

Brush 1916 The Machinable Copper Nickel Alloy

Brush 1916 is a heat-treatable leaded copper alloy engineered specifically for automatic screw machine and cold forming applications. With a machinability index of 70, Brush 1916 also provides high strength, good machinability, good conductivity, excellent surface finish, close diameter control, and microstructural consistency. The properties of Brush 1916 make it an ideal material for machined or formed electrical contacts, connector pins and sockets.

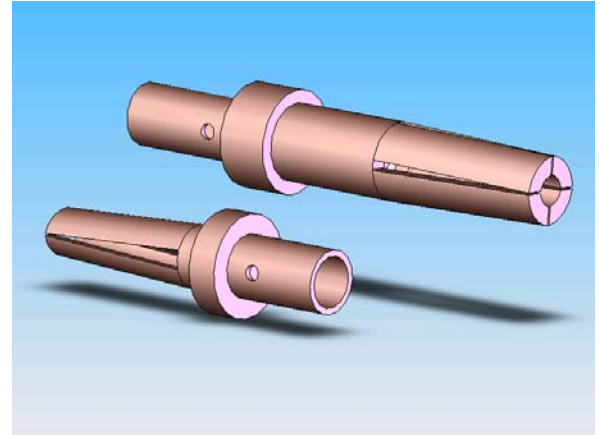


FIGURE 1: CHEMICAL COMPOSITION (WEIGHT %)

UNS NO.	NICKEL	LEAD	PHOSPHORUS	COPPER
C19160	0.8-1.2	0.8-1.2	0.15-0.35	Balance

FIGURE 2: PHYSICAL PROPERTIES

Density	Coefficient of thermal expansion (68 to 212 °F, 20 to 100 °C)	Thermal conductivity (68 °F, 20 °C)	Electrical conductivity (HT condition)
0.320 lb/in ³ 8.88 g/cm ³	$9.8 \times 10^{-6} \text{ } ^\circ\text{F}^{-1}$ $17.7 \times 10^{-6} \text{ } ^\circ\text{C}^{-1}$	120 BTU/ft hr °F 210 W/m °C	50% IACS $29 \times 10^6 \text{ S/m}$

FIGURE 3: MECHANICAL PROPERTIES

TEMPER	SIZE RANGE (inch)	ROD			WIRE		
		ULTIMATE TENSILE STRENGTH (ksi)	YIELD STRENGTH 0.2% OFFSET (ksi)	ELONGATION (%)	ULTIMATE TENSILE STRENGTH (ksi)	YIELD STRENGTH 0.2% OFFSET (ksi)	ELONGATION (%)
A	0.030-0.625	30-50	10-40	35-55	25-50	5-25	40-60
AT	0.030-0.625	50-70	25-50	20-45	50-70	25-50	25-45
H	0.030-0.4375	55-75	45-70	1-20	50-75	35-65	1-20
	> 0.4375-0.625	40-65	25-55	1-20	40-65	25-55	1-20
HT	0.030-0.4375	80-105	70-95	4-30	80-105	70-100	4-30
	> 0.4375-0.625	70-100	55-85	4-30	75-105	65-90	4-30

Annealed Temper (A) is the softest form available for applications where maximum formability is required. Precipitation hardened (AT) properties are obtained by heat treatment, performed by the customer, after forming.

Hard Temper (H) is cold worked to increase strength; however, formability is decreased. H temper material can also be heat treated to obtain peak (HT) properties after forming. H tempers are commonly used for cold-heading operations.

Heat Treated Temper (HT) provides maximum properties after heat treatment. H temper product can be heat treated by the user to obtain HT properties. Mill hardened HT material can also be purchased from Materion Brush Performance Alloys and is generally the most cost effective temper.

Heat Treatment

The recommended heat treatment cycle for Brush 1916 is 700 °F for 3½ hours. Additional heat treatment information is available from Materion Brush Performance Alloys.

Machining

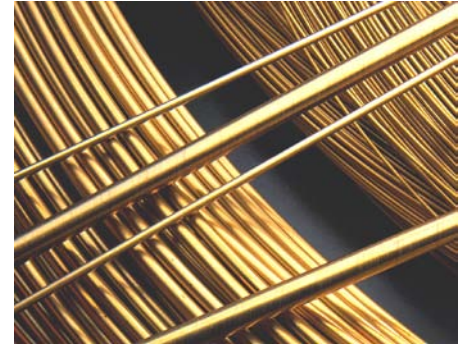
The addition of lead in the Brush 1916 alloy composition allows for chip control in turning and drilling operations, making the alloy ideal for automatic machining. Brush 1916 machines readily at feeds and speeds used for other leaded copper alloys. High speed steel and carbide tools are recommended for all machining operations.

Availability

Brush 1916 is available in rod or wire in diameters beginning at 0.030" and up to 0.625". Diameter tolerances are closely held, usually within ½ of the allowable limits defined in ASTM B 249 and B 250.

Diameter Tolerance, inches			
Over	to	Incl	Diameter (+/-) O.O.R.
0.0300	0.0800		0.0005 0.0005
0.0800	0.2500		0.0008 0.0008
0.2500	0.3125		0.0010 0.0010
0.3125	0.4375		0.0015 0.0015
0.4375	0.6250		0.0020 0.0020

Wire is available in coils up to 300 pounds and rod is provided in straight lengths up to 12 feet. Rod straightness is 0.010" per 18" length. Custom shapes are available upon request.



Technical Assistance

Detailed information regarding Brush 1916, its properties and characteristics, as well as specific application and fabrication assistance, is available from Materion Brush Performance Alloys Customer Technical Service Department in Mayfield, Ohio, 1-800-375-4205

North American Service Centers – Sales Inquiries

For strip, wire and rod under 0.4" (10 mm) diameter
Elmhurst, IL
 TOLL FREE: 800.323.2438
 LOCAL: +(1) 630.832.9650
 FAX: +(1) 630.832.9657

For plate, tube, bar, and rod 0.4" (10 mm) diameter and over
Warren, MI
 TOLL FREE: 800.521.8800
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To obtain a complete list of Materion's global distributor/agent network, visit us online at www.materion.com/BrushAlloys/ContactUs.