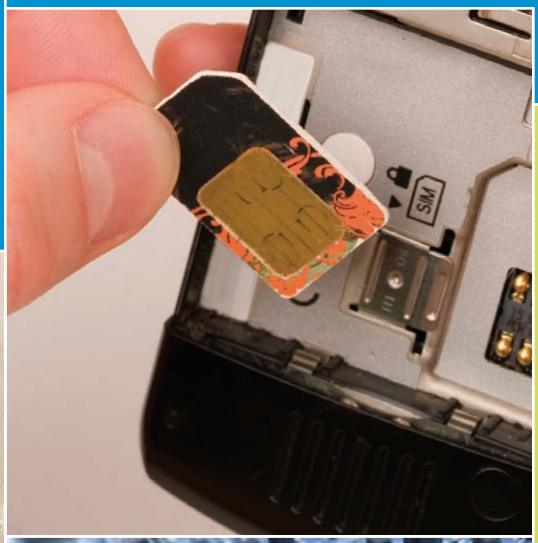
MATERION

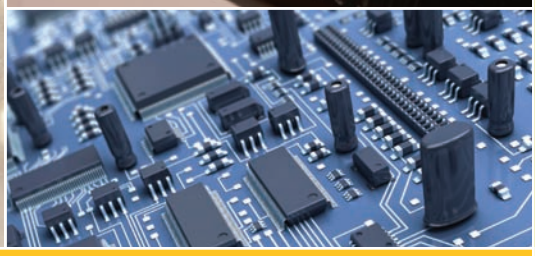
BRUSH PERFORMANCE ALLOYS

COMPUTER, DATACOM, AND TELECOMMUNICATIONS

BRUSH 60®

SOLUTIONS DELIVERED





Brush 60® is a new generation, high conductivity, copper beryllium alloy which is specifically engineered to meet the stringent electrical and mechanical requirements of computer, datacom, and telecommunications applications. The market demand for smaller, lighter products is reducing the available design space resulting in smaller footprints and lower profiles. Simultaneously signal frequencies and power consumption are increasing. In these environments, signal integrity and thermal management become critical. Brush 60®, a pre-hardened alloy, uses advanced metallurgy and processing techniques to satisfy these performance requirements while meeting the cost targets of the most demanding designs.

PERFORMANCE BENEFITS

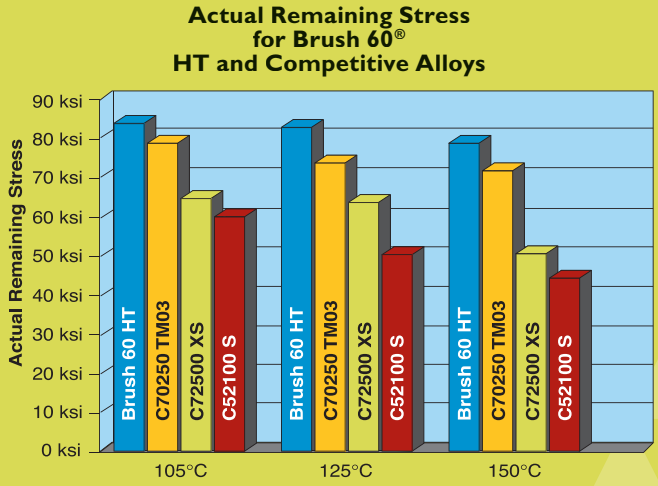
Signal Reliability – High contact force and lower resistivity improve signal transfer.

Durability – Minimal stress relaxation at elevated temperatures ensures maximum retention of normal force for superior life cycle reliability.

Design Flexibility – Outstanding formability provides freedom to create intricate parts without sacrificing yield strength.

Manufacturability – Exceptional consistency of dimensional and mechanical properties allows stamping presses to run at higher speeds with fewer tooling adjustments. Brush Performance Alloys can routinely guarantee Cpk values equal to or greater than 1.50 on critical material properties.

Recyclability – By-products of stamping operations are a valuable resource which can be recycled.



Miniaturization and increased signal frequencies have resulted in higher operating currents and greater operating temperatures.

When elevated temperatures result in stress relaxation, contact force falls, leading to increased contact resistance, greater signal distortion, higher impedance, and signal propagation delay.

Brush 60® provides critical advantages to designers concerned with reliability and end-of-life performance. Due to its outstanding stress relaxation characteristics, Brush 60® is able to retain a greater amount of normal force over the life of the connector **(Figure 1)**.

Figure 1. Actual Remaining Stress of Brush 60® HT vs. competitive alloys. Materials initially stressed to 75% of mean yield strength. Results shown after 1000 hours at constant temperature.

Note: For detailed graphs of stress relaxation, contact Brush Performance Alloys Technical Service.

CHEMICAL COMPOSITION

UNS C17460	Weight Percent
Beryllium (Be)	0.15-0.50
Copper (Cu)	Balance
Nickel (Ni)	1.0-1.4
Tin (Sn)	0.25 max
Zirconium (Zr)	0.5 max

Health & Safety – Handling copper beryllium 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 Material Safety Data Sheet (MSDS) before working with this material. For additional information on safe handling practices or technical data on copper beryllium, contact **Materion Brush Performance Alloys, Technical Service Department at 800.375.4205.**

RoHS COMPLIANT

MECHANICAL AND PHYSICAL PROPERTIES

Temper	Yield Strength		Tensile Strength		Elong.	Formability (R/t)		Electrical Conductivity	Electrical Resistivity	Elastic Modulus	Density	Hardness HV
	ksi	N/mm²	ksi	N/mm²	% min	Long.	Trans.	(min)	(max)			
3/4 HT	95-115	655-795	115-135	795-930	11	0.7	0.7	50% IACS 29 m/ohm-mm²	20.8 circ mil/ft 3.45 µohm • cm	20 x 10⁶ psi 138 kN/mm²	0.318 lb/in³ 8.80 gm/cm³	220-280
HT	105-125	720-860	120-140	825-965	10	1.5	1.5	50% IACS 29 m/ohm-mm²	20.8 circ mil/ft 3.45 µohm • cm	20 x 10⁶ psi 138 kN/mm²	0.318 lb/in³ 8.80 gm/cm³	230-290

ALLOY COMPARISONS

Alloy	UNS Number	Temper	Yield Strength		Conductivity	Elongation	Formability (R/t)		Modulus	Hardness HV
			ksi	N/mm²	(% IACS)	(% min)	Long.	Trans.	10⁶ psi	
Brush 60®	C17460	3/4 HT	95-115	655-795	50	11	0.7	0.7	20	220-280
Brush 60®	C17460	HT	105-125	720-860	50	10	1.5	1.5	20	230-290
7025	C70250	TM03	95-120	655-825	40	5	2.5	2	19	200-250
7026	C70260	S	95	655	40	6	0.5	1	19	200
725	C72500	XS	95	655	11	1 max	2	3	20	190-240
521	C52100	S	106	730	13	3	2	7	16	230-270
K55	C70250	R690	95-120	655-825	40	5	2	2	19	220-260
688	C68800	H	101	696	18	4	2	2	16.8	255
654	C65400	XH	109	751	7	4	2	3.5	17	213-235

A comparison of Brush 60® with other high performance alloys is shown in the above alloy comparison table. Brush 60® offers an excellent combination of elastic modulus, strength, formability, and conductivity which are key material properties required in today's high frequency connector designs.

For more information about our products, please call **Materion Brush Performance Alloys Customer Technical Service** at **800.375.4205** or visit us at **www.materion.com/brushalloys**

MATERION

ABOUT MATERION

Materion is the new name for Brush Engineered Materials Inc., its Brush Wellman Inc. subsidiary, and all of the company's businesses worldwide. Materion is among the world's premier providers of advanced materials solutions and services. Now under the one Materion brand, we are better aligned to deliver a broader scope of products, services and expertise needed to drive our customers' growth and profitability and become their first choice in a partner. Materion Corporation common stock trades on the New York Stock Exchange under the symbol MTRN.

MATERION BUSINESSES

Advanced Chemicals
Barr Precision Optics & Thin Film Coatings
Brush Beryllium & Composites
Brush Performance Alloys
Ceramics
Electrofusion
Large Area Coatings
Microelectronics & Services
Natural Resources
Technical Materials

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