Tipical Applications and Characteristics

Corrosion (C), Wear (W) & Heat (H) Resistant Alloys and High-Performance (S) Superalloys

Alloy B-2	Ni68 Mo28 Fe2 Co1 Cr1	C	Significant resistance to reducing environments. This alloy provides resistance to pure sulphuric acid, to a number of non-oxidant acids, to a wide range of organic acids and to chloride-induced SSC.
Alloy C-22	Ni58 Cr22 Mo13 Fe3 W3	C	Better corrosion resistance than C-276 in selected environments. Resistance to a wide range of organic acids and to chloride-induced SSC and other reducing chemicals.
Alloy 6B	Co59 Cr30 W3,5 Ni2,5 Mn1,4 C1	W	Excellent hot strength. Replacement for casting due to better ductility and dependability for sealing surfaces. Used to minimize seizing, galling and non-lubricated wear. Turbine engine nozzle fuel injectors, steam turbine (last vane). Pump applications such as motor shafts, bushings, sleeves and stems.
Alloy 6BH	Co59 Cr30 W3,5 Ni2,5 Mn1,4 C1	W	This variant of 6B offers increased wear life due to higher hardness and retained edge characteristics. Saw and scrapper blades. FDA approved for use in food industry.
Alloy 25	Co50 Cr20 W15 Ni 10 Fe3 Mn1,5	H	Excellent strength for continuous service to 950°C. Oxidation and carburization resistance to 100°C. Resistance to galling, to marine environments, hydrochloric and nitric acids at certain concentration and temperatures, and to wet chlorine environments at room temperature..
Alloy G30	Ni46 Cr30 Fe15 M05,5 W2,5	C	Resistance to phosphoric and sulphuric acids and nitric fluoride applications. Resists the formation of grain boundary precipitates in weld affected zone, suitable for use in application as-welded.
Alloy 59	Ni59 Cr23 M016,5 Fe1,5	C	Excellent resistance to oxidizing media with improved stability over alloy C-276. Pulp and paper, scrubber, mixers and other applications that require resistance to oxidizing and reducing environments.

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Nickel 200	Ni99,6 C0,04	C	Pure wrought nickel with good mechanical properties and corrosion resistance. Used for chemical and process plant such as caustic soda and synthetic fibre production.
Alloy 218	Fe63 Cr17 Mn8 Ni8,5 Mn1,4 C1	W	Resistance to galling and wear. Yield strength twice than 304 and 316, in the annealed conditions. Excellent cryogenic impact strength. Chloride pitting superior than 316 type.
Nickel 201	Ni99,6 C0,02 max	C	As nickel 200 but with controlled C content, to prevent intergranular embrittlement at service temperature above 315°C. Used for chemical and process plant.
Alloy 301	Ni94 Al 4,5 Ti0,5	C	An age-hardenable nickel grade combining the corrosion resistance of nickel 200 with greater strength and hardness. Used for extrusion dies in the plastic industry and in the chemical and process industries.
Alloy 330	Fe44 Ni35,5 Cr18,5 Si1,1	H	An alloy with good resistance to oxidation and carburization, for thermal processing and heat treatment applications.
Alloy 400	Ni65,1 Cu32 Fe1,6 Mn1,1	C	A NiCu alloy with high strength and excellent resistance to a range of media including seawater, dilute hydrofluoric and sulphuric acids and alkalises. Used in marine and offshore engineering, salt production, feedwater heater tubing and chemical and hydrocarbon processing.
Alloy R-405	Ni65 Cu32,5 Fe1,2 Mn1,1 S0,04	C	Similar to Alloy 400 but with controlled sulphur o improve machining characteristics.

Alloy K-500	Ni64,7 Cu30,2 Al 2,7 Fe1 Ti0,6	C	Similar to alloy 400 but age-hardenable for improved strength and hardness. Used for pump shafts, oil well tools, doctor blades, springs, fasteners and marine propeller shaft.
Alloy 600	Ni76 Cr15 Fe8	C H	A NiCrFe alloy, with good high-temperature strength and oxidation resistance, and resistance to stress-corrosion cracking and caustic corrosion. Used for chemical and petrochemical processing, heat treatment applications, and in nuclear and automotive engineering.
Alloy 601	Ni60,5 Cr23 Fe14,4 Al 1,4	H	An alloy with outstanding high-temperature strength and oxidation resistance. Used in a range of thermal processing applications.
Alloy 601 GC	Ni60,5 Cr23 Fe14,4 Al1,4 Zr0,2	H	A grain-controlled variant of alloy 601 developed for thermal processing applications such as seam-welded tubing used for strand annealing furnace tubing and furnace roller hearths.
Alloy 617	Ni52 Cr22 Co12,5 Mo9,5 Fe1,5 Al 1,2	H S	An alloy with an exceptional combination of high temperature strength, stability and oxidation resistance. Also resistant to carburizing gases and a range of aqueous environments, it is used in petrochemical and thermal processing, nitric acid production and gas turbine engineering.
Alloy 622	Ni59 Cr20,5 Mo14,2 Fe2,3 W3,2	C	An alloy with corrosion resistance in a wide range of reducing and oxidizing media, and resistance to localized corrosion and stress-corrosion cracking.
Alloy 625	Ni61 Cr21,5 Mo9 Nb3,6 Fe2,5	C H S	A NiCrMo alloy with resistance to severely corrosive environments, particularly to pitting, crevice corrosion and high temperature oxidation, and with high strength from cryogenic temperatures up to 815°C. Used in aerospace engineering, gas turbine, chemical processing, oil and gas, extraction, pollution control, and marine and nuclear engineering.

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Alloy 625LCF	Ni61 Cr21,5 Mo9 Nb3,6 Fe2,5	C H S	Similar to alloy 625 but with composition and processing controlled for optimum resistance to mechanical and thermal fatigue at up to 650°C.
Alloy 686	Ni58 Cr20,5 Mo 16,3 W3,8 Fe1	C	Offering optimum resistance to localized corrosion in acid chloride environments and excellent resistance to oxidizing, reducing and mixed acids. Used in a range of aggressively corrosive environments in pollution control, waste processing and process industry applications.
Alloy 690	Ni61,5 Cr29 Fe9	C H	An alloy with excellent resistance to high temperature corrosion in applications such as nuclear steam generators, coal gasification, and sulphuric, nitric and nitric/hydrofluoric acid processing.
Alloy 706	Ni45,5 Fe37 Cr16 Nb2,9 Fe2,5	S	A superalloy for turbine gas applications, particularly for the discs and spacers of large land-base engines.
Alloy 718	Ni54 Fe18,5 Cr18 Nb5 Mo3 Ti1	C H S	An age-hardenable alloy combining high strength up to 700°C with corrosion resistance and excellent weld ability. Used in aerospace, gas turbines, oil and gas extraction and nuclear engineering.
Alloy 725	Ni57 Cr21 Mo8 Fe7,5 Nb3,5 Ti1,5 Al 0,3	C	An alloy with corrosion resistance comparable with that of alloy 625 but with higher strength obtainable by age-hardening.
Alloy 718SPF	Ni54 Fe18,5 Cr18 Nb5 Mo3 Ti 1	S	A development of alloy 718 with composition and processing controlled to create a high strength, nickel-base superalloy with exceptional fatigue-resistance and amenable to superplastic forming.
Alloy X-750	Ni73 Cr15,5 Fe7 Ti2,5 Nb1 Al 0,7	H S	An age-hardenable NiCrFe alloy with high tensile and creep-rupture properties up to 700°C. Applications include gas turbine engineering, tooling, fasteners, springs and automotive components.
Alloy 751	Ni73 Cr15 Fe7 Ti2,5 Al 1,1 Nb1	H	Similar to alloy X-750 but with higher aluminium for greater age-hardening. Used for high temperature applications such as internal combustion engine exhaust valves.

Alloy MA754	Ni77,5 Cr20 Fe1 Y2O3 0,6 Ti 0,5 Al 0,3	H S	An oxide dispersion strengthened, mechanically alloyed product with exceptional high temperature strength and creep-resistance. Used in thermal processing and gas turbine applications.
Alloy MA758	Ni77,5 Cr20 Fe1 Y2O3 0,6 Ti 0,5 Al 0,3	H	An oxide dispersion strengthened, mechanically alloyed product, similar to alloy MA754 but with higher chromium to improve resistance to high temperature corrosion. Used for a range of high performance thermal processing applications.
Alloy 783	Co34 Ni28,5 Fe26 Al 5,4 Nb3 Cr3 Ti 0,1	S	A Co-base superalloy with a low coefficient of thermal expansion, good oxidation- and impact-resistance, and metallurgical stability. Used or gas turbine engine casings, rings and seals.
Alloy HX	Ni47 Cr22 Fe18 Mo9 Co1,5 W0,6 C0,1	H S	An alloy with an excellent balance of strength, fabricability and oxidation resistance at up to 1100°C. Used for aircraft, marine and land-base gas turbine engine combustors and other fabricated components, and in thermal processing and nuclear engineering.
Alloy C-276	Ni57 Mo16 Cr16 Fe5 W4	C	An alloy with excellent resistance to reducing and mildly oxidizing environments. Resistance to localized attack and stress-corrosion cracking. Used extensively in pollution control applications and throughout the chemical and process industries.
Alloy G-3	Ni44 Cr22 Fe19,5 Mo7 Cu2	C	An alloy that is readily weldable and resistant to intergranular corrosion in the welded condition. Used for gas well downhole tubular, and handling phosphoric and sulphuric acids.

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Alloy 050	Ni50 Cr20 Fe17 Mo9 W0,7	C	An alloy with excellent resistance to stress-corrosion cracking, particularly i sour gas environments, used for downhole tubing in oil and gas extraction.
Alloy 800	Fe46 Ni32,5 Cr21 C0,05	C H	An alloy with high strength and corrosion resistance used in chemical, petrochemical and food processing, in nuclear engineering, and for the sheathing of electric heating elements. Applications generally at temperatures below 650°C.
Alloy 800H	Fe46 Ni32,5 Cr21 Al+Ti0,3-1,2 C0,08	H	Similar to alloy 800 but with improved creep and stress-rupture properties for applications above 650°C. Resistant to high temperature oxidation, carburization and nitridation, it is widely used in petrochemical and thermal processing.
Alloy 800HT	Fe46 Ni32,5 Cr21 Al+Ti0,3-1,2 C0,08	H	Similar to alloy 800H but with even more precisely controlled composition and higher ASME design stress allowable.
Alloy 803	Fe37 Ni35 Cr25 Al+Ti0,3-1,2 C0,08	H	An alloy with improved resistance to high temperature oxidation, carburization and sulphidation, used in petrochemical and thermal processing applications.
Alloy 825	Ni42 Fe28 Cr21,5 Mo3 Cu2 Ti 1	C	A NiFeCr alloy with excellent resistance to sulphuric and phosphoric acids. Resistant to oxidizing ad reducing acids, stress-corrosion cracking, pitting and intergranular corrosion, it is used in chemical and petrochemical processing, oil and gas extraction, pollution control, waste processing and pickling applications.
Alloy 840	Fe60 Ni20 Cr20	H	An FeNiCr alloy specially developed for the seam-welded tubing used for the heating of electrical heating elements.
Alloy 864	Fe39 Ni34 Cr21 Mo4,2 Si0,8 Ti 0,6	C H	An alloy with excellent fatigue resistance, thermal stability and resistance to hot salt corrosion, pitting and chloride stress-corrosion cracking. Developed for automotive exhaust system flexible coupling, EGR tubes, manifolds and tailpipes.
Alloy 903	Fe42 Ni38 Co15 Nb3 Ti14 Al 0,9	S	An age-hardenable alloy with a low and constant coefficient of thermal expansion up to 430°C. It has high strength, a constant modulus of elasticity and resistance to thermal shock from cryogenic temperatures up to 650°C.

Alloy 909	Fe42 Ni38 Co13 Nb4,7 Ti 1,5 Si0,4 Al 0,03	S	Similar to alloy 903 but with improved notch-rupture and tensile properties at high temperatures and improved processing characteristics. Used for gas turbine casings, shrouds, vanes and shafts.
Alloy 925	Ni44 Fe28 Cr21 Mo3 Ti2,1 Cu1,8 Al 0,3	C	Offering corrosion resistance comparable with that of alloy 825 but with higher strength obtained by age-hardening. Used in the oil and gas and marine industries for applications calling or high strength and resistance to general corrosion and pitting.
Alloy MA956	Fe74 Cr20 Al 4,5 Ti0,5 Y_2O_3 0,5	S	An oxide dispersion strengthened, mechanically alloyed product with exceptional strength and oxidation-, sulphidation- and carburization-resistance at up to 1250°C. Used in gas turbines, thermal processing and advanced energy conversion system.

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Alloy 020	Fe37 Ni35 Cr20 Mo2,5 Cu0,9 N 0,2	C	An alloy with resistance to general corrosion, pitting and crevice corrosion in media containing chlorides and sulphuric, phosphoric and nitric acids. Used in chemical and process plant.
Alloy 25-6Mo	Fe45 Ni25 Cr20 Mo6,5 Cu0,9 N 0,2	C	An austenitic 6% Mo alloy resistant to pitting and crevice corrosion in media containing chlorides and other halides. Applications include handling sulphuric and phosphoric acids, chemical plant, marine and offshore engineering, pulp and paper production, pollution control, and nuclear service water piping.
Alloy 028		C	A corrosion resistant austenitic stainless steel used for ownhole tubing in oil and gas extraction operations.

These alloys are available on the market and are identified with different Trademarks, as:
- Incoloy®, Inconel®, Monel®, Nimonic® of Special Metal Corporation.
- Hastelloy®, Haynes® and C-22® of Haynes International, Inc.
- Carpenter® and 20Cb-3® of Carpenter Technology Corporation.
- Nitronic® of Armco.
- Ferralium® of Langley Alloys Ltd.

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