

Alloys 3 (C17510) and 10 (C17500) Rod and Bar

Alloys 3 and 10 rod and bar from Materion Performance Alloys provide high electrical and thermal conductivity coupled with moderate strength. Typical applications include dies casting plunger tips and dies for steel extrusion.



CHEMICAL COMPOSITION (weight percent)

Alloy	Nickel	Cobalt	Beryllium	Copper
3 (C17510)	1.4 – 2.2	-	0.2 – 0.6	Balance
10 (C17500)	-	2.4 – 2.7	0.4 – 0.7	Balance

PHYSICAL PROPERTIES*

Alloy	Elastic Modulus	Melting Point (Solidus)	Electrical Conductivity/ Resistivity	Density**	Thermal Expansion Coefficient	Thermal Conductivity (25 °C)
3	20,000 ksi 138 GPa	1900°F 1040°C	45-60% IACS 2.9-3.8 μΩ-cm	0.319 lb/in ³ 8.83 g/cm ³	9.8x10 ⁻⁶ in/in °F 17.6x10 ⁻⁶ m/m °C	140 BTU/ft hr °F 240 W/m K
10	20,000 ksi 138 GPa	1850°F 1010°C	45-60% IACS 2.9-3.8 μΩ-cm	0.319 lb/in ³ 8.83 g/cm ³	9.8x10 ⁻⁶ in/in °F 17.6x10 ⁻⁶ m/m °C	115 BTU/ft hr °F 200 W/m K

*Properties specified for the precipitation age hardened (heat treated) condition

** Value listed is the density after heat treatment. The density before heat treatment is 0.316 lbs/in³ (8.75 g/cm³) for both alloys

MECHANICAL PROPERTIES*

Temper*	Outer Diameter (Rod) or Thickness (Bar)		Heat Treatment Required	0.2% Offset Yield Strength		Ultimate Tensile Strength		Elongation
	inch	mm		ksi	MPa	ksi	MPa	
A (TB00)	0.030-10	0.76-254	Before Heat Treatment	10-30	70-210	35-55	240-380	20-35
H (TD04)	0.030-3	0.76-76		50-75	340-520	65-80	450-550	10-15
AT (TF00)	0.030-10	0.76-254	After 3 hours	80-100	550-690	100-130	690-900	10-25
HT (TH04)	0.030-3	0.76-76	After 2 hours	95-125	660-860	110-140	760-970	5-25

*Properties may vary by diameter (rod) or thickness (bar)

**Rod and Bar typically provided in an annealed or cold drawn temper and heat treated after machining. Only rod or bar greater than 0.4375" (11.0 mm) diameter or thickness may also be purchased in the pre-heat treated condition.

FORMS AVAILABLE

Alloys 3 and 10 rod and bar are supplied in straight lengths up to 30 ft (9.1m). Solution Annealed rod and bar are available in diameters/ thicknesses ranging from 0.030" to 10" (0.76 mm to 254 mm) and hard drawn tempers are available in 0.030" to 3" (0.76 mm to 76 mm). Alloys 3 and 10 are also available in tube, wire, plate and parts finished by drawing, extrusion, and machining. Alloy 3 is also available in strip.

SPECIFICATIONS AND STANDARDS

Alloy 3 - C17510, ASTM B-441, SAE J 461, SAE J 463

Alloy 10 – C17500, ASTM B-441, SAE J 461, SAE J 463

TOLERANCES

	Rod Diameter or Bar Thickness (inches)		Standard Tolerance (inches)		Rod Diameter or Bar Thickness (mm)		Standard Tolerance (mm)	
	Over	Including	Diameter or Thickness	Out of Round	Over	Including	Diameter or Thickness	Out of Round
Cold Drawn	0.0300	0.0800	±0.0003	0.0003	0.76	2.0	±0.008	0.008
	0.0800	0.1250	±0.0004	0.0004	2.0	3.2	±0.010	0.010
	0.1250	0.2500	±0.0006	0.0004	3.2	6.4	±0.015	0.010
	0.2500	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	0.500	±0.002		9.5	12.0	±0.05	
	0.500	1.00	±0.003		12.0	25.0	±0.08	
	1.00	2.00	±0.004		25.0	50.0	±0.10	
	2.00	3.00	±0.2% of Size		50.0	75.0	±0.2% of Size	
Hot Worked	0.750	1.25	±0.020		20	30	±0.50	
	1.25	2.50	±0.030		30	65	±0.75	
	2.50	6.00	±0.060		65	150	±1.50	

Additional tolerances are per ASTM B 441. Please specify the exact tolerances that you require when you place your order. Tighter tolerances may be available at additional cost. Please contact your local sales engineer to confirm the requested capability.

RELATED INFORMATION

Additional technical or safe handling information on Alloy 3 or Alloy 10 rod and/or bar 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.

SAFE HANDLING OF COPPER BERYLLIUM

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 Safety Data Sheet (SDS) before working with this material. For additional information on safe handling practices or technical data on copper beryllium, contact Materion Performance Alloys, Technical Service Department at 1-800-375-4205.

North American Service Centers – Sales Inquiries

For strip ≤0.060" (1.5 mm) thick, wire and rod ≤0.5" (12.7 mm) diameter:

Elmhurst, IL
TOLL FREE: 800-323-2438
PHONE: +(1) 630-832-9650
FAX: +(1) 630-832-9657

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
PHONE: +(1) 586-772-2700
FAX: +(1) 586-772-2472

International Sales Offices

CHINA/HONG KONG

TEL: + (852) 2318-1960 / 1907
brushalloysHK-info@materion.com

CHINA/SHANGHAI

TEL: + (86) 21-5237-2328
brushalloysCN-info@materion.com

GERMANY

TEL: + (49) 711-830-930
brushalloysDE-info@materion.com

JAPAN

TEL: + (81) 33 230 2961
brushalloysJP-info@materion.com

REPUBLIC OF KOREA

TEL: + (82) 32-811-2171
brushalloysKR-info@materion.com

SINGAPORE/ASEAN

TEL: + (65) 6842-4456
brushalloysSG-info@materion.com

TAIWAN, R.O.C.

TEL: + (886) 2-2747-8800 x-121
brushalloysTW-info@materion.com

UNITED KINGDOM & IRELAND

TEL: + (44) 118-930-3733
brushalloysUK-info@materion.com