

Inconel 625 | Alloy 625 | W.Nr. 2.4856 Chemical Compositions-Data Sheet

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Alloy 625

- is a corrosion-resistant nickel-chromium-molybdenum alloy has good resistance properties even at elevated temperatures. Its high nickel, chromium and molybdenum contents promote good resistance to chlorine-induced stress-crack corrosion as well as pitting and crevice corrosion.
- Grade 1 describes the alloy in annealed and Grade 2 the solution annealed form.
- due to its outstanding hot-strength and wear properties combined with its good resistance to oxidation and carburization, Material 625 can be used at temperatures of up to 1000 °C. For application temperatures above 600 °C, the solution-annealed finish should be selected. In the temperature range between approx. 650 °C and 850 °C, this alloy has a tendency to become brittle. This must be taken into account in the design of the plant/equipment.

Application

- Offshore engineering plants/equipment
- Plants for the manufacture or processing of sulfuric, phosphoric, nitric, hydrofluoric and hydrochloric acid, as well as organic acids and alkali
- Flue gas purification systems
- Plants for the processing of oil and natural gas

Specifications

DIN Designation	NiCr22Mo9Nb
DIN Material Number	2.4856
VdTÜV Datasheet	499
UNS	N06625
DIN	17744, 17750, 17751, 17752, 17753
ASTM	B 443, B 444, B 446, B 704, B 705
ASME	SB 443, SB 444, SB 446, SB 704, SB 705
BS	3072/NA21, 3074/NA21, 3076/NA21
SAE	AMS 5599, AMS 5666, AMS 5837

Delivery Forms

Sheet	hot or cold rolled, heat treated, pickled
Strip	cold rolled, heat treated pickled or cold rolled, bright annealed
Pipe	longitudinally welded or seamless, heat treated, pickled or bright annealed
Rod	rolled or forged, heat treated
Wire	rolled or drawn
Forging	heat treated, machined on request
Welding filler metal	welding bars, wire electrodes, coated bar electrodes

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/inconel/inconel-625/>

Processing Instructions

Material 625 alloy is cold and hot formable. For degrees of deformation over 15%, we recommend soft annealing followed by quenching in water, in order to achieve the optimum corrosion resistance. Hot forming is carried out in the temperature range between 1175 and 900 °C. All workpieces should be freed of oil, grease, paint and other contaminants prior to heating. A sulfur-free furnace atmosphere that is neutral or slightly oxidizing must be maintained.

Heat Treatment

Stress-relief annealing: 600 – 810 °C

Annealing: 900* – 1050 °C

Solution annealing: 1093 – 1200 °C

Heat-up: rapid heat-up is helpful.

Cooling: water, forced inert gas, or forced air

* Minimum temperature

Welding

Alloy 625 can be welded using the GTAW and GMAW gas metal arc welding processes as well as MMA welding processes as joint and build-up welding between like materials. The semi-finished products to be welded should be processed in a stress-free, metallic bright condition and be free of dirt. Care must be taken to apply a low amount of heat during welding. Preheating or secondary heat treatment is generally unnecessary.

Chemical Composition*

	Al	C	Co	Cr	Fe	Mn
Min.	-	-	-	21.0	-	-
Max.	0.40	0.030	1.0	23.0	5.0	0.5
	Mo	Nb/Ta	Si	Ti	Ni	
Min.	8.0	3.2	-	-	Bal.	
Max.	10.0	3.8	0.40	0.40	Bal.	

* weight %

Physical Properties

Melting temperature range	1290-1350 [°C]
Density*	8440 [kg · m ⁻³]
Permeability* 1000 Oe	1.01
Modulus of elasticity* (dynamic, solution annealed)	205 [GPa]
Shear modulus* (dynamic, soft annealed)	80 [GPa]
Specific heat*	410 [J · kg ⁻¹ · K ⁻¹]
Thermal conductivity*	9.8 [W · m ⁻¹ · K ⁻¹]
Coefficient of thermal expansion*	12.8 x 10 ⁻⁶ [K ⁻¹]
Specific electrical resistivity*	1.3 [Ω · mm ² · m ⁻¹]

* at room temperature

Mechanical Properties at Room Temperature*

Condition	Annealed	Solution annealed	
Semi-finished product form* Bar	Up to 102 mm	From 102 – 254 mm	All
R _{p0.2} min [MPa]	410	345	275
R _m [MPa]	825	755	690
A _{min} [%]	30	25	30

* diameter or distance between two parallel surfaces

Mechanical Properties at Elevated Temperatures*

Semi-finished product form* Bar	Strength parameter	Temperature °C				
		Room temp.	100	200	300	400
Cold rolled Annealed	R _{p0.2} [MPa]	380	350	320	300	280
Cold rolled Annealed	R _m [MPa]	760	740	700	685	670

* acc.to VdTÜV Data Sheet

Welding Filler Metal

	DIN EN ISO	Alloy designation
Bar (GTAW)	18274	Ni 6625
Wire (GMAW)	18274	Ni 6625
Coated bar electrode (MMA)	14172	Ni 6625

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.

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