AEROSPACE INDUSTRY

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SUPPORTING YOUR SUCCESS

HIGH PERFORMANCE ALLOYS

Materials used in the hot section (combustion chambers and exhaust systems) of aero engines are subject to very high temperatures and require high strength and excellent creep resistance as well as oxidation and corrosion resistance. Nickel-based superalloys are the most used materials in gas turbines (both for aero engines and land-based turbines for power generation) because of their high strength, creep properties and high temperature corrosion resistance and are the material of choice for the engine components required to operate at temperatures above 800 °C. Cobalt-based alloys are also used in these most aggressive environments. Increasingly the aerospace sector is looking towards composite materials for weight savings in low temperature applications. Nickel alloys also find application in composite manufacture where they used for tooling. There are a wide range of nickel-based and cobalt-based alloys which are utilised in these critical applications and we hope to intro-duce you to just a few key grades here.

ALLOY 625 exhibits an excellent combination of corrosion resistance and high strength at temperatures up to 815 ºC. Being highly formable the alloy is ideally suited to sheet fabrications such as bellows, ducting and exhaust systems.

ALLOY 718 is often used for applications such as discs and shafts where high strength and oxidation resistance are critical. We can supply ALLOY 718 in the annealed condition (according to AMS 5662) and 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.

ALLOY X has high strength, corrosion resistance and is highly formable making it especially suitable for casings and sheet fabrications such as combustors, exhaust systems, ducting and after burners.

The cobalt-based grade **ALLOY L-605** finds application in the hot section of the turbine and combustion chamber liners, ducts and after burners. ALLOY L-605 has high strength and is resistant to oxidation and scaling at temperatures up to 980 ºC. This grade also has good wear and galling properties.

ALLOY 36 has a very low thermal expansion coefficient from room temperature to 200 °C making is very useful in applications requiring high dimensional stability such as for tooling and dies in the production of aerospace composite components.

ALLOY PROPERTIES

	Specifications	Key attributes	Application
ALLOY 625 **N06625** **2.4856**	Bar: AMS 5666, ASTM B446 Sheet/plate: AMS 5599, 5879	A Ni-Cr-Mo alloy with resistance to severely corrosive environments and with high strength from cryogenic temperatures to 815 °C	Turbine shroud rings, bellows, expansion joints, ducting and exhaust systems
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	Compressor blades, shafts, fasteners, pylon components
ALLOY X **N06002** **2.4665**	Bar: AMS 5754, ASTM B572	Excellent strength and oxidation resistance up to 1200 °C	Casings, rings and seals, sheet fabrications
ALLOY L605 **R30605**	Bar: AMS 5759, DMD415-22, ASTM F90	A high strength cobalt-based alloy with good oxidation resistance at temperatures up to 980 ºC and good resistance to wear and galling	Rings, blades and combustion chamber parts, bearings
ALLOY 36 **K93603** **1.3912**	Bar: ASTM F-1684 Sheet/plate: ASTM F1684	A binary iron-nickel (36%) alloy which has a very low coefficient of thermal expansion	Tooling and dies for aerospace composite components

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