

# FERROUS METALS

## Nickel and Cobalt Alloys



SPECIFICATION	GRADE	TYPE OF STEEL	AFNOR	DIN	WERKSTOFF	AISI	ACI	AMS	1970 EN	CHARACTERISTICS AND TYPICAL APPLICATIONS
ANC 11	-	Ni 21% Cr 10% Mo 10% Co	NC21DK 10	-	-	-	-	-	40	Medium strength alloy, excellent resistance to oxidation and thermal fatigue at temperatures over 1000°C. Good thermal shock resistance upto 1100°C. Typical application is Gas turbine stator blades.
ANC 13 (ST31)	-	Co 26% Cr 10% Ni 7% W	KC 25 NW	Co Cr 25 Ni W	2.4966	-	-	5382E	-	A cobalt base superalloy with high wear and corrosion resistance, excellent stress-rupture properties, resistance to thermal and mechanical shock and corrosion resistance. It is commonly used in the hottest sections of industrial gas turbines.
ANC 14 (ST 8)	-	Co 27% Cr 5.5% Mo 2.7% Ni	KD 27 DN	Co Cr 28 Mo	2.4979	-	-	5385D	34	High strength and heat resistant alloy. Good resistance to oxidation and corrosion at high temperatures. Typical applications are impellers, gas turbines, valves at high service temperatures.
ST 6	-	Co 30% Ni 4% W 5%	-	-	-	-	-	5788	-	Hard alloy, very wear resistant at high temperatures. General-purpose wear resistance applications. Valve seats and gates, pump shafts and bearings, erosion shields and rolling couples.
ANC 15 (Hastelloy B)	-	Ni 28% Mo	ND28Fe KV	Ni Mo 30	2.4482	-	-	5396	-	Used typically for parts, such as exducers and fans, requiring good corrosion resistance and strength, usage is not limited to such applications. Gas turbine bolting and shafting.
ANC 16 (Hastelloy C)	-	Ni 17% Mo 16.5% Cr 4.5% W	NCD 16 Fe	Ni Mo 16 Cr W	2.4537	-	CW 12	5388C	-	Primarily for parts and assemblies, such as turbine rotors, shafts, blades, and bolts, requiring high strength up to 1500°F (816°C) and oxidation resistance up to 2000°F (1093°C).
ANC 17 (Hastelloy D)	-	Ni 9% Si 3% Cu	-	Ni Si 10 Cu	2.4566	-	-	-	-	Good corrosion resistance, particularly when used with hot sulphuric acid. Used in chemical plant components.
Hastelloy B2	-	Ni 69% Mo 28% Fe 1%	-	-	2.4617	-	-	-	-	Nickel-base wrought alloy with excellent resistance to hydrochloric acid at all concentrations and temperatures. Therefore, it has great resistance to stress-corrosion cracking and pitting. It also withstands hydrogen chloride, sulfuric, acetic and phosphoric acids.
Hastelloy X	-	Ni 47% Cr 22% Fe 18% Mo 9% Co 1.5%	-	NiCr22Fe 18Mo	2.4665	-	-	-	-	Hastelloy X is a nickel base alloy that possesses exceptional strength and oxidation resistance up to 2200°F. It has also been found to be exceptionally resistant to stress-corrosion cracking in petrochemical applications.
Inconel 600	-	Ni 72% Cr 15% Fe 8%	-	-	2.4816	-	-	-	-	Good oxidation resistance, but useful at the higher temperatures only when stresses are low, and where such parts may require welding during fabrication. Strength at elevated temperatures is similar to that of 18-8 type steels.
Inconel 601	-	Ni 60% Cr 23%	-	-	2.4851	-	-	5715 5870	-	Heat treating baskets and fixtures, radiant furnace tubes, strand - annealing tubes, thermocouple protection tubes, and furnace muffles and retorts. Thermal reactors for controlling automotive emissions.
Inconel 625 (CW6MC)	-	Ni 55% Cr 21% Mo 9% Fe 5% Nb (Cb) 4%	-	-	2.4856	-	-	-	-	Good casting alloy with excellent machining and bearing properties. Aero and land-based turbine engine parts. Exhaust and fuel systems, rocket / space application components, chemical and process industry parts, oil, gas, petroleum and natural gas industry parts.
HS188	-	Co 31% Cr 22% Ni 22% W 15%	-	-	2.4683	-	-	5772	-	Used typically for formed and drawn parts requiring high strength up to 982°C (1800°F) and oxidation resistance up to 1093°C (2000°F), but usage is not limited to such applications

This list gives details of the main alloys cast but we would be pleased to discuss any other materials required. As this is intended to be a guide only, the full relevant standard specifications should be referred to when determining suitable materials for a particular product and its application.