



Belvac Ceramic Solutions



The No Compromise
Solution—
Highest Quality Zirconium
Ceramic Formulations

Key Benefits

Belvac combines state of the art Zirconia-based ceramic formulations with full vertically integrated world class manufacturing processes. The result is ceramic tooling with unsurpassed material quality, competitive pricing, and lead times that are designed to support customer production schedules.

Belvac provides a Broad range of ceramic tooling solutions for the Can Making Industry and Industrial Applications. A high quality, high precision, no compromise approach is the foundation to the manufacturing excellence behind the Belvac Brand of Zirconia based ceramic tooling.

Belvac produces two foundational formulations. Magnesia Stabilized Zirconia, or MgPSZ, has unprecedented fracture toughness, which makes it durable, reliable, and ideal for machining into complex shapes with tight tolerances.

Ytria Tetragonal Zirconia Polycrystal, or YTZP, is often specified for demanding applications that require a strong, hard material with a near-flawless microstructure.

Features

- Food, Beverage, and Aerosol
- Aluminum and Steel Applications
- Necker, Shaper, Bodymaker, Cupper
- Rods
- Wire Drawing
- Oil and Gas
- Valves and Pumps
- Machinery and Forming
- Other Industrial Applications
- Vertically Integrated Manufacturing
- Near-Flawless Microstructure
- Excellent Corrosion Resistance
- Superior Abrasion and Cavitation Resistance



Belvac's Zirconia Ceramics have many distinctive advantages over other tooling materials. Belvac Zirconia ceramic materials provide excellent corrosion resistance, outstanding toughness, excellence strength, and superior abrasion and cavitation resistance.



Technical Specifications		Belvac Ceramic Solutions		
Property	Test Method	Units	Y-TZP Hip'd	MgPSZ
Color			White	Ivory
Chemistry (%)				
ZrO ₂ +HfO ₂ +MgO	ICP	Wt. %		
ZrO ₂ +HfO ₂ +Y ₂ O ₃	ICP	Wt. %	99.7	
Al ₂ O ₃	ICP	Wt. %	0.25	<.1
Other	ICP	Wt. %	<.1	<.3
Density	ASTM-373	g/cm ³	6.08	5.82
Apparent Porosity	ASTM-373	%	0	1
Water Absorption	ASTM-373	%	0	0
Flexural Strength	ASTM C1161-02C	MPa	1600	600
Elastic Modulus	ASTM C1198	MPa	210	200
Poisson's Ratio	ASTM C1198		0.30	0.30
Compressive Strength (RT)	ASTM C773	MPa	2500	1750
Hardness (HV 1.0 kg)	ASTM-C1327	GPa	13	11.5
Hardness (Rockwell 45N)	ASTM-E18		81	75.0
Fracture Toughness (K _{1C})	ASTM-C1421 A4; Notched Beam	MPa.M ^{1/2}	5	10
Thermal Conductivity	ASTM-E2585	W/(m*K)	2.5	2.5
Specific Heat (RT)	ASTM-E2585	J/(kg*K)	450	450
Coeff. of Therm. Exp. (RT to 1000 C)	ASTM-E228	E-06 1/K	10.5	10.5
Volume Resistivity (RT)	ASTM-D257	ohms-cm E+11	>10	>10
Grain Size	ASTM-E112	microns	0.5	50

Belvac 17A



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