



## EC200/EC201 (UNS N02200 & N02201) NICKEL ALLOY

EC200/EC201 is a commercially pure nickel alloy which combines good mechanical properties with good to excellent resistance to many corrosive environments including dry chlorine, hydrogen chloride, and caustic alkalis. EC200/EC201 is ferromagnetic and has relatively low electrical resistivity which is useful in the electronics industry.

### CHEMICAL COMPOSITION (Nominal Analysis, weight percent)

<b>Carbon</b> ( <i>max</i> ) .....	<b>0.02</b>	<b>Nickel</b> ( <i>min</i> ) .....	<b>99.0</b>
<b>Manganese</b> ( <i>max</i> ) .....	<b>0.35</b>	<b>Copper</b> ( <i>max</i> ) .....	<b>0.25</b>
<b>Sulfur</b> ( <i>max</i> ) .....	<b>0.01</b>	<b>Iron</b> ( <i>max</i> ) .....	<b>0.40</b>
<b>Silicon</b> ( <i>max</i> ) .....	<b>0.35</b>		

### TYPICAL APPLICATIONS

#### **Chemical Processing**

- caustic processing and storage, chemical shipping containers, synthetic fiber production, fluorine electrolysis

#### **Aerospace**

- rocket motor cases

#### **Electronics Industry**

#### **Food Processing**

**Specifications:** ASTM B160, ASME SB160, ASTM B564

**Forms:** ingot, billet, bar, rod, and coil rod

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## PHYSICAL PROPERTIES

<b>Melting Temperature:</b>	2615°F to 2635°F (1435°C to 1446°C)	
<b>Density:</b>	0.322 lb./in. <sup>3</sup> (8.89 gm/cm <sup>3</sup> )	
<b>Specific Heat:</b>	(@ 70°F) 0.106 Btu/lb./°F	
<b>Curie Temperature:</b>	680°F (360°C)	
<b>Electrical Resistivity:</b>	(@ 70°F) 3.7 microhm-in.	
<b>Modulus of Elasticity:</b>	(@ 70°F) 30 x 10 <sup>6</sup> psi	
<b>Coefficient of Thermal Expansion</b>		
Temperature		
°F	°C	in./in./°F
80 to 200	27 to 93	7.4 x 10 <sup>-6</sup>
80 to 400	27 to 204	7.7 x 10 <sup>-6</sup>
80 to 600	27 to 316	8.0 x 10 <sup>-6</sup>
<b>Thermal Conductivity</b>		
Temperature		
°F	°C	Btu/ft <sup>2</sup> /ft./hr./°F
212	100	38.8
400	204	35.4
600	316	32.5

## HEAT TREATMENT

EC200/EC201 does not harden by heat treatment. Annealing is accomplished by heating between 1300°F - 1700°F and water quenching.

## WORKABILITY

The recommended hot working temperature range is between 1600°F - 2200°F. The recommended ignot breakdown temperature is between 2100°F - 2200°F. EC200/EC201 is readily cold worked, however this alloy work hardens and may require in-process annealing. Cold working will increase tensile and yield strength.

## CORROSION & OXIDATION RESISTANCE

EC200/EC201 provides excellent corrosion resistance to hot concentrated alkali and good corrosion resistance to dry chlorine, fluorine, hydrogen chloride and hydrogen fluoride up to moderately high temperatures. This alloy is not resistant to ammonia or its derivatives in the simultaneous presence of air, oxygen or other oxidants. Oxidizing salts and oxidizing mineral acids are corrosive.

## MECHANICAL PROPERTIES

<b>Tensile Properties:</b>			
	UTS (ksi) (min)	.2%YS (ksi) (min)	%EL (min) 2" or (50.8 mm) or 4D
ASTM B160 (annealed)	55	15	40
ASTM B160 (cold worked)	75	50	15
ASTM B160 (cold worked <1")	80	60	10

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## WELDING

EC200/EC201 can be welded using conventional methods such as oxyacetylene, metallic-arc, resistance welding, gas tungsten arc (GTAW), gas metal arc (GMAW, and shielded metal arc (SMAW).

## MACHINING

EC200/EC201 can be machined using conventional techniques. The alloy is gummy in the annealed condition therefore slightly slower cutting speeds and lighter feeds than those used for mild steel are recommended. Machinability is better in the cold worked condition.



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