

ALLOY 800/800AT/800H TECHNICAL DATA

Type Analysis

Incoloy	Incoloy 800		Incoloy 800H	
	Min	Max	Min	Max
Nickel + Cobalt	30.0	30.0	30.0	35.0
Cobalt	---	2.00	---	2.00
Chromium	19.0	23.0	19.0	23.0
Copper	---	0.75	---	0.75
Iron	Bal		Bal	
Silicon	---	1.00	---	1.00
Manganese	---	1.50	---	1.50
Carbon	---	0.10	0.05	0.10
Aluminum	0.15	0.60	0.15	0.60
Titanium	0.15	0.60	0.15	0.60
Sulfur	---	0.015	---	0.015

Description

Alloy 800 is an iron-nickel-chromium alloy with moderate strength and good resistance to oxidation and carburization at elevated temperatures. It is particularly useful for high-temperature equipment in the petrochemical industry because the alloy doesn't form the embrittling sigma phase after long time exposure at 1200°F (649°C). Excellent resistance to chloride stress-corrosion cracking is another important feature of alloy 800.

Alloy 800H is a solution heat treated (2100°F/1150°C), controlled-carbon version of alloy 800 with improved elevated temperature properties. It has improved creep and stress-rupture characteristics in the 1100°F (593°C) to 1800°F (982°C) temperature range.

Applications

Typical applications for alloy 800 and 800H are - Heat exchangers and process piping; carburizing fixtures and retorts; furnace components; electric range heating-element sheathing; extruded tubing for ethylene and steam methane reforming furnaces; ammonia effluent coolers.

Physical Properties

Physical Properties	°F	British Units	°C	Metric Units
Density	Room	0.287 lb./in.(3)	Room	7.95 g/cm(3)
Electrical Resistivity	70 200 400 600 800	38.9 microhm-in. 40.6 microhm-in. 43.0 microhm-in. 44.7 microhm-in. 46.1 microhm-in.	21 93 204 316 427	0.989 microhm-m 1.03 microhm-m 1.09 microhm-m 1.13 microhm-m 1.17 microhm-m
Mean Coefficient of Thermal Expansion	70-200 70-400 70-600 70-800	7.9 microin./in.-°F 8.8 microin./in.-°F 9.0 microin./in.-°F 9.2 microin./in.-°F	21-93 21-204 21-316 21-427	14.2 X 10 ⁽⁻⁶⁾ m/m-K 15.8 X 10 ⁽⁻⁶⁾ m/m-K 16.2 X 10 ⁽⁻⁶⁾ m/m-K 16.6 X 10 ⁽⁻⁶⁾ m/m-K
Thermal Conductivity	70 200 400 600 800	80 Btu-in/ft ² -hr-°F 89 Btu-in/ft ² -hr-°F 103 Btu-in/ft ² -hr-°F 115 Btu-in/ft ² -hr-°F 127 Btu-in/ft ² -hr-°F	21 93 204 316 427	11.5 W/m-K 12.8 W/m-K 14.8 W/m-K 16.6 W/m-K 18.3 W/m-K
Dynamic Modulus of Elasticity	Room	28.5 x 10(6) psi	Room	196 GPa

These properties apply to both alloys

Mechanical Properties

Alloy	Form	Condition	Ultimate Tensile Strength, ksi (MPa)	Yield Strength at 0.2% offset, ksi (MPa)	Elongation in 2" or 4D, percent
800	Sheet, Plate	Annealed	85 (586)	40 (276)	43
800	Sheet, Plate Strip, Bar	Annealed	75 (520)*	30 (205)*	30*
800H	Sheet, Plate	SHT	80 (552)	35 (241)	47
800H	Sheet, Plate Strip, Bar	SHT	65 (450)*	25 (170)*	30*

* - minimum
SHT - Solution heat-treated

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