

## Brush 1915 & Brush 1916 Rod and Wire: Machinable Copper Nickel Alloy

**Brush 1915<sup>®</sup>** is a heat-treatable leaded copper alloy used in automatic screw machines and cold forming applications. With a machinability index of 70, Brush 1915 also provides high strength, good machinability, good conductivity, excellent surface finish, close diameter control and microstructural consistency. The properties of Brush 1915 make it an ideal material for machined or formed electrical contacts, connector pins and sockets.

**Brush<sup>®</sup> 1916** is a heat-treatable leaded copper alloy engineered specifically for automatic screw machine applications. Brush 1916 offers a machinability index of 70, provides high strength, good machinability, excellent conductivity, excellent surface finish, close diameter control and microstructural consistency. These properties make Brush 1916 a strong material to machine or form into electrical contacts, connector pins and sockets.

Both 1915 and 1916 are intended for use in automatic screw machining process. However, only 1915 is optimized for cold heading operations.

### Brush 1915 Chemical Composition (Weight Percent)

UNS Number	Nickel	Lead	Phosphorus	Copper
C19150	0.8 - 1.2	0.5 - 1.0	0.15 - 0.35	Balance

### Brush 1916 Chemical Composition (Weight Percent)

UNS Number	Nickel	Lead	Phosphorus	Copper
C19160	0.8 - 1.2	0.8 - 1.2	0.15 - 0.35	Balance

### Brush 1915 & Brush 1916 Physical Properties

Density	Thermal Expansion Coefficient (68°F - 212°F / 20°C - 100°C)	Thermal Conductivity (68°F / 20°C)	Electrical Conductivity (HT condition)
0.320 lb/in <sup>3</sup> 8.88 g/cm <sup>3</sup>	9.8 x 10 <sup>-6</sup> in/in °F 17.7 x 10 <sup>-6</sup> m/m °C	120 BTU/ft hr °F 210 W/m °C	50% IACS 29 x 10 <sup>6</sup> S/m

## Brush 1915 & Brush 1916 Mechanical Properties

Temper	Size Range (inch/mm)	Brush 1915 & 1916 Rod			Brush 1915 & 1916 Wire		
		Ultimate Tensile Strength (ksi/Mpa)	Yield Strength 0.2% Offset (ksi/Mpa)	Elongation (%)	Ultimate Tensile Strength (ksi/Mpa)	Yield Strength 0.2% Offset (ksi/Mpa)	Elongation (%)
A	0.030 - 0.625/ 0.76 - 15.9	30 - 50/ 210 - 350	10 - 40/ 70 - 280	35 - 55	25 - 50/ 170 - 350	5 - 25/ 35 - 170	40 - 60
AT	0.030 - 0.625/ 0.76 - 15.9	50 - 70/ 350 - 480	25 - 50/ 170 - 350	20 - 45	50 - 70/ 350 - 480	25 - 50/ 170 - 350	25 - 45
H	0.030 - 0.438/ 0.76 - 11.1	55 - 75/ 380 - 520	45 - 70/ 310 - 480	1 - 20	50 - 75/ 350 - 520	35 - 65/ 240 - 450	1 - 20
	> 0.438 - 0.625/ > 11.1 - 15.9	40 - 65/ 280 - 450	25 - 55/ 170 - 380	1 - 20	40 - 65/ 280 - 450	25 - 55/ 170 - 380	1 - 20
HT	0.030 - 0.438/ 0.76 - 11.1	80 - 105/ 590 - 720	70 - 95/ 480 - 660	4 - 30	80 - 105/ 560 - 720	70 - 100/ 480 - 690	4 - 30
	> 0.438 - 0.625/ > 11.1 - 15.9	70 - 100/ 480 - 690	55 - 85/ 380 - 590	4 - 30	75 - 105/ 520 - 720	65 - 90/ 450 - 620	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 be purchased from Materion and is generally the most cost-effective temper.

## Brush 1915 & Brush 1916 Heat Treatment

The recommended heat treatment cycle for Brush 1915 & Brush 1916 is 700°F (371°C) for 3½ hours. Additional heat treatment information is available from Materion.

## Brush 1915 & Brush 1916 Machining

The addition of lead in the Brush 1915 & Brush 1916 alloy composition allows for chip control in turning and drilling operations, making the alloy ideal for automatic machining. Brush 1915 and 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.

## Brush 1915 & Brush 1916 Availability

Brush 1915 and Brush 1916 are available in rod or wire in diameters beginning at 0.030" (0.76 mm) and up to 0.625" (15.8 mm). Diameter tolerances are closely held, usually within ½ of the allowable limits defined in ASTM B249 and B250. Wire is available in coils up to 300 pounds (136 kg) and rod is provided in straight lengths up to 12 feet (3.66 m). Rod straightness is 0.010" per 18" length (0.254 mm per 457.2 mm length). Custom shapes are available upon request.

## Brush 1915 & Brush 1916 Rod Tolerances

Diameter (inches)		Diameter Tolerance (inches)	Out of Round Tolerance (inches)	Diameter (mm)		Diameter Tolerance (mm)	Out of Round Tolerance (mm)
Over	Including			Over	Including		
0.030	0.080	± 0.0003	0.0003	0.76	2.0	± 0.008	0.008
0.080	0.1250	± 0.0004	0.0004	2.0	3.2	± 0.010	0.010
0.1250	0.250	± 0.0006	0.0004	3.2	6.4	± 0.015	0.010
0.250	0.3125	± 0.0007	0.0007	6.4	7.9	± 0.018	0.018
0.3125	0.3750	± 0.001	0.001	7.9	9.5	± 0.025	0.025
0.3750	0.625	± 0.002		9.5	15.8	± 0.050	

Additional tolerances per ASTM B249.

## Brush 1915 & Brush 1916 Wire Tolerances

Wire Diameter (inches)		Diameter Tolerance (Inches)		Wire Diameter (mm)		Diameter Tolerance (mm)	
Over	Including	Cold Drawn	Annealed	Over	Including	Cold Drawn	Annealed
0.030	0.080	± 0.0003	± 0.001	0.8	1.5	± 0.01	0.03
0.080	0.1250	± 0.0004	± 0.002	1.5	2.0	± 0.01	0.03
0.1250	0.250	± 0.0006	± 0.002	2.0	3.8	± 0.02	0.05
0.250	0.313	± 0.0007	± 0.002	3.8	12.0	± 0.03	0.05
0.313	0.500	± 0.0010	± 0.002				

Additional tolerances per ASTM B250.

## Technical Assistance

Detailed information on Brush 1915 and Brush 1916, its properties and characteristics, as well as specific applications and fabrication assistance, is available from Materion Performance Alloys Customer Technical Service Department at +1.800.375.4205 or email [BrushAlloys-info@materion.com](mailto:BrushAlloys-info@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.