



CORROSION MATERIALS

"Your Corrosion Alloy Specialist"

"ISO 9001-2008 Certified
ISO Registered Since 1993"

Alloy 800H/800HT® (UNS N08810 & N08811 / W.Nr. 1.4958 & 1.4959) are solid solution strengthened, iron-nickel-chromium alloys, typically offered as one, dual certified alloy meeting the elemental requirements of both alloys. The principle difference between alloy 800H and 800HT® material is the restricted aluminum and titanium content in 800HT®, which results in higher creep and stress rupture properties. Both Alloy 800H and 800HT® are superior to Alloy 800 (UNS N08800), having greater creep and stress rupture properties. The alloy is typically used for applications involving long-term exposure to high-temperatures where resistance is needed from oxidation, carburization and other types of high-temperature corrosion. Hydrocarbon processing, heat-treat furnaces and power generation are some of the most common applications where 800H & 800HT® is utilized. Pressure vessels and vessel components constructed from 800H and 800HT® are approved under the ASME, Boiler and Pressure Vessel Code, Section VIII, Division 1.

Resistance to Corrosion

High nickel and chromium contents in both alloy 800H and 800HT® result in excellent resistance to oxidation, carburization and sulfidation. The high nickel content also increases the resistance to nitriding, although not as good as other alloys such as Alloy 600, which contains a higher percentage of nickel.

Mechanical Properties

Product Form	Condition	Tensile (ksi)	0.2% Yield (ksi)	Elongation (%)
Rod & Bar	Annealed	75 to 100	30 to 60	60 to 30

Fabrication and Heat Treatment

Hot-working temperatures should be between 1600°F and 2200°F with heavy forming to be performed at temperatures above 1850°F. No forming should be performed between 1200°F and 1600°F and preheating of tools and dies to 500°F is suggested to avoid chill. Cooling after hot working should be as quick as possible, avoiding extensive time at temperatures between 1000°F and 1400°F. Cold working should be performed on material in the annealed condition. Stress relief or annealing should be considered depending on the total amount of strain induced by fabrication taking into consideration the intended service of the material.

Alloy 800H/HT®

UNS N08810 & N08811/ W.Nr. 1.4958 & 1.4959

Chemical Composition

	Alloy 800H	Alloy 800HT®
Ni.....	30.0 to 35.0.....	30.0 to 35.0
Cr.....	19.0 to 23.0.....	19.0 to 23.0
C.....	0.05 to 0.10.....	0.06 to 0.10
Mn.....	1.5 Max.....	1.5 Max.
S.....	0.015 Max.....	0.015 Max.
Si.....	1.0 Max.....	1.0 Max.
Cu.....	0.75 Max.....	0.75 Max.
P.....	0.045 Max.....	0.045 Max.
Al.....	0.15 to 0.60.....	0.15 to 0.60
Ti.....	0.15 to 0.60.....	0.15 to 0.60
Fe.....	Remainder.....	39.5 Min.
Other...../.....		Al + Ti = 0.85 to 1.20

Physical Properties¹

Density@ Room Temp.	0.287 lb/in. ³
Melting Point	2475°F to 2525°F
Specific Heat @ 70°F	0.11 Btu/lb•°F
Permeability @ 70°F for Annealed Material	1.014 (200 Oersted)
Curie Temperature	-175°F
Elastic Modulus @ 75°F (Tension)	28.50 X 10 ⁶ psi
Elastic Modulus @ 1600°F (Tension)	19.20 X 10 ⁶ psi
Electrical Resistivity @ 70°F	595 ohm•circ mil/ft
Electrical Resistivity @ 1800°F	776 ohm•circ mil/ft

¹. The compositional range of Alloy 800H falls within the range of 800HT, therefore there is no significant difference in physical properties.

Because excessive grain growth can negatively affect mechanical properties, care must be taken in selecting an annealing temperature and time at temperature for the process. If material is to be deformed more than 20% and a final anneal is desired, fine-grain material should be considered for the starting stock.

Stress relief is performed between 1000°F and 1600°F and should be at temperature for 1 hour per inch of material or for a minimum of 1½ hours at 1600°F, whichever is greater. Recrystallization anneal is achieved at temperatures between 2100°F and 2200°F.

High Temperature Mechanical Properties

Temperature (°F)	Tensile (ksi)	0.2% Yield (ksi)	Hardness (BHN)
800	67.5	18.8	/
1000	62.7	13.0	90
1200	54.8	13.5	84
1400	34.2	13.1	74

Applicable Specifications

Alloy 800H/HT® - Form	ASTM	ASME	British Standard	European Standard
Bar ¹	B408, B564 ¹	SB408, SB564 ¹	BS3076-NA15 ²	EN 10204-3.1
Seamless Pipe ³	B407	SB407	/	EN 10204-3.1
Welded Pipe ⁴	B514	SB514	/	EN 10204-3.1

1. Applies to pipe $\geq 3.500''$. Size tolerance on this material is $+0.125''/-0.000''$. 2. Alloy 800H only 3. ASTM grain size 5 or coarser per ASTM E112. 4. X-Ray per ASME Section VIII, Division 1, #UW-51 for pipe $\geq 6.000''$.

Aqueous Corrosion Data (Laboratory tests at 176°F)

Media	Common Name	Test Duration (days)	Corrosion Rate (mpy)
10% C ₂ H ₄ O ₂	Acetic Acid	7	0.01 / no pitting
5% Al ₂ (SO ₄) ₃ • 18H ₂ O	Aluminum Sulfate	7	0.01 / no pitting
5% NH ₄ Cl	Ammonium Chloride	42	0.02 / pitting after 42 days
10% NH ₄ OH	Ammonium Hydroxide	7	0.01 / no pitting
5% (NH ₄) ₂ SO ₄	Ammonium Sulfate	7	nil / no pitting
10% BaCl ₂	Barium Chloride	42	0.03 / pitting after 42 days
5% CaCl ₂	Calcium Chloride	42	0.01 / pitting after 42 days
5% H ₂ CrO ₄	Chromic Acid	7	1.6 / no pitting
10% C ₆ H ₈ O ₇	Citric Acid	7	nil / no pitting
10% CuSO ₄	Copper Sulfate	7	nil / no pitting
5% FeCl ₃	Ferric Chloride	42	420 / pitting after 7 days
10% C ₃ H ₆ O ₃	Lactic Acid	7	0.04 / no pitting
CH ₃ OH	Methanol	7	Nil / no pitting
10% C ₂ H ₂ O ₄	Oxalic Acid	7	11.0 / no pitting
5% C ₆ N ₆ FeK ₃	Potassium Ferricyanide	7	0.04 / no pitting
5% NaHSO ₃	Sodium Bisulfite	7	0.03 / no pitting
20% Na ₂ CO ₃	Sodium Carbonate	7	nil / no pitting
NaCl	Sodium Chloride	42	0.34 / pitting after 7 days
5% NaOCl	Sodium Hypochlorite	42	8.0 / pitting after 7 days
5% Na ₂ SO ₄	Sodium Sulfate	7	nil / no pitting
10% C ₄ H ₆ O ₆	Tartaric Acid	7	0.02 / no pitting
10% ZnCl ₂	Zinc Chloride	42	0.01 / pitting after 42 days

Please contact Corrosion Materials for a complete list of available items from inventory.

In-house machine and weld facilities help insure that the most common items will be in stock. Items not in stock can be fabricated in a short period of time either in-house or through our extensive, approved subcontractor and supplier network.

We also supply a complete range of items in the following alloys; Alloy C276, B2, B-3®, F-255, Alloy 22, 625, 200/201, Alloy 400, 405 and 600. Bar products are also available in K500, Alloy 800H/HT®, and Alloy 6B as well as various Ti grades.

(800HT® is a registered trademark of Special Metals Corporation. B-3® is a registered trademark of Haynes International Inc.)

The data and information contained in this pamphlet have been taken from open literature and is believed to be reliable. The information contained is intended to be used as a guide. Corrosion Materials does not make any warranty or assume any legal liability for its accuracy, completeness or usefulness.

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