



INDUSTRIAL USES OF NICKEL



Due to their combination of excellent mechanical properties, corrosion resistance and formability nickel and its alloys have numerous uses across a wide range of industries. With the focus on applications such as aerospace, chemical processing and oil and gas extraction it is easy to overlook some of the smaller applications but they are no less important and the unique combination of properties offered by nickel alloys can be utilised to great effect.

NICKEL 201 is commercially pure nickel and exhibits good mechanical properties and corrosion resistance. It also has high thermal and electrical conductivities making it suitable for components in the electrochemical field.

ALLOY 625 is resistant to a wide range of aqueous corrosion environments due to its contents of chromium and molybdenum and can be used for gaskets, fittings and flanges in contact with varied aggressive chemicals. ALLOY 625 is also resistant to high temperature corrosion and has high strength at temperatures up to 815 °C. Being highly formable the alloy is ideally suited to sheet fabrications such as bellows, ducting and exhaust systems. Also utilised in these applications is **ALLOY 625HP/625LCF** – a special variant of ALLOY 625 which is produced by vacuum melting and is specially processed to achieve a fine grain size. This gives the material increased ductility and enhanced low cycle fatigue resistance. ALLOY 625HP/625LCF can offer a fatigue life up to 100 times that of conventional 625 which

is desirable particularly in automotive exhaust systems that are subjected to repeated thermal and mechanical cycling.

Due to its high nickel content **ALLOY 718** also has good resistance to stress corrosion cracking. Additions of chromium and molybdenum give resistance in many types of corrosive media and to local corrosion such as pitting and crevice corrosion. We can supply ALLOY 718 in the annealed condition (according to AMS 5662) and also in the fully precipitation treated condition (according to AMS 5663) depending on requirements. Machining in the fully heat treated condition improves the surface finish and dimensional stability whereas machining in the annealed condition offers optimum machinability and tools life. Parts can subsequently be precipitation heat treated to develop full strength. Due to its high strength and corrosion resistance ALLOY 718 is used for valve components and for bolting and fastener applications.

ALLOY 36 is a binary Iron-Nickel alloy containing 36% nickel. One of the key benefits of this grade is its low coefficient of thermal expansion making it ideal for applications requiring high dimensional stability such as in laser components and measuring systems. ALLOY 36 also has good low temperature properties and maintains good toughness at temperatures down to -250 °C making it suitable for cryogenic service.

ALLOY PROPERTIES

	Specifications	Key attributes	Application
NICKEL 201 N02201 2.4068	Sheet/strip: ASTM B162	Good mechanical properties and corrosion resistance with high electrical conductivity	Electrical and electronic parts, electrochemical industries
ALLOY 625 N06625 2.4856	Bar: AMS 5666, ASTM B446, NACE MR-0175 Sheet/plate: AMS 5599, 5879	A Ni-Cr-Mo alloy with resistance to sea water, severely corrosive environments and high temperature corrosion combined with high strength from cryogenic temperatures to 815 °C	Fittings and flanges, gaskets, chemical plant hardware, sea water service
ALLOY 625HP N06626 2.4856	Sheet/strip AMS 5879	Special variant of ALLOY 625 with enhanced ductility and fatigue resistance	Automotive exhaust systems, flexible couplings and bellows, expansion joints
ALLOY 718 N07718 2.4668	Bar: AMS 5662 (annealed), AMS5663 (aged), ASTM B637 Sheet/plate: AMS5596 (annealed), ASTM B670	Combines high strength at temperatures up to 700 °C with excellent corrosion resistance	Valve body, stem, seat and other valve components, fasteners and bolting
ALLOY 36 K93603 1.3912	Bar: ASTM F-1684 Sheet/plate: ASTM F1684	A binary iron-nickel (36%) alloy which has a low thermal expansion coefficient and good toughness at -250°C	Used for cryogenic service and also in applications which require high dimensional stability such as measurement and laser systems