

Incoloy 800H | Alloy 800H | W.Nr. 1.4958 Chemical Compositions-Data Sheet

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Alloy 800H

- is a variant of alloy 800 with a specified minimum carbon content. In contrast to alloy 800, alloy 800H is solution annealed. This results in optimized creep properties at high temperatures. Along with good mechanical long-term properties, the alloy offers resistance to oxidation and carburization up to approx. 1000 °C. As a result of its nickel content of approx. 30%, alloy 800H tends not to precipitate sigma phase.
- also exhibits good resistance to sulfur-containing media in certain temperature ranges.
- Owing to the material's versatile applicability, combined with its reasonable price/performance ratio and good processing characteristics, it is widely used as a construction material.

Application

- Components for heat treatment plants, such as jet tubes, muffles, and baskets
- Petrochemical plant/equipment components exposed to hydrogen sulfide
- Pigtails, collectors and waste heat boilers in reformers
- Convection zone piping in ethylene furnaces and other pyrolysis furnaces
- Parts exposed to hydrogen, e.g. in hydrogen production
- Steam superheater tubes in the power plant industry

Specifications

DIN Designation	X10NiCrAlTi32-21 ¹⁾
DIN Material Number	1.4876 ¹⁾
VdTUV Datasheet	434
UNS	N08810 (800H)
ASTM	B 163, B 366, B 407, B 408, B409, B 514/515, B 564
ASME	SB 163, SB 407, SB 408, SB 409, SB 514, SB 564

¹⁾ different Designations/Material Numbers are possible depending on manufacturer or specification

Delivery Forms

Sheet	hot or cold rolled, solution annealed, descaled or with oxidized surface
Strip	cold rolled, solution annealed, pickled or cold rolled, bright annealed
Pipe	longitudinally welded or seamless, solution annealed, pickled or bright annealed
Bar	rolled or forged, solution annealed, machined on request
Wire	rolled or drawn
Forging	solution annealed, machined on request

Do you require other delivery forms or finishes? We will be glad to discuss your needs with you over the phone.

Further information under:

<https://www.ncalloys.com/alloys/incoloy/incoloy-800h/>

Processing Instructions

Alloy 800H is cold and hot deformable. Its cold formability is similar to that of conventional stainless CrNi steels. With degrees of deformation $\geq 5\%$, hot working is performed in the temperature range of 1200 to 950 °C, and with degrees of deformation $< 5\%$, the temperature is 1050 to 850 °C. With components subject to acceptance testing requirements, solution annealing should be repeated after hot forming in general, and after cold forming with degrees of deformation $\geq 10\%$. The furnace should be adjusted to maintain a slightly reducing atmosphere in order to prevent too much oxidation. Care must be taken to avoid a sulfur containing atmosphere. Alloy 800H can be easily machined using all standard processes.

Heat Treatment

Solution annealing: 1150 – 1200 °C

Cooling: water, air or inert gas

Alloy 800H should be cooled as rapidly as possible through the range 760 to 540 °C.

Welding

The welding of alloy 800H is preferably carried out on using GTAW (TIG) and GMAW (MIG) gas metal arc welding processes as well as the SMAW (coated electrode). The components to be joined should be in a stress-free and bright condition. Among others, care must be taken to apply low heat input in order to minimize hot cracking susceptibility. Preheating and post-weld heat treatment are normally not required.

Chemical Composition*

	Co	C	Cr	Cu	Mn
Min.	-	0,06	19	-	-
Max.	1.00	0.10	23	0.75	1.50
	Ni	Si	Ti+Al ₁₎	Fe	
Min.	30	-	-	Bal.	
Max.	34	1.0	0.7	Bal.	

* weight %

1) Al + Ti $\leq 0.7\%$ for operating temperature < 700 °C acc. to VdTÜV Datasheet 434

Physical Properties

Melting temperature range	1355 – 1385 [°C]
Density*	7950 [kg · m ⁻³]
Modulus of elasticity*	196 [GPa]
Specific heat*	502 [J · kg ⁻¹ · K ⁻¹]
Thermal conductivity*	11.7 [W · m ⁻¹ · K ⁻¹]
Coefficient of thermal expansion 20-100°C	14.2 x 10 ⁻⁶ [K ⁻¹]
Specific electrical resistivity*	0.99 [Ω · mm ² · m ⁻¹]
Permeability* 200 Oe	min 1.01
Curie temperature	< - 115 [°C]

* at room temperature

Mechanical Properties at Room Temperature*

R _{p0.2} min [MPa]	170
R _m [MPa]	450 - 700
A min [%]	30

* mean values

Creep Strength*

Temperature [°C]	600	650	700	750
R _{m/10 000} [MPa]	152	107	75	52
R _{m/100 000} [MPa]	114	77	53	36
Temperature [°C]	800	850	900	950
R _{m/10 000} [MPa]	37	25	17	11.5
R _{m/100 000} [MPa]	24	16	10.5	7

* for further values, see VdTÜV Datasheets

Welding Filler Metal*

	DIN EN ISO	Alloy Designation
Bar (GTAW)	18274	Ni6082
	18274	Ni6625
Wire (GMAW)	18274	Ni6082
	18274	Ni6625
Coated electrode (MMA)	14172	Ni6625

* for TÜV approval, please inquire

We will be glad to provide you with information and instructions on machining and processing as well as selection of filler metals. Please do not hesitate to call us.

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Last revision: January 2026