MATERION

Data Sheet

RWMA Class 3 and Class 4 Alloys

RWMA Class 3 Alloys from Materion provide high electrical and thermal conductivity coupled with moderate hardness for resistance welding electrodes and structural components. The high thermal and electrical conductivity allow Class 3 components to run cooler without softening or "mushrooming" at high temperatures, and consequently to last longer. This is especially important for weld wheels and electrodes which see the high temperatures at the point of the weld. The high elastic modulus results in less bending under load in structural components such as resistance welding arms. If additional wear resistance is required, Class 4 Alloys provide higher hardness for added resistance to permanent deformation. All of this results in fewer replacement parts, less down time, better welds and better accuracy when using Materion's Class 3 and Class 4 Alloys.

Chemical Composition (Weight Percent)

Alloy	Class	Nickel (Ni)	Cobalt (Co)	Nickel + Cobalt	Beryllium (Be)	Silicon (Si)	Chromium (Cr)	Copper (Cu)
3 (C17510)	3	1.4 - 2.2	-		0.2 - 0.6			Balance
10 (C17500)			2.5 - 2.7		0.4 - 0.7			Balance
310 (C17540)		0.8 - 1.3	0.8 - 1.3		0.4 - 0.7			Balance
C18000		1.8 - 3.0				0.4 - 0.8	0.1 - 0.8	Balance
25 (C17200)	4			0.20 min.	1.80 - 2.00			Balance

Typical Physical Properties*

Alloy	Elastic Modulus		Density		Thermal Expansion Coefficient		Thermal Conductivity (25 °C)	
	ksi	GPa	lb/in^3	g/cm^3	in/in °F	m/m °C	BTU/ft hr °F	W/m °C
3 & 10	20,000	138	0.319	8.83	9.8 x 10^{-6}	17.6 x 10^{-6}	140	240
310	19,600	135	0.318	8.81	9.8 x 10^{-6}	17.6 x 10^{-6}	135	235
C18000	18,000	124	0.320	8.86	9.1 x 10^{-6}	16.4 x 10^{-6}	120	210
25	19,000	131	0.302	8.36	9.7 x 10^{-6}	17.5 x 10^{-6}	60	105

*These properties are listed for reference only and are not certified nor are they considered a specification.

Minimal Mechanical and Physical Properties

Class (per RWMA Bulletin #16)	Electrical Conductivity	Hardness
Class 3	45% IACS	HRB 90
Class 4	20% IACS	HRC 33

Forms Available

RWMA Class 3 and RWMA Class 4 materials are available in rod, plate, and forged products. Alloys 3 and 10 are also available in rod, bar, plate, tube, strip and parts finished by drawing, extrusion, and machining.

Industry Standards and Specifications

There are no official standards or specifications for RWMA material, other than meeting the minimum hardness and conductivity as listed in RWMA Bulletin 16.

Related Information

Additional technical information on RWMA materials may be obtained by phoning +1.800.375.4205. For sales inquiries on bar, tube, plate/sheet of 0.060" (1.5 mm) thick or more, or rod of 0.5" (12.7 mm) diameter or more, call +1.800.521.8800.

Health and Safety

Processing beryllium-containing alloys poses a health risk if safe practices are not followed. Inhalation of airborne beryllium can cause serious lung diseases in some individuals. Occupational safety and health regulatory agencies worldwide have set mandatory limits on occupational respiratory exposures. Read and follow the guidance in the Safety Data Sheet (SDS) before working with this material. The SDS and additional important beryllium health and safety information and guidance can be found at berylliumsafety.com, berylliumsafety.eu and Materion.com. For questions on safe practices for beryllium-containing alloys, contact the Materion Product Stewardship Group at +1.800.862.4118 or contact us by email at Materion-PS@Materion.com.

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