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Advanced Technical Ceramic Solutions



## CeramaZirc *Sintered Zirconia*

**Dubbed 'ceramic steel' Zirconia ( $ZrO_2$ ) ceramic materials offers a combination of high hardness, wear and corrosion resistance while still maintaining one of the highest figures for fracture toughness amongst ceramic materials.**

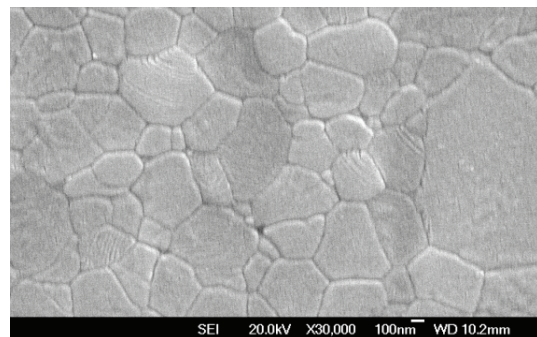
Precision Ceramics offers a range of Zirconia materials spanning from conventional sintered Zirconia to high performance Nano Zirconia consolidated by Hot Isostatic Pressing.

### Key properties of Zirconia ceramic

- Use temperatures up to 1000°C
- Low thermal conductivity
- Chemical inertness
- Resistance to molten metals
- Wear resistance
- High fracture toughness
- High hardness

### Typical Uses of $ZrO_2$

- High pressure equipment ball valve balls and seats
- High density ball grinding media
- Rollers and guides for metal forming
- Thread and wire guides
- Metal extrusion dies
- Deep well down-hole valves and seats
- Powder compacting dies
- Pump seals and shaft bearings
- Oxygen sensors
- High temperature induction furnace susceptors
- Fuel cell membranes
- High purity 3 mol.% Ytria Partially Stabilised Zirconia (3YSZ)
- Sintered to near theoretical density for enhanced reliability
- Excellent balance between hardness and toughness



### CeramaZirc

Density [ $g/cm^3$ ] = 6.05  
 Flexural Strength [MPa] = 850  
 Compressive Strength [MPa] = 2100  
 Young's Modulus [GPa] = 200  
 Poisson Ratio = 0.30  
 Hardness  $HV_{0.5}$  [GPa] = 12.5  
 Fracture toughness  $K_{Ic}$  [ $MPa/m^2$ ] = 8  
 Max use temperature [°C] = 1000  
 Thermal expansion coefficient [ $\times 10^{-6}/^\circ C$ ] = 10  
 Thermal conductivity [w/mK] = 2  
 Thermal shock resistance [ $\Delta T$  °C] = 250

\* $K_{Ic}$  toughness as measured by the Indentation method

N.B. Values presented are mean values for the samples tested and are given as an indication only for the purpose of comparing between different materials. The properties of the actual material might vary slightly and could be affected by the shape and size of the part.

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