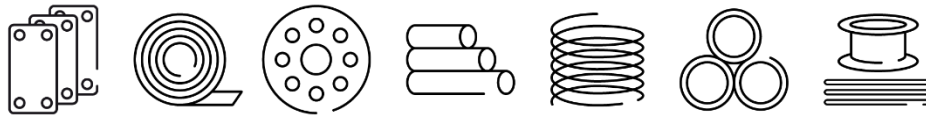


Alloy 825 | NiCr21Mo | 2.4858

High Performance Alloys Data Sheet



Zapp is Certified to ISO 9001



Alloy 825

- belongs to the group of highly corrosion-resistant nickel-iron-chromium alloys.
- is resistant to reducing and oxidizing hot acids, e.g. pure phosphoric acids of various concentrations and temperatures.
- exhibits good resistance to wet sulfur oxide and numerous acid mixtures, especially when they contain significant amounts of sulfuric acid. Owing to its nickel content of approx. 38%, the material offers high resistance to stress-crack corrosion in chloride-containing media where austenitic Cr-Ni steels can be attacked.
- exhibits good strength and toughness and can be processed like stainless Cr-Ni steel.

Application

- Chemical process engineering, e.g. phosphoric and sulfuric acid evaporators
- Pickling plants and installations, e.g. agitators, pump components and filter systems
- Plants for salt processing, e.g. centrifuges, piping, gate valves and dampers
- Storage and transport vessels for acids
- Onshore and offshore engineering, e.g. heat exchangers, product piping and transfer lines

Further information under:

<https://www.zapp.com/en-us/materials/high-performance-alloys-ni-co-ti>

Specifications

DIN Designation	NiCr21Mo
DIN Material Number	2.4858
VdTÜV Datasheet	432/1, 432/2, 432/3
UNS	N08825
DIN	17744, 17750, 17751, 17752, 17753
ASTM	B 163, B 423, B 424, B 425
ASME	SB 163, SB 423, SB 424, SB 25
BS	3072/NA16, 3073/NA16, 3074/NA16, 3076/NA16

Delivery Forms

Sheet	hot or cold rolled, heat treated, pickled or de-scaled
Strip	hot or cold rolled, heat treated, pickled or de-scaled
Pipe	seamless or longitudinally welded, heat treated, pickled or de-scaled
Wire	rolled or drawn, heat treated, pickled or de-scaled
Bar	hot rolled or forged, heat treated, pickled or de-scaled
Forging	heat treated, machined on request
Welding filler metal	welding rod, wire electrode coated rod electrode

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

Processing Instructions

Material 825 alloy is cold and hot formable. The recommended working range for hot forming is between 1200 and 900 °C. In order to guarantee optimal corrosion resistance combined with good mechanical-technological properties, the final forging operation should be carried out below 1080 °C. Annealing is required after hot forming in general and after cold forming with degrees of deformation > 15 %. A sulfur-free furnace atmosphere should be maintained if possible. If the absence of sulfur cannot be guaranteed, annealing should be conducted under oxidizing conditions. The process must not be permitted to alternate between oxidizing and reducing conditions under any circumstances.

Heat Treatment

Annealing: 920 – 980 °C, duration depending on thickness of semi-finished product
Cooling: water or air

Welding

The welding of Material 825 is preferably carried out on like materials using the GTAW and GMAW gas metal arc welding process and the fusion arc welding process. Owing to the tendency to hot crevice susceptibility, the semi-finished products should be processed in a stress-free, metallic bright condition and be free of dirt. In order to achieve, among other things, an optimal corrosion resistance, care must be taken to apply a low amount of heat during welding. Preheating or secondary heat treatment is generally unnecessary.

Chemical Composition*

	C	Si	Mn	P	S	Cu
Min.	-	-	-	-	-	1.50
Max.	0.025	0.50	1.00	0.020	0.010	3.00
	Mo	Cr	Ti	Al	Ni	Fe
Min.	2.50	19.5	0.60	-	38.0	Bal.
Max.	3.50	23.5	1.20	0.20	46.0	Bal.

* weight %

Physical Properties

Melting temperature range	1370-1400 [°C]
Density*	8118 [kg · m ⁻³]
Modulus of elasticity* (approximately)	195 [GPa]
Specific heat*	500 [J · kg ⁻¹ · K ⁻¹]
Thermal conductivity*	11.0 [W · m ⁻¹ · K ⁻¹]
Coefficient of thermal expansion 20-100°C	14.0 x 10 ⁻⁶ [K ⁻¹]
Specific electrical resistivity*	1.12 [Ω · mm ² · m ⁻¹]

* at room temperature

Mechanical Properties at Room Temperature

Semi-finished product form	Sheet ≤ 20 mm thickness, pipe ≤ 8 mm wall thickness	Forging ≤ 240 mm thickness
	R _{p 0.2} min [MPa]	235
R _m [MPa]	550-750	550-750
A min [%]	30	35

Mechanical Properties at Elevated Room Temperatures*

Semi-finished product form	Strength parameter	Temperature °C			
		100	200	300	400
Sheet ≤ 20 mm thickness, pipe ≤ 8 mm wall thickness	R _{p 0.2} [MPa]	205	180	170	160
Forging ≤ 240 mm thickness	R _{p 0.2} [MPa]	190	165	155	145

* minimum values

Welding Filler Metal

	DIN EN ISO	Alloy Designation
Bar (GTAW)	18274	Ni8125
Wire (GMAW)	18274	Ni8125
Coated electrode (MMA)	14172	Ni8025

We will be glad to provide you with information and instructions on machining and processing and on the selection of suitable welding filler metal. Please do not hesitate to call us.

Zapp Precision Metals GmbH
HIGH PERFORMANCE ALLOYS
Zapp-Platz 1
40880 Ratingen
Phone +49 2102 710-204
Fax +49 2102 710-391
highperformancealloys@zapp.com

SERVICE CENTER DEUTSCHLAND
Zapp Precision Metals GmbH
HIGH PERFORMANCE ALLOYS
Hochstraße 32
58425 Unna
www.zapp.com

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