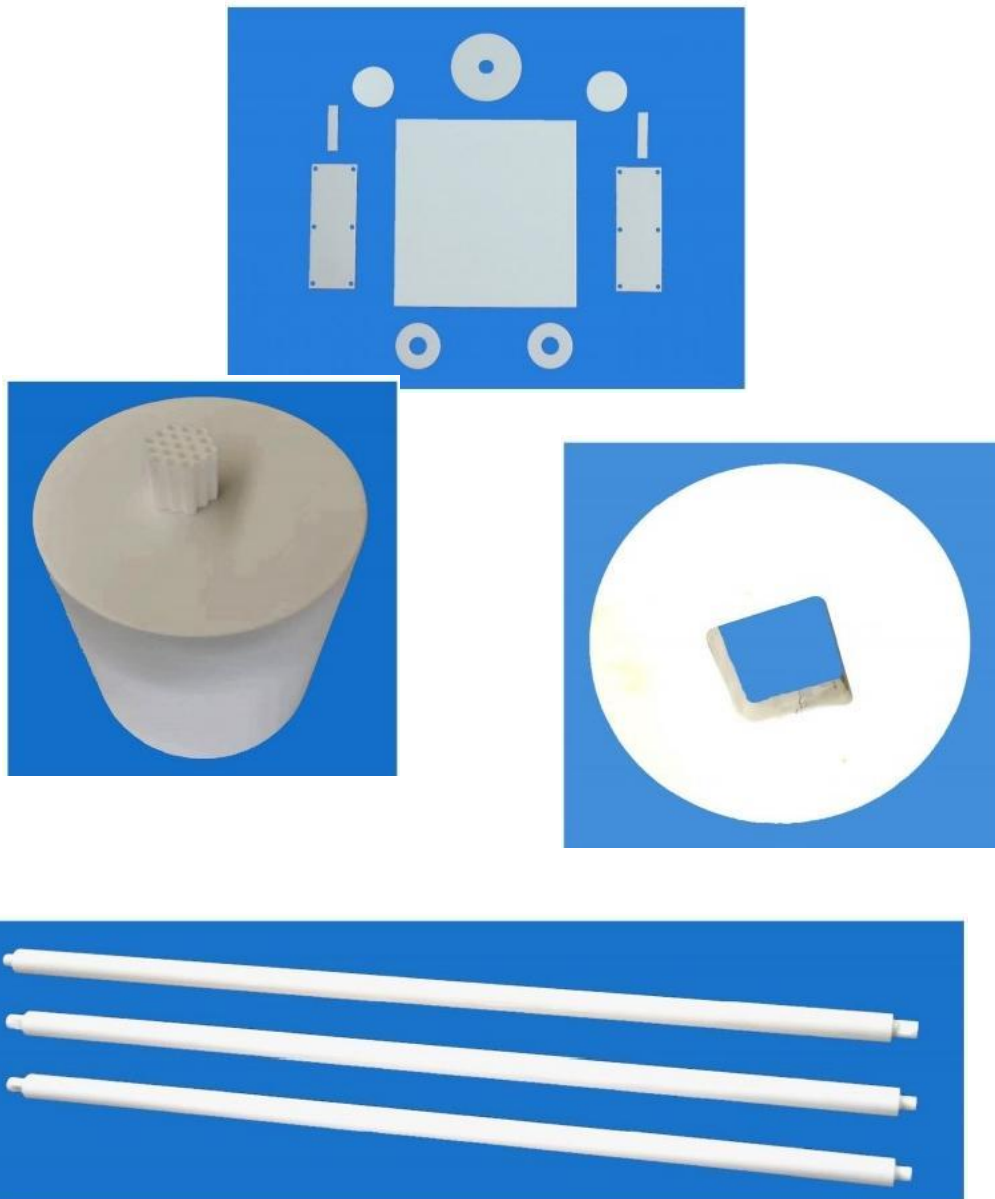


BeO Substrate



BeO Ceramic Materials Performance Indexes

Item	Test condition	Index		Unit
		B-97	B-99	
Dielectric constant	1MHz	6.9±0.4	6.9±0.4	
	(10±0.5) GHz			
Dielectric loss angle tangent value	1MHz	≤4×10	≤4×10	
	(10±0.5) GHz	≤8×10	≤8×10	
Volume resistivity	25°C	≥10 ⁴	≥10 ⁴	Q.cm
	300°C	≥10 ¹	≥10 ¹	
Breaking strength	D.C	≥15	≥20	kV/mm
Flexural strength	—	≥170	≥190	MPa
Average coefficient of linear expansion	25°C~500°C	(7.0~8.5)×10 ⁴	(7.0~8.5)×10 [*]	1/K
Heat conductivity	25°C	≥200	≥260	W/m.K
	100°C	≥160	≥190	
Thermal shock resistance	0°C~800°C	Should be no cracks		
Volume density	—	≥2.85	≥2.85	g/cm ³
Chemical stability	1:9HCL	≤0.3	≤0.3	mg/cm
	10%NaOH	≤0.2	≤0.2	
Airtightness	—	≤10×10 ⁻¹	≤10×10 ⁻¹	Pa.m ³ /s
Average crystalline grain size	—	12~30	12~30	μ m

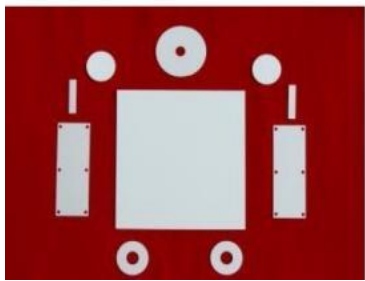
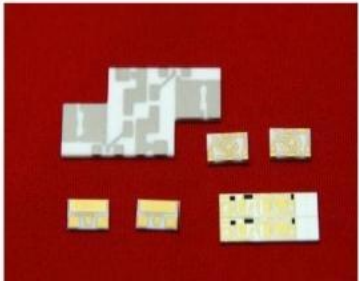
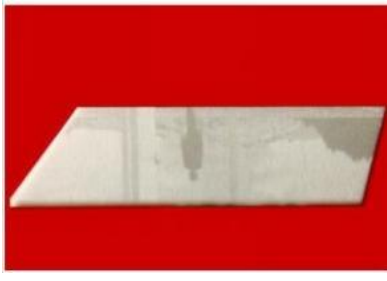
Metallized BeO Ceramics Main Performance Index

S/N	Item	Test condition	Main indicators	Unit
1	Plated thickness		nickel-plate layer:3~8 tin-plate layer:5~8 gold-plated layer: 1.3~5.7	μm
2	Tensile strength	Q/RZ 533A-2008	≥ 8	MPa
3	Seal strength	SJ/T 3326-2016	≥ 30	MPa
4	Insulation resistance	GJB 360A-1996	≥ 10000	M Ω

Attenuation Ceramic Material Performance Indicators

S/N	Item	Test condition	Unit	Material (grade number) index		
				B-99(AT)		B-97(BT)
				I level	II level	III level
1	Complex dielectric constant	10GHz	ϵ'	8.0~9.0	8.0~9.5	8.0~9.5
	Dielectric loss angle tangent		$\tan \delta$	>0.3	>0.4	>0.3
2	Flexural strength	—	MPa	≥ 160	≥ 140	≥ 140
3	Average coefficient of linear expansion	25°C~500°C	1/K	(7.0~8.5) $\times 10$		
4	Heat conductivity	25°C	W/m.K	≥ 120	≥ 110	≥ 90
		100°C		≥ 100	≥ 90	≥ 70
5	Thermal shock resistance	0°C~800°C		Should be no cracks		
6	volume density	—	g/cm	≥ 2.80	≥ 2.80	≥ 2.80
7	Water absorption		%	<1	<1	<1

BeO Ceramics Typical Products

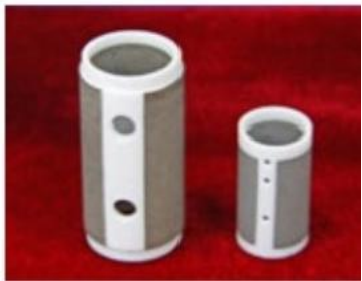


B-99 BeO ceramics	B-99 BeO ceramics	B-99 BeO ceramics
Substrates (import substitution)	Metallized substrates	Polished substrates (import substitution)
		
<p>Size:1-114mm Thickness:0.2-20mm Color:white Dielectric constant(1MHz): 6.9±0.4 Heat conductivity(25°C): ≥260W/m.K Volume density: ≥2.85g/cm³ Volume resistivity: ≥10Q.cm Dielectric loss angle tangent value: ≤4×10 Breaking strength:≥50 kV/mm Flexural strength:≥190 MPa working temperature: -40°C~+1600°C</p> <p>Purpose:Solid-state electronics, various high-power devices, optical communication</p>	<p>Size:1-114mm Thickness:0.2-20mm Color:white Main material of metal layer: tungsten manganese Metal layer thickness: 10-30um Nickel layer thickness: 2-5um Gold layer thickness:0.8-1.2um Tensile strength of the metal layer: ≥20 MPa working temperature: -40°C ~+900°C</p> <p>Purpose:Solid-state electronics, various high-power devices, optical communication</p>	<p>Size:1-51mm Thickness:0.2-1mm Color:white Dielectric constant(1MHz): 6.9±0.4 Heat conductivity(25°C): ≥260W/m.K Volume density: ≥2.85g/cm³ Volume resistivity: ≥10¹⁴Ω.cm Dielectric loss angle tangent value: ≤4×10 Breaking strength:≥50 KV/mm Flexural strength:≥190 MPa working temperature: -40°C~+1600°C</p> <p>Purpose:Solid-state electronics, various high-power devices, optical communication</p>

BeO Ceramics Typical Products



B-99 BeO ceramics	B-99 BeO ceramics	B-99 BeO ceramics
Ceramic rod (import substitution)	Ceramic tile (import substitution)	Ceramic post (import substitution)
		
<p>Length size:1-300mm Width:0.3-2mm Color:white Dielectric constant(1MHz): 6.9 ± 0.4 Heat conductivity(25°C): $\geq 260 \text{ W/m.K}$ Volume density: $\geq 2.85 \text{ g/cm}^3$ Volume resistivity: $\geq 10^4 \text{ Q.cm}$ Dielectric loss angle tangent value: $\leq 4 \times 10^4$ Breaking strength: $\geq 50 \text{ kV/mm}$ Flexural strength: $\geq 190 \text{ MPa}$ working temperature: $-40^\circ\text{C} \sim +1600^\circ\text{C}$ Purpose: High power travelling wave tube</p>	<p>Size:customization Color:white Dielectric constant(1MHz): 6.9 ± 0.4 Heat conductivity(25°C): $\geq 260 \text{ W/m.K}$ Volume density: $\geq 2.82 \text{ g/cm}$ Volume resistivity: $\geq 10^4 \text{ Q.cm}$ Dielectric loss angle tangent value: $\leq 4 \times 10^4$ Breaking strength:$\geq 50 \text{ kV/mm}$ Flexural strength:$\geq 190 \text{ MPa}$ working temperature: $-40^\circ\text{C} \sim +1600^\circ\text{C}$ Purpose: High power travelling wave tube</p>	<p>Size:customization Color:white Dielectric constant(1MHz): 6.9 ± 0.4 Heat conductivity(25°C): $\geq 260 \text{ W/m.K}$ Volume density: $\geq 2.85 \text{ g/cm}^3$ Volume resistivity: $\geq 10^4 \text{ Q.cm}$ Dielectric loss angle tangent value: $\leq 4 \times 10^4$ Breaking strength:$\geq 50 \text{ kV/mm}$ Flexural strength:$\geq 190 \text{ MPa}$ working temperature: $-40^\circ\text{C} \sim +1600^\circ\text{C}$ Purpose:High power electronic devices</p>

BeO Ceramics Typical Products

B-99 BeO ceramics	B-99 BeO ceramics	B-99 BeO ceramics
Ceramic tube (import substitution)	Crucible	Dysmorphism
		
<p>Size:customization Color:white Dielectric constant (1 MHz): 6.9 ± 0.4 Heat conductivity(25°C): $\geq 260\text{W/m K}$ Volume density: ≥ 2.85 g/cm³ Volume resistivity: $\geq 10^{10}$ $\Omega\cdot\text{cm}$ Dielectric loss angle tangent value: $\leq 4\times 10^{-4}$ Breaking strength: ≥ 50 kV/mm Flexural strength:≥ 190 MPa working temperature: -40°C~+900°C Purpose:Vacuum devices</p>	<p>Size:customization Color:white Dielectric constant (1 MHz): 6.9 ± 0.4 Heat conductivity(25°C): $\geq 240\text{W/m.K}$ Volume density: ≥ 2.8 g/cm³ Volume resistivity: $\geq 10^{10}\Omega\cdot\text{cm}$ Dielectric loss angle tangent value: $\leq 4\times 10^{-4}$ Breaking strength: ≥ 50 kV/mm Flexural strength: ≥ 190 MPa working temperature: -40°C~+1600°C Purpose:Smelting</p>	<p>Material: B-99 AT I grade Q / RZ20143 Technical conditions: comply with GB9531.6 regulations With high size precision, large mechanical strength, small discharge volume, high heat conductivity, good thermal stability, and we can make other specifications of attenuated ceramic products according to user requirements</p>