm$	10^{14}	10^{10}	10^{11}	10^{12}	0.2 - 0.5
at 1000 degrees Celsius	$Ohm \cdot cm$	10^7	10^3	10^7		
Dielectric strength	KV/mm	>25			>25	

Depend of application, we can offer you a wide range of **Aluminium Oxide** in 99,7% - 99,5% - 97,6% - 60%, all in gas-proof quality, we can also offer 99,5% and 80% in porous quality .

Zirconium Oxide has among the engineering ceramics the highest mechanical strength and toughness at normal temperatures. It comes in different grades among others **Y_2O_3 stab. ZrO_2 , MgO stab. ZrO_2 and Zirconia toughened Alumina ZTA.**

The expansion rate of **Zirconia** is more or less similar to steel, so it can be applied as inserts in steel by means of a pressfit or shrinkfit if necessary.

Zirconia in general can be machined to very tight tolerances and we can even reach a surface finish of 0,006 microns.

The lifetime of **Zirconia** wearparts is remarkable and beats Tungsten Carbide in several applications. **Zirconia** can be described as a ceramic with a certain ductility which makes it suitable for springs, knives and optical fibre connectors. It is the "workhorse" within the extensive ceramic family.