MATERION

Data Sheet

Advanced Ceramics Material Properties*

Our beryllium oxide (BeO) and aluminum oxide (Al_2O_3) ceramic materials are ideal for addressing challenges in power electronics, semiconductor manufacturing and more. Learn more about the properties of our advanced technical ceramics.

			Thermalox® 995	BW 1000®	BW3250®	Thermalox CR	Durox® 98	Durox AL
			General Purpose	High Strength	Extra-High Thermal Conductivity	Crucible Material	High Purity	High Purity
	Property	Units	99.5% BeO	99.5% BeO	99.5% BeO	99.7% BeO	97.6% Al_2O_3	99.8% Al_2O_3
Physical	Color		White	White	Variable	Light Grey	Off White	Off White
	Density	g/cm^3	2.85	2.89	2.92	2.85	3.83	3.94
	Grain Size	micron	15	Max: 14 Typical: 9 to 12	22	25	2	2
	Hardness	Rockwell 45N	60	60	60	60	85	85
	Gas Impenetrability	cc/sec He	10^{-8}	10^{-8}	10^{-8}	10^{-8}	10^{-8}	10^{-8}
	Water Absorption	Percentage	0%	0%	0%	0%	0%	0%
Thermal	Thermal Conductivity	W/m•K (at RT)	285	275	325	250	27	30
	Coefficient of Thermal Expansion	10^{-6}/°C (RT to 1000°C)	9	9	9	9	7.5	8
	Specific Heat	cal/g°C	0.25	0.25	0.25	0.25	0.20	0.20
Mechanical	Flexural Strength (MOR)	MPa	221	262	207	207	379	379
	Elastic Modulus	GPa	345	345	345	345	351	360
	Tensile Strength	MPa	152	172	152	124	152	276
	Compressive Strength	MPa	1,551	1,551	1,551	1,551	2,413	2,413
	Poisson's Ratio		0.26	0.26	0.26	0.26	0.22	0.22
	Fracture Toughness (K_{Ic})	$MPa\sqrt{m}$	3.5	3.7	3.5	3.7	4	4
Electrical	Dielectric Constant	1 MHz (at RT)	6.76	6.76	6.76	6.76	9.5	9.7
	Dielectric Constant	10 GHz (at RT)	6.67	6.67	6.67	6.67	9.4	9.6
	Dissipation Factor	1 MHz (at RT)	0.0004	0.0004	0.0004	0.0004	0.0001	0.0001
	Dissipation Factor	10 GHz (at RT)	0.004	0.004	0.004	0.004	0.0001	0.0001
	Volume Resistivity	Ω-cm (at RT)	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$	$>10^{15}$
	AC Dielectric Strength	V/mil (6.35 mm)	230	230	230	230	220	220

*Typical property values are shown unless otherwise noted. Actual values may vary with size, shape and method of manufacture.

Health and Safety

Processing beryllium-containing alloys poses a health risk if safe practices are not followed. Inhalation of airborne beryllium can cause serious lung diseases in some individuals. Occupational safety and health regulatory agencies worldwide have set mandatory limits on occupational respiratory exposures. Read and follow the guidance in the Safety Data Sheet (SDS) before working with this material. The SDS and additional important beryllium health and safety information and guidance can be found at berylliumsafety.com, berylliumsafety.eu and Materion.com. For questions on safe practices for beryllium-containing alloys, contact the Materion Product Stewardship Group at +1.800.862.4118 or contact us by email at Materion-PS@Materion.com.

Disclaimer

Only the buyer can determine the appropriateness of any processing practice, end-product, or application. Materion does not make any warranty regarding its recommendations, the suitability of Materion's product, or its processing suggestions for buyer's end product, application, or equipment.

The properties presented on this data sheet are for reference purposes only, intended only to initiate the material selection process. They do not constitute, nor are they intended to constitute, a material specification. Material will be produced to one of the applicable industry standards, if any, listed in the Industry Standards and Specification section.

Actual properties may vary by thickness and/or part number. Please contact your local sales engineer for detailed properties to be used in simulation.

Any properties marked as preliminary are subject to change at any time as the manufacturing process is further refined.

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