Ualloy625A (Alloy 625)

Inconel 625 refers to alloy 625, UNS N06625, belongs to Ni-Cr base solution strengthened nickel base alloy. It maintains stable mechanical property from crystallization to 980°C（1796°F）.

Cr helps alloy 625 resistant to oxidation and thermal corrosion.

Mo helps to refine austenite grains so as to deliver higher yield strength to alloy625 itself.

Nb helps to improve the creep property.

Inconel 625 |Nickel Alloy 625 Chemical Composition

	Ni	Fe	Mn	C	Si	S	Cr	Al	Ti	Nb+Ta	Mo	P	Co
Min	58						20			3.15	8.0		if determined
Max		5.0	0.5	0.1	0.5	0.015	23	0.4	0.4	4.15	10	0.015	1.0

Nickel Alloy 625 Grade 1 vs Grade 2 Mechanical Properties

Garde	Tensile Strength Min.	0.2% Offset Yield strength Min.	Elongation in 2 in (50mm) or 4D min. %	Microstructure
ASTM B564 | ASTM B446 Garde 1 ≦4''(102mm)	120ksi(827Mpa)	60 ksi (414 Mpa)	30	
Garde 1 4-10'' (102-254mm)	110ksi(758Mpa)	50 ksi (345 Mpa)	25	
ASTM B564 | ASTM B446 Grade 2	100ksi(689Mpa)	40 ksi (275Mpa)	30	

Web: Ualloy.com
Tel: 86-0571-63255636
Fax: 86-0571-63256181
E: sales@ualloy.com

Information presentation property of Ualloy

AMS 5666 ≦4''(102mm)	120ksi(827Mpa)	60 ksi (414 Mpa)	30	Finer than No.5
AMS 5666 4-10'' (102-254mm)	110ksi(758Mpa)	50 ksi (345 Mpa)	25	Finer than No.4

Inconel 625 |Nickel Alloy 625 Heat Treatment

Standard	Solution
ASTM B564 |B446 Grade1	Annealed 1600°F (871 °C) minimum.
ASTM B564 |B446 Grade2	Solution annealed at 2000°F (1093 °C) minimum, with or without subsequent stabilization anneal at 982 °C minimum to increase resistance to sensitization.
AMS 5666	Annealed 1616°F (880 °C), 2 hours.

Nickel Alloy 625 Coefficient of Thermal Expansion

Physical Property	°C	Metric Units	°F	British Units
Mean Coefficient of Thermal Expansion	20-204	13.1x10(-6)m/m-°C	68-400	7.3 micrinches/in.-°F
	20-316	13.5	68-600	7.5
	20-427	13.9	68-800	7.7
	20-538	14.4	68-1000	8.0
	20-649	15.1	68-1200	8.4
	20-760	15.7	68-1400	8.7
	20-871	16.6	68-1600	9.2
	20-982	17.3	68-1800	9.6

Solution temperature reflection on Alloy 625 hardness

Web: Ualloy.com
Tel: 86-0571-63255636
Fax: 86-0571-63256181
E: sales@ualloy.com

Information presentation property of Ualloy

Solution T	970°C 1778°F	990°C 1814°F	1050°C 1922°F	1120°C 2048 °F	1160°C 2120°F
Hardness HBS	217	207	197	187	187

Nickel Alloy 625 Cladding

Alloy 625 welding wires and rods are used for joining base materials such as UNS N06625, UNS N08825, and other common steel.
Valve surface weld overlay
Pipeline weld overlay
Waste Incineration Furnace

Process	Diameter	Voltage	Amperage	Gas
TIG	0.035''(0.9mm)	12.15	60-90	100% Argon
	0.045''(1.2mm)	13.16	80-110	100% Argon
	1/16''(1.6mm)	14.118	90-130	100% Argon
	3/32''(2.4mm)	15.2	120-175	100% Argon
	1/8''(3.2mm)	15.2	150-220	100% Argon
MIG	0.035''(0.9mm)	26-29	150-190	75% Argon+25% Helium
	0.045''(1.2mm)	28-32	180-220	75% Argon+25% Helium
	1/16''(1.6mm)	29-33	200-250	75% Argon+25% Helium
SAW	0.035''(0.9mm)	28-30	275-350	Suitable Flux may be used
	0.045''(1.2mm)	29-32	350-450	Suitable Flux may be used
	5/32''(4.0mm)	30-33	400-550	Suitable Flux may be used

Alloy 625 Oxidation Resistance

Cyclic Oxidation/h	100	200	300	400	500	600	700	800

Web: Ualloy.com
Tel: 86-0571-63255636
Fax: 86-0571-63256181
E: sales@ualloy.com

Information presentation property of Ualloy

Weight Change/%	980°C	0.086	0.065	0.065	0.048	0.021		0.03	-0.081
	1095°C	-0.182	-1.086	-3.335	-5.399	-6.566	-10.066		

Nickel Alloy 625 Corrosion Resistance

It has strong resistance to pitting, crevice corrosion and stress corrosion generated by oxidation and reducing acids.

Alloy 625 SCC (Stress Corrosion Cracking)

Test conditions and results of Inconel 625 specimens in air and high temperature steam

Test step	Temperature / °C	Medium environment	Loading method	CGR / mms^{-1}	Duration / h
S1	700	Air	Constant *K*	3.39×10^{-8}	146
S2	700	Water vapor	Constant *K*	5.43×10^{-8}	161
S3	750	Air	Constant *K*	4.66×10^{-7}	145
S4	750	Water vapor	Constant *K*	5.06×10^{-7}	148
S5	725	Air	Constant *K*	1.48×10^{-7}	156
S6	725	Water vapor	Constant *K*	2.08×10^{-7}	172

Web: Ualloy.com
Tel: 86-0571-63255636
Fax: 86-0571-63256181
E: sales@ualloy.com

Information presentation property of Ualloy

Nickel Alloy 625 Bolts | Bellows | Fittings | Flange Mechanical Property

Garde	Tensile Strength Min.	0.2% Offset Yield strength Min.	Elongation in 2 in (50mm) or 4D min. %	Microstructure
ASTM B564	ASTM B446 Garde 1 ≦4''(102mm)	120ksi(827Mpa)	60 ksi (414 Mpa)	30	
Garde 1 4-10'' (102-254mm)	110ksi(758Mpa)	50 ksi (345 Mpa)	25	
ASTM B564	ASTM B446 Grade 2	100ksi(689Mpa)	40 ksi (275Mpa)	30	
AMS 5666 ≦4''(102mm)	120ksi(827Mpa)	60 ksi (414 Mpa)	30	Finer than No.5
AMS 5666 4-10'' (102-254mm)	110ksi(758Mpa)	50 ksi (345 Mpa)	25	Finer than No.4

Alloy 625 Machining

Tool Type	Application
High speed steel	complex surface processing

Web: Ualloy.com
Tel: 86-0571-63255636
Fax: 86-0571-63256181
E: sales@ualloy.com

Information presentation property of Ualloy

High speed steel containing cobalt	Low cutting speed
Carbide cutting tool	The cutting speed is higher than that of high-speed steel Semi-finishing and finishing
Silicon nitride ceramics	Higher cutting speed than carbide tools Semi-finishing and finishing
PCBN tool	Continuous cutting

Alloy 625 | Inconel 625 Embrittlement

It shows a pronounced susceptibility to hydrogen embrittlement at room temperature.

Alloy 625 | Inconel 625 Modulus of Elasticity

Web: Ualloy.com
Tel: 86-0571-63255636
Fax: 86-0571-63256181
E: sales@ualloy.com

Information presentation property of Ualloy

θ/°C	20	95	205	315	425	540	650	760	870
E/GPa	205	200	195	190	185	175	170	160	146

Inconel 625 |Nickel Alloy 625 Applications

Marine equipment
Exhaust systems of aircraft, automobiles and motorsports
Thrust-reverser assemblies
Expansion joints
Furnace muffles
Reactors of petrochemicals, nuclear, refineries
Weld overlay and spacers for energy recycle systems (ERS)
Offshore oil rigs
Pollution control equipment components
Springs, sealings, special fasteners, special valve seats
Bellows and gaskets
Fuel nozzles
Afterburners
Turbine scrolls

Inconel is a trademark of high-performance nickel-based alloys developed by Special Metals Corporation.

Web: Ualloy.com
Tel: 86-0571-63255636
Fax: 86-0571-63256181
E: sales@ualloy.com

Information presentation property of Ualloy