



**MATERIAL No.: ALLOY 800/ 1.4876 /N08800**

**DESCRIPTION**

<b>EN symbol (short)</b>	X10NiCrAlTi 32-21	<b>Density lb//in<sup>3</sup></b>	0,287
<b>Alloy</b>	800	<b>Hardness HB30</b>	<=192
<b>UNS</b>	N 08800	<b>Composition</b>	Nickel Iron Chrome alloy
<b>Registered work's label</b>	Nicrofer®3220 Incoloy 800	<b>Category</b>	Heat resistant steels and alloys
		<b>Structure</b>	austenitic
		<b>Additional characteristics</b>	forge scale temperature 2012 °F

**Description** Version 1.4958(alloy 800H,UNS 08810) or 1.4959 (Alloy 800HT;UNS 08811) increasingly substitute this material, since they can be solution annealed. This procedure improves their creep-strength limit in high temperatures.

**CHEMICAL COMPOSITION**

		C	Mn	P	S	Cr	Ni	Si	Al	Ti	Fe	Cu
<b>1.4876</b>	<b>Min %</b>					19,00	30,00		0,15	0,15		
	<b>Max %</b>	0,12	2,0	0,030	0,015	23,00	34,00	1,00	0,60	0,60		
(Key to steel 2010)												
<b>alloy 800</b>	<b>Min %</b>											
	<b>Max %</b>											
<b>N 08800</b>	<b>Min %</b>					19,0	30,0		0,15	0,15	39,5	
	<b>Max %</b>	0,10	1,50		0,015	23,0	35,0	1,0	0,60	0,60		0,75

ASTM B 407 (N 08800-Alloy 800)

**PHYSICAL PROPERTIES**

Property	Value
<b>Density: lb//in<sup>3</sup></b>	0,287
<b>Hardness: HB30</b>	<=192
<b>permeability by 20°C</b>	1,01
<b>magnetizable</b>	no

<b>elasticity modulus</b> (N/mm <sup>2</sup> ) /ksi		194 / 28,1			
<b>Temperature</b> <b>T</b> °C/F (°C/F)	<b>Specific heat</b> J / kgK (Btu / lb °F)	<b>Thermal conductivity</b> W/mK (Btu·in / ft <sup>2</sup> ·h·°F)	<b>Electric resistance</b> μΩ · cm (Ω circ mill / ft)	<b>Modulus of elasticity</b> kN/mm <sup>2</sup> (10 <sup>3</sup> ksi)	<b>Expansion rate from 70°F bis T</b> 10 <sup>-6</sup> / K (10 <sup>-6</sup> / °F)
20 / 68	472 (--)	11,5 (--)	101 (--)	194 (--)	12 (--)
100 / 212	501 (--)	13,1 (--)	104 (--)	189 (--)	15,1 (--)
200 / 392	525 (--)	14,8 (--)	108 (--)	183 (--)	15,7 (--)
300 / 572	532 (--)	16,4 (--)	112 (--)	177 (--)	16,2 (--)
400 / 752	555 (--)	18,1 (--)	115 (--)	170 (--)	16,6 (--)
500 / 932	582 (--)	19,6 (--)	118 (--)	163 (--)	17,0 (--)
600 / 1112	604 (--)	21,2 (--)	120 (--)	156 (--)	17,4 (--)
800 / 1472	609 (--)	24,3 (--)	124 (--)	141 (--)	18,0 (--)
1000 / 1832	641 (--)	27,3 (--)	127 (--)	127 (--)	18,6 (--)
<b>Temp.</b>	<b>Creep strain limit</b>	<b>Creep strain limit</b>	<b>Creep rupture strength</b>	<b>Creep rupture strength</b>	<b>Creep rupture strength</b>
			<b>1000 h</b>		
<b>°C/°F</b>			<b>Mpa/ksi</b>		
650 / 1202			165 / 23,9		
705 / 1300			105 / 15,2		
870 / 1600			32 / 4,7		
980 / 1800			14 / 2,0		
<b>Temperature</b>	<b>Yield strength in high temperatures</b>		<b>Yield strength in high temperatures</b>		<b>Tensile strenght in high temperatures</b>
<b>°C / °F</b>	<b>Rp 1,0</b>		<b>Rp 0,2</b>		<b>Rm</b>
	<b>N/mm<sup>2</sup> / ksi</b>		<b>N/mm<sup>2</sup> / ksi</b>		<b>N/mm<sup>2</sup> / ksi</b>
20 / 68	200 / 29		170 / 24,6		450 / 65,2
100 / 212	160 / 23,2		140 / 20,3		400 / 58,0
300 / 572	115 / 16,6		95 / 13,7		390 / 56,5
500 / 932	100 / 15,4		80 / 11,6		360 / 52,2
600 / 1112	95 / 13,7		75 / 10,9		300 / 43,5

ksi value calculated

### MECHANICAL PROPERTIES (20°C / 68°F)

<b>1 %Yield strength Rp 1,0 Mpa(ksi)</b>	200 / 29	
<b>tensile elastic limit (Mpa) /ksi</b>	>=170 />=24,6	
<b>Tensile strenght Rm (Mpa)</b>	450-680	
<b>Elongation A5 (%)</b>	>=30	quer
	>=35	längs
<b>impact work KV(ISO-V)/Jcm<sup>2</sup></b>	>=150	längs
	>=100	quer

### TEMPERATURE INFORMATION

<b>Application area</b>		
<b>Operation temperature</b>	°F to 1112 °F	air to 2012°F
<b>Explanation report</b>	soft-annealed : resistant to scaling by air to 2012 °F	
<b>Solution heat treatment</b>		
<b>Working temperature</b>	1922 °F to 2102 °F	
<b>Explanation report</b>	cooling down Water/air	
<b>soft-annealed</b>		
<b>Working temperature</b>	1688 °F to 2552 °F	
<b>Solution heat treatment</b>		
<b>Working temperature</b>	1832 °F to 2282 °F	

### STANDARDS / INFORMATION

<b>Standards</b>	<b>Description</b>
<a href="#">ASTM A 312</a>	Standard Specification for Seamless and welded austenitic stainless steel pipes
<a href="#">ASTM B 163</a>	Standard Specifications for seamless nickel and nickel alloy condensers and heat-exchanger tubes
<a href="#">ASTM B 407</a>	Standard Specification for Nickel-Iron-Chromium Alloy Seamless Pipe and Tube
<a href="#">ASTM B 408</a>	Standard Specification for Nickel-Iron-Chromium Alloy Rod and Bar
<a href="#">ASTM B 409</a>	Standard Specification for Nickel-Iron-Cromium Alloy metal sheets
<a href="#">DIN EN 10088-1 (09/2005)</a>	Stainless steels Part 1: List of stainless steels
<a href="#">DIN EN 10095 (05/1999)</a>	heat resistant steel and nickel alloy
<a href="#">DIN EN 10216-2(10/2007)</a>	Stanless steel tubes for pressure purposes. Non-alloy and alloy steel tubes with specified elevated temperature properties
<a href="#">DIN EN 10297-2 (02/2006)</a>	seamless circular steel pipes for machine construction and general technical

	applications, stainless steel
SEW 310 (08/1992)	physical properties of steel
SEW 470 (02/1976)	heat-resisting rolled and forged steels

#### PROCESS INFORMATION

<b>Chip removing process</b>	process in annealed state, due to cold work hardening low cutting speed keep constant cutting tool contact
<b>Welding</b>	
<b>- Material classification acc. CEN ISO/TR 15608</b>	<b>8,2</b>
<b>- Type</b>	well weldable all methods of welding
<b>- Add. material</b>	2.4806/2.4807

#### MAIN FIELDS OF APPLICATION

<b>Details of application</b>	scaling resistant in air up to 2012°F corrosion and heat resistant
<b>Certifications</b>	Nace MR 01-75
<b>Steam boiler construction</b>	
<b>industrial furnace engineering</b>	
<b>Apparatus engineering</b>	
<b>crude oil</b>	

#### RANGE OF PRODUCTS

<b>Product type</b>	<b>Product</b>
Plates / Sheets	plates/sheets plate/sheet cuts
Fittings	welded elbows welded reductions Welded T-pieces seamless elbows seamless reductions seamless T-pieces
Flanges / Collars / Flared tube ends	various flanges (weld neck flange, blind flange etc.)
Pipes / Tubes	welded pipes/tubes

	seamless pipes/tubes
Bar steel	flat steel round bar steel

[Pipe/Tube/Fitting/Flange/Valve/Plate](#)

Stainless Steel/Nickel Alloy/Duplex

