

NI 200/201 TECHNICAL DATA

Type Analysis

Element	Min	Max
Carbon	--	0.07*
Manganese	--	0.35
Silicon	--	0.25
Sulfur	--	0.01
Nickel + Cobalt		99.5
Iron	--	0.25
Copper	--	0.15

*For Ni 201 carbon is limited to 0.02% max

Description

Carpenter Nickel 200 alloy is a commercially pure nickel that exhibits good corrosion resistance. It is ferromagnetic and has relatively low electrical resistivity. This combination of properties has allowed its use in a wide variety of applications.

Because the alloy displays good corrosion resistance, it has been used in food handling equipment, caustic solution, and general corrosion-resistant parts and structures. The magnetic and mechanical properties have enabled it to be used in devices requiring magnetic actuated parts. The excellent combination of properties enables Carpenter Nickel 200 alloy to be cold worked by forming and drawing. It is readily welded and will retain its properties at both subzero and elevated temperatures. Its low electrical resistivity has allowed its use as conducting leads and terminals in electrical and electronic components.

Because of its magnetostrictive properties (specially significant length change when magnetized), the nickels have been used in sonic devices such as sonar or for controls in ultrasonic welding.

Carpenter Nickel 200 alloys meets the requirements of ASTM Specification B-160.

Carpenter Nickel 201 alloy is a low carbon modification of Carpenter Nickel 200 alloy that has found applications in the electronic industry at temperatures up to 1200°F (649°C). It is preferred to Carpenter Nickel 200 alloy above 600°F (315°C), because of its better resistance to "creep."

This alloy has a low annealed hardness and very low work-hardening rate that is desirable for cold forming operations such as deep drawing, spinning, coining, etc. It has been used in corrosion-resistant equipment such as caustic evaporators, in spun anodes, combustion boats and laboratory crucibles, and electronic components where its excellent fabricating characteristics provide some advantage.

Physical Properties

Specific gravity 8.89
Density
lb/cu in 0.321
Average Coefficient of Thermal
Expansion x 10(-6)/°C
(25° to 100°C) 13.0
Electrical Resistivity
Ohms cir-mil/ft 57
Microhm-cm 9.5
Temperature Coefficient of
Resistance(/°C) 0.004/0.005
Specific Heat, cal/g/°C 0.108

Thermal Conductivity
@ R.T., Btu-in/ft²-hr-°F 306
W/m-K 44
Curie Temperature 680°F(360°C)
Melting Point 2624°F(1440°C)
Magnetic Saturation (Telsa) 0.61
Modulus of Elasticity in
Tension(x10(6)psi) 30
Magnetostriction @ Saturation
(Bs) x 10(-6) Δ L/L 30

Typical Mechanical Properties

Condition	Ultimate Tensile Strength	Yield Strength	% Elongation in 2"
	ksi	ksi	
Wire			
Annealed	70	25	40
Hard drawn	120	110	5
Strip			
Annealed	70	20	40
Cold Rolled	100	85	5
Rod & Bar			
Annealed	60	20	45
Cold drawn	90	70	25

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