



OIL AND GAS EXTRACTION

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NICKEL ALLOYS FOR DEMANDING APPLICATIONS

Stainless steels and nickel-based alloys have long found application in the oil and gas industry for exploitation of sour crudes. Due to the combination of increasing pressures, temperatures and quantities of chlorides and hydrogen-sulphide extensive use is now being made of the speciality Ni-Cr-Mo alloys for extremely severe corrosive applications. High temperature strength, corrosion resistance and ease of fabrication are all important considerations. Materials for oil and gas extraction span a wide range of grades and compositions. In nickel alloys the primary factors for corrosion resistance are the levels of nickel, chromium and molybdenum. Additions of small amounts of other elements such as copper, niobium, titanium, aluminium and tungsten can have significant effects on corrosion resistance or strength. **Alloys 400 and K-500** have excellent resistance

to sea water and with their high nickel content are immune to chloride induced stress corrosion cracking making them ideally suited for use as pump and valve components. **Alloys 825 and 625** are widely used in this sector due to their combination of excellent general corrosion resistance and mechanical properties. Their applications range from sea water piping and heat exchangers to bellows and expansion joints. For resistance to hydrogen sulphide stress corrosion cracking in down hole applications **Alloy C-276** can be considered. The combination of its high nickel, molybdenum and chromium contents makes it one of the most corrosion resistant grades on the market.

If you would like to know more about these alloys and availability please contact us via info@bibusmetals.com.

ALLOY PROPERTIES

	Composition (%)	Key attributes	Application
Alloy 400 N04400 2.4360	65Ni – 32Cu – 1.6Fe – 1.1Mn	A solid solution strengthened Ni-Cu alloy. Its sea water corrosion resistance and mechanical properties make it an ideal material for marine applications	Bolting, valves, pump shafts, bellows expansion joints and heat exchangers
Alloy K-500 N05500 2.4375	65Ni – 30Cu – 2.7Al – 1Fe – 0.6Ti	A precipitation hardened alloy combining the corrosion resistance of Alloy 400 with increased strength	Pump and propeller shafts, valves and fasteners
Alloy 800H/HT N08810/N08811 1.4958 / 1.4959	46Fe – 32.5Ni – 21Cr – 0.85-1.2 Al+Ti	As Alloy 800 but with improved creep and stress-rupture properties for applications above 650 °C. Resistant to high temperature oxidation, carburisation and nitridation	Flare stacks, heat exchangers
Alloy 825 N08825 2.4858	42Ni – 28Fe – 21Cr – 3Mo – 2Cu – 1Ti	A Ni-Fe-Cr alloy with additions of Mo and Cu developed for use in aggressively corrosive environments. Resists a wide range of general and localised corrosion, chloride ion stress corrosion cracking, pitting and intergranular corrosion	Sea water cooled heat exchangers, offshore piping systems, valves and fittings
Alloy 625 N06625 2.4856	61Ni – 21.5Cr – 9Mo – 3.6Nb – 2.5Fe	A Ni-Cr-Mo alloy with resistance to severely corrosive environments and with high strength from cryogenic temperatures to 815 °C	Bellows expansion joints, fittings, valves, instrument tubing, sea water piping and heat exchangers
Alloy C-276 N10276 2.4819	57Ni – 16Mo – 16Cr – 5Fe – 4W	An alloy with excellent resistance to reducing and mildly oxidising environments. Resistant to localised attack and H ₂ S stress corrosion cracking	Downhole tubing and couplings

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