



Quick Facts

- Nickel Chromium alloy
- Available in hot worked and annealed condition
- High strength and outstanding corrosion resistance
- Range of service temperatures from cryogenic to 980°C
- Excellent weldability
- Low magnetic permeability
- Commonly referred to as Inconel® 625

Alloy 625 is a nickel-chromium alloy which gains its stiffening effect through molybdenum and niobium additions, therefore eliminating the need for this alloy to be aged. It has superior resistance to a wide range of corrosive environments as well as the high temperature effects of oxidation and carburisation.

Alloy 625 is excellent for sea-water applications, having freedom from pitting and crevice corrosion, high corrosion fatigue strength and resistance to chloride-ion stress corrosion cracking. This alloy also has high tensile, creep and rupture strength, fatigue and thermal fatigue strength and oxidation resistance, making it suitable for aircraft engine exhaust systems, housing engine controls and aircraft ducting systems. It is also used in the nuclear field for reactor cores, control rod components in nuclear water reactors.

Typical Applications

Typical applications are combustion system transition liners, propeller blades, seals, fasteners, pumps, turbine shroud rings, heat exchanger tubing, reaction vessels, distillation columns, heat exchangers and valves.

Stock Range

We stock a comprehensive range of round bar sizes between 12.7mm and 260mm diameter.

We can also supply flat bar, rings, blocks and slabs.

Primarily manufactured in Europe and USA



Industry Specifications

- ASTM B164/564 (2019)
- BS 3076 NA21 (1989)
- UNS N06625
- AMS 5666 (Currently Rev J)
- NACE MR0175/ISO15156
- Werkstoff Nr. 2.4856

Material may also be supplied to Customer specifications, subject to enquiry

Chemical Analysis

Typical Analysis:

	C	Mn	Si	P	S	Cr	Ni	Co	Ti	Al	Mo	Nb+ Ta	Fe	-
Min	-	-	-	-	-	20.0	58.0	-	-	-	8.0	3.15	-	%
Max	0.10	0.50	0.50	0.15	0.15	23.0	-	1.0	0.40	0.40	10.0	4.15	5.0	%

Material Condition

The majority of our material is hot worked and soft annealed (Grade 1) condition which offers the best combination of strength and corrosion resistance. We also supply solution annealed (Grade 2) material if required.

Heat Treatment

Typical annealing cycle is 929 - 1037°C (1700-1900°F)/ soak time dependant on section size. Solution treatments cycles are typically in the range 1093 - 1204°C (2000 - 2200°F) are more common for hot worked product. Cooling rate has no effect on Alloy 625.

Corrosion Resistance

ASTM G28 Method A – corrosion rate of 3mm per year maximum



Mechanical Properties

Typical properties for Annealed Grade 1 up to 100mm section:

Tensile (PSI (MPA))	Yield (0.2% offset), (PSI (MPA) Min)	Elongation in 2" or 4D min%	Reduction of Area	Rockwell Hardness HRC Max	Charpy Impacts at -70°C Joules (ftlb) min
120,000 (827)	60,000 (413)	30	35	35	Average 42 (31) Single 33(25)

Machinability

Alloy 625 should be machined in the heat-treated condition as this alloy is prone to work hardening. For that reason, low cutting speeds should be used and the tool should be engaged at all times.

Physical Properties

Typical properties at room temperature in the annealed condition:

Melting Range	1290°C - 1350°C (2350°F- 2460°F)
Room Temp Density	8.44 g/cm ³ (0.305 lb/in ³)
Young's Modulus	207.5 GPa (30.1 x 103 KSI)
Shear Modulus	81.4 GPa (11.8 x 103 KSI)
Poisson's Ratio	0.278
Thermal Conductivity	9.8W/m. °C (688tu-in./ft2hr.- °F)
Specific Heat	410 Joules/kg-K (0.098 Btu/lb°F)
Curie Temperature	-196°C (<-320°F)
Mean Coefficient of expansion Annealed 20-100°C (70-212°F)	12.8 µm/m•°C (7.1x10-6 in/in°F)
PREN	40.8
Magnetic Permeability @ 200 Oersted	1.0006



All material we supply has full traceability with inspection certification in accordance with BS EN 10402 3.1. We can supply material with intent of BS EN 10402 3.2 inspection certification on request.

We have onsite PCN and SNT Level II inspectors who can test material to your requirements.

All information included in this sheet is intended as a guide only and is correct to the best of our knowledge.