

Nickel 200/201 (UNS No2200/No2201)



Nickel 200/201 offers great resistance to different corrosive and caustic media. It has good electric and thermal conductivities and magnetostrictive characteristics. It is resistant to alkali, acidic and neutral environments. Nickel 201 is a lower carbon grade of Nickel 200.

Nickel 200/201 is used in viscose rayon and polymer production, food processing, reactors, tubes, aerospace engineering, military and other applications.

Chemical Composition

Element	Nickel 200	Nickel 201
Nickel (Ni)	99 %	99 %
Iron (Fe)	0.40 %	0.40 %
Carbon (C)	0.15 %	0.02 %
Manganese (Mn)	0.35 %	0.35 %
Silicon (Si)	0.35 %	0.35 %
Copper (Cu)	0.25 %	0.25 %
Sulfur (S)	0.01 %	0.01 %

Physical Properties

Room temperature density	0.321 lb/inch ³
Young Modulus at 78oF	29.7 x 10(6) psi
Melting temperature	2624oF or 1440oC
Specific heat at 70oF	0.109 Btu/lb-oF
Thermal conductivity at 70oF	487 Btu.inch/ft ² .h.oF
Electrical resistivity at 70oF	58 ohm.cir mil/ft or 9.5Microhm-cm
Specific gravity	8.89

Temperature coefficient of resistance	0.004/0.005 per oC
Curie temperature	680oF or 360oC
Magnetic Saturation	0.61 tesla
Modulus of elasticity in tension	30 x 10(6) osi

Mean Coefficient of thermal expansion

Temperature, oF	10(-6) inch/inch.oF
-300 oF	4.7
-100 oF	6.2
200 oF	7.4
600 oF	8
1000 oF	8.5
1400 oF	8.9
2000 oF	9.5

Mechanical Properties

High Temperature mechanical properties of Annealed Nickel 201 alloy

Temp, oF	Tensile Strength, Psi	Yield Strength, Psi	Elongation %	Reduction of Area, %
Room	58500 Psi	15000 Psi	50 %	73 %
200 oF	56100 Psi	15400 Psi	45 %	74 %
400 oF	54000 Psi	14800 Psi	44 %	72 %
600 oF	52500 Psi	15300 Psi	42 %	72 %
800 oF	41200 Psi	1300 Psi	58 %	80 %
1000 oF	33100 Psi	12100 Psi	60 %	84 %
1200 oF	22200 Psi	10200 Psi	74 %	90 %

Nickel 200/201 Tensile Properties

Cold processed	Ultimate tensile strength	75 ksi or 515 Mpa
	Yield Strength cold processed	50 ksi or 345 Mpa
	Elongation	15 %
Hot processed	Ultimate tensile strength	55 ksi or 380 Mpa
	Yield Strength cold processed	15 ksi or 105 Mpa
	Elongation	40

Corrosion Resistance

Condition	Temperature		Corrosion rate, mpy
Acetic acid (5%) water or air	70 of	21 oC	40 mpy
10 % Acetic acid	86 of	30 oC	3.4 mpy
56 % Acetic acid	176 of	80 oC	66 mpy
85 % Acetic acid	70 of	21 oC	400 mpy
98 % Acetic acid	241 of	116 oC	12 mpy

50 % caustic soda or sodium hydroxide	195 of	90 oC	0.55 mpy
50 % caustic soda or sodium hydroxide	310 of	155 oC	0.5 mpy
75 % caustic soda or sodium hydroxide	250 of	120 oC	1 mpy
90 % Formic acid diluted	70 of	21 oC	4 mpy
90 % Formic acid vaporized	70 of	21 oC	7 mpy
1 % Hydrochloric acid	214 of	101 oC	680 mpy
10 % Hydrochloric acid	86 of	30 oC	80 mpy
10 % Hydrochloric acid	221 of	105 oC	8000 mpy
10 % Nitric acid	216 of	102 oC	12000 mpy
10 % Phosphoric acid	75 of	24 oC	0.6 mpy
10 % Phosphoric acid	214 of	101 oC	154 mpy
40 % Phosphoric acid	75 of	24 oC	1 mpy
500 ppm Sodium Hypochlorite	77 of	25 oC	0.8 mpy
2% Sulfuric acid	70 of	21 oC	2 mpy
5% Sulfuric acid	140 of	60 oC	10 mpy
5% Sulfuric acid water or air	86 of	30 oC	61 mpy
19 % Sulfuric acid	223 of	106 oC	110 mpy
20 % Sulfuric acid	70 of	21 oC	4 mpy
50 % Sulfuric acid water or air	86 of	30 oC	16 mpy
50 % Sulfuric acid	255 of	124 oC	1000 mpy
93 % Sulfuric acid water or air	86 of	30 oC	10 mpy

Processing

Hot Processing

Nickel 201 alloy can be hot processed to provide any shape. The processing temperature varies from 1200oF to 2250oF and it should be handled carefully because the processing temperature is the significant factor to receive hot malleability.

Cold Processing

Nickel 201 can be cold processed by following the common methods but as nickel alloys have more hardness than steel so more strength is needed to conduct any operation. Nickel 201 alloy is used in the applications that are conducted at temperatures more than 600oF. With nominal base stiffness and work processing rate, it is suitable for cold forging.

Available Forms

Wire, mesh, strip, foil, bar, rod, pipe, tubing, plate, sheet, flanges