

Carpenter MP35N* Ni-Co-Cr-Mo Alloy, 45% Cold Reduction + Aged 538°C (1000°F)/4hr/AC

Category : Metal , Nonferrous Metal , Cobalt Alloy , Nickel Alloy , Superalloy

Material Notes:

Data provided by Carpenter Technology Corporation. Carpenter MP35N alloy is a nonmagnetic, nickel-cobalt-chromium-molybdenum alloy possessing a unique combination of ultrahigh tensile strength, good ductility and toughness, and excellent corrosion resistance. In addition, this alloy displays exceptional resistance to sulfidation, high temperature oxidation, and hydrogen embrittlement. The unique properties of MP35N alloy are developed through work hardening, phase transformation and aging. If the alloy is used in the fully work hardened condition, service temperatures up to 750°F (399°C) are suggested. MP35N alloy is normally produced by vacuum induction melting (VIM), followed vacuum arc remelting (VAR). Because of its unique combination of properties, MP35N alloy has been used in a wide variety of applications. MP35N alloy has been used in fasteners, springs, nonmagnetic electrical components and instrument parts in medical, seawater, oil and gas well, and chemical and food processing environments.*MP35N is a trademark of SPS Technologies, Inc. MP is a registered trademark of SPS Technologies, Inc.

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Physical Properties	Metric	English	Comments
Density	8.43 g/cc	0.305 lb/in ³	

Mechanical Properties	Metric	English	Comments
Tensile Strength, Ultimate	1772 MPa	257000 psi	
Tensile Strength, Yield	1730 MPa @Strain 0.200 %	251000 psi @Strain 0.200 %	
Elongation at Break	12 %	12 %	
Reduction of Area	52 %	52 %	
Modulus of Elasticity	234.8 GPa	34060 ksi	
Shear Modulus	80.95 GPa	11740 ksi	
Charpy Impact	26.0 J	19.2 ft-lb	V-Notch Cold Drawn 49%

Thermal Properties	Metric	English	Comments
CTE, linear	12.8 µm/m-°C	7.11 µin/in-°F	
	@Temperature 21.0 - 93.0 °C	@Temperature 69.8 - 199 °F	
	14.8 µm/m-°C	8.22 µin/in-°F	
	@Temperature 21.0 -	@Temperature 69.8 -	

Thermal Properties	316 °C Metric	601 °F English	Comments
	15.7 $\mu\text{m}/\text{m}\cdot^{\circ}\text{C}$	8.72 $\mu\text{in}/\text{in}\cdot^{\circ}\text{F}$	
	@Temperature 21.0 - 538 °C	@Temperature 69.8 - 1000 °F	
Thermal Conductivity	11.2 W/m-K	77.7 BTU-in/hr-ft ² -°F	
	@Temperature 23.0 °C	@Temperature 73.4 °F	
	17.0 W/m-K	118 BTU-in/hr-ft ² -°F	
	@Temperature 316 °C	@Temperature 601 °F	
	23.4 W/m-K	162 BTU-in/hr-ft ² -°F	
	@Temperature 649 °C	@Temperature 1200 °F	
Melting Point	1315 - 1440 °C	2399 - 2620 °F	
Solidus	1315 °C	2399 °F	
Liquidus	1440 °C	2620 °F	

Component Elements Properties	Metric	English	Comments
Boron, B	0.010 %	0.010 %	
Carbon, C	<= 0.025 %	<= 0.025 %	
Chromium, Cr	19 - 21 %	19 - 21 %	
Cobalt, Co	33 %	33 %	as remainder
Iron, Fe	<= 1.0 %	<= 1.0 %	
Manganese, Mn	<= 0.15 %	<= 0.15 %	
Molybdenum, Mo	9.0 - 10.5 %	9.0 - 10.5 %	
Nickel, Ni	33 - 37 %	33 - 37 %	
Phosphorous, P	<= 0.015 %	<= 0.015 %	
Silicon, Si	<= 0.15 %	<= 0.15 %	
Sulfur, S	<= 0.010 %	<= 0.010 %	
Titanium, Ti	<= 1.0 %	<= 1.0 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0001033 ohm-cm	0.0001033 ohm-cm	
	@Temperature 23.0 °C	@Temperature 73.4 °F	

Electrical Properties	Metric 154 ohm-cm	English 154 ohm-cm	Comments
	@Temperature 538 °C	@Temperature 1000 °F	

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