EC330 (UNS N08330) NICKEL-IRON-CHROMIUM-SILICON ALLOY

EC330 is an austenitic nickel-iron-chromium-silicon alloy specially suited for applications at 1500°F to about 2150°F. This alloy will withstand prolonged heating in air at temperatures up to 1900°F without excessive scaling. EC330 has greater resistance to thermal shock and resists carburization more than most other grades of austenitic stainless steel.

CHEMICAL COMPOSITION (Nominal Analysis, weight percent)

Carbon *(max)*	**0.08**	**Nickel**	**34.00 / 37.00**
Manganese *(max)*	**2.00**	**Copper** *(max)*	**0.50**
Phosphorus *(max)*	**0.030**	**Molybdenum** *(max)*	**0.75**
Sulfur *(max)*	**0.030**	**Lead** *(max)*	**0.005**
Silicon	**0.75 / 1.50**	**Tin** *(max)*	**0.025**
Chromium	**17.00 / 20.00**	**Iron**	**Balance**

TYPICAL APPLICATIONS

EC330 is used exclusively in elevated temperature environments where resistance to thermal cycling, oxidation, and carburization is required while maintaining strength. Applications include furnace containers for annealing, annealing fixtures, furnace parts, heat treating baskets, furnace fans, and petro-chemical furnace parts.

Electralloy's **EC330** can be supplied to meet all the requirements of the following specifications, and more...

ASTM B511

ASTM B512

AMS 5716

EC330 is available in a variety of sizes and forms, including ingot, billet, bar, and coil rod.

EC330 (UNS N08330) NICKEL-IRON-CHROMIUM-SILICON ALLOY

AS9100:2016/EN 9100:2016/JISQ 9100:2016

PHYSICAL PROPERTIES

Melting Range:	2500°F to 2600°F (1399°C to 1427°C)
Density:	0.289 lb./in.^{3} (8.00 gm/cm^3)
Magnetic Permeability:	(H=200 Oersteds) Annealed 1.02 max.
Specific Heat:	(32°F - 212 °F) 0.11 Btu/lb./°F

Coefficient of Thermal Expansion

Temperature °F	Temperature °C	In./in./°F
32 to 212	0 to 100	8.0 x 10^{-6}
32 to 1000	0 to 538	9.3 x 10^{-6}
32 to 1600	0 to 871	10.0 x 10^{-6}

Thermal Conductivity

Temperature		
°F	°C	Btu/ft^2/ft./hr./°F
212	100	7.8
932	500	9.4

Modulus of Elasticity :

Temperature	10^6 psi
70	28.5
1800	18.0

TYPICAL MECHANICAL PROPERTIES

Tensile Data: *Annealed*

	UTS	.2 % YS	% El in 2" (50.8 mm) or 4D	HRB
	psi/ksi (min)	psi/ksi (min)	(min)	(max)
ASTM B 511	70,000 (483 MPa)	30,000 (207 MPa)	30	
AMS 5716	70,000 (483 MPa)	25.0 (172 MPa)	30, 4D only	95

HEAT TREATMENT

EC330 does not harden by heat treatment. Annealing is accomplished by heating between 2050°F - 2250°F and water quench.

WORKABILILTY

The recommended hot working temperature range is between 1800°F - 2200°F. EC330 is readily cold worked. No special precautions are needed, however this alloy work hardens and may require in-process annealing.

CORROSION & OXIDATION RESISTANCE

The high alloy content of EC330 promotes excellent corrosion resistance to carburizing and carbo-nitriding atmospheres in the 1600°F - 1900°F range. EC330 may be used in oxidizing atmospheres up to 1900°F without excessive scaling. It may be used up to 2150°F in neutral atmospheres and in reducing atmospheres free of sulfur.

WELDING

EC330 can be welded using conventional methods such as gas tungsten arc (GTAW), gas metal arc (GMAW), and shielded metal arc (SMAW).

MACHINING

EC330 can be machined using conventional techniques and equipment however considerably more power is required when compared to mild steel. To avoid excessive work hardening, the setup should be as rigid as possible and high speed steel or carbide-tipped cutting tools used. Cutting tools should be kept sharp at all times to assure clean burr free cutting. Heavy feeds and a good supply of coolant are recommended.

ELECTRALLOY
a G.O. CARLSON Inc. Company

G. O. Carlson
Plate Products

11-2013