

## BrushCAST® Copper Beryllium Casting Alloys

The extraordinary manufacturing and performance characteristics of Materion Performance Alloys BrushCAST Copper Beryllium Casting Alloys offer significant advantages in demanding commercial, industrial, and aerospace component applications. Materion Performance Alloys 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 provide a dynamic range of metallurgical alternatives to meet specific performance requirements. The inherent 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 pioneered by Materion Performance Alloys have resulted in BrushCAST alloys being a cost effective design choice.

**BrushCAST alloys are available in precise measurement, easy to use shot. 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 & galling resistance, and accurate replication of component detail. Alloy 3C offers nearly 3 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     |     | Average Coefficient of Thermal Expansion |                       | Thermal Conductivity at 70°F /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 (percent) | 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            |

**Safe Handling of BrushCAST Copper Beryllium Alloys**

Handling BrushCAST copper beryllium alloys in solid form poses no special health risk. Like many industrial materials, beryllium-containing materials may pose a health risk if recommended safe handling practices are not followed. Inhalation of airborne beryllium may cause a serious lung disorder in susceptible individuals. The Occupational Safety and Health Administration (OSHA) has set mandatory limits on occupational respiratory exposures. Read and follow the guidance in the Safety Data Sheet (SDS) before working with this material. For additional information on safe handling practices or technical data on BrushCAST contact Materion Performance Alloys Customer Technical Service Department at 800-375-4205.

**RELATED INFORMATION**

Additional technical (melting, casting, heat treating, etc.) or safe handling information on BrushCast Alloys may be obtained by phoning 800-375-4205. For pricing and availability, phone 800-521-8800, or the local sales number listed on the bottom of this page.

**North American Service Centers – Sales Inquiries**

For bar, tube, plate/sheet >0.060” (1.5 mm) thick and rod >0.5” (12.7 mm) diameter:

**Warren, MI**

TOLL FREE: 800-521-8800  
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