

## BrushCAST® Copper Beryllium Casting

The extraordinary manufacturing and performance characteristics of Materion BrushCAST Copper Beryllium Casting Alloys offer significant advantages in demanding commercial, industrial and aerospace component applications. The Materion BrushCAST family of casting alloys offers component design engineers a broad range of material solutions that meet the quality, reliability and high technology requirements of today's global marketplace.

The unique combination of physical and mechanical properties of copper beryllium casting alloys provides a dynamic range of metallurgical alternatives to meet specific performance requirements. The strength, hardness, conductivity and castability of these materials make them ideal for applications which require a high-performance engineered material solution. Advancements in component casting technology and proprietary material production technology have resulted in BrushCAST alloys being a cost-effective design choice.

BrushCAST alloys are available in precise measurements. BrushCAST master alloy and cast billet are also available.

### High Strength Casting Alloys: 275C, 165C, 21C and 20C

BrushCAST high strength casting alloys provide peak strength and hardness greater than many steels but with thermal conductivity similar to that of aluminum and up to five times that of steel. Additionally, these alloys offer good electrical conductivity, excellent wear and galling resistance, and the highest accuracy in replicating fine detail in cast components.

### High Conductivity Casting Alloy: 3C

Alloy 3C offers excellent electrical and thermal conductivity, good strength and galling resistance and accurate replication of component detail. Alloy 3C offers nearly three times the conductivity of the high-strength alloys, twice the thermal conductivity of aluminum alloys, and ten times that of steel.

### Fine Grain Casting Alloys: 275CT, 165CT and 20CT

BrushCAST high-strength casting alloys are available in fine grain equivalents. Material properties and manufacturing characteristics are similar to those of the standard casting alloys. Grain refinement is achieved through precise additions of either cobalt or titanium. Our fine grain casting alloys are preferred in applications where excellent surface finish characteristics are required in the cast product.

## Table 1: BrushCAST Copper Beryllium Casting Alloy Physical Properties

BrushCAST Alloy	UNS No.	Density		Elastic Modulus		Thermal Expansion Coefficient		Thermal Conductivity (20°C)		Electrical Conductivity
		lb/in <sup>3</sup>	g/cm <sup>3</sup>	10 <sup>6</sup> psi	GPa	in/in/°F (70 - 400°F)	m/m/°C (20 - 200°C)	BTU/(ft hr °F)	W/m °C	% IACS
3C	C82200	.319	8.83	20	140	10 x 10 <sup>-6</sup>	18 x 10 <sup>-6</sup>	144	250	45 - 50
165C, 165CT	C82400	.304	8.41	19	130	10 x 10 <sup>-6</sup>	18 x 10 <sup>-6</sup>	58	58	20 - 25
20C, 20CT	C82500	.300	8.30	19	130	10 x 10 <sup>-6</sup>	18 x 10 <sup>-6</sup>	56	56	18 - 25
21C	C82510	.300	8.30	19	130	10 x 10 <sup>-6</sup>	18 x 10 <sup>-6</sup>	56	56	18 - 25
275C, 275CT	C82800	.294	8.14	19	130	10 x 10 <sup>-6</sup>	18 x 10 <sup>-6</sup>	52	52	17 - 23

## Table 2: BrushCAST Copper Beryllium Casting Alloy Mechanical Properties

BrushCAST Alloy	Temper	Yield Strength (0.2% Offset)		Tensile Strength		Elongation (%)	Rockwell Hardness
		ksi	MPa	ksi	MPa		
3C	As Cast	25 - 45	170 - 240	55 - 60	380 - 410	15 - 25	B55 - 65
	As Cast & Aged	40 - 55	280 - 380	60 - 75	410 - 520	10 - 20	B75 - 90
	Solution Annealed & Aged	70 - 80	480 - 550	90 - 100	620 - 690	5 - 10	B92 - 100
165C, 165CT	As Cast	35 - 40	240 - 280	70 - 75	655 - 720	20 - 25	B74 - 82
	As Cast & Aged	65 - 75	450 - 520	95 - 105	450 - 520	10 - 20	C20 - 24
	Solution Annealed & Aged	135 - 145	930 - 1000	145 - 155	1000 - 1070	2 - 4	C34 - 39
20C, 20CT, 21C	As Cast	40 - 50	280 - 345	75 - 85	520 - 590	15 - 30	B80 - 85
	As Cast & Aged	70 - 75	480 - 520	100 - 105	690 - 720	10 - 20	C20 - 24
	Solution Annealed & Aged	120 - 150	830 - 1030	150 - 175	1030 - 1210	1 - 3	C38 - 43
275C, 275CT	As Cast	50 - 60	345 - 410	85 - 90	590 - 620	5 - 25	B80 - 90
	As Cast & Aged	60 - 70	410 - 480	95 - 105	655 - 720	10 - 15	C20 - 25
	Solution Annealed & Aged	165 - 180	1140 - 1240	180 - 195	1240 - 1340	0.5 - 3	C43 - 47

## 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](http://berylliumsafety.com), [berylliumsafety.eu](http://berylliumsafety.eu) and [Materion.com](http://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](mailto:Materion-PS@Materion.com).

## Related Information

Additional technical (melting, casting, heat treating, etc.) or safe handling information on BrushCast Alloys may be obtained by phoning +1.800.375.4205. For pricing and availability, phone +1.800.521.8800.

### 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.