

Aerospace Alloys and Applications



For over 113 years, we have been a global leader in the development, manufacturing, and delivery of high-performance alloys for mission-critical applications.

Our aerospace legacy spans from the earliest jet engines to today's most advanced space exploration programs. Our materials are developed into components across nearly every commercial aircraft platform, numerous military systems, and cutting-edge space vehicles.

We are dedicated to delivering unmatched product quality, alloy & application expertise, and customer support to meet the evolving demands of the aerospace industry.

[HAYNES® 292® alloy](#)

HAYNES® 292® alloy is a new wrought, gamma-prime strengthened superalloy for high-temperature applications such as cases and rings used in aero and industrial gas turbine engines. This new alloy can be readily fabricated and welded and is expected to offer superior low-cycle fatigue (LCF) strength, creep strength, and oxidation resistance compared to Waspaloy and other wrought gamma-prime strengthened alloys.

[HAYNES® 233® alloy](#)

HAYNES® 233® alloy is a nickel-cobalt-chromium-molybdenum-aluminum alloy that has an exceptional oxidation resistance coupled with superior creep strength at temperatures up to 2100°F (1149°C), or higher – a combination of properties never before achieved in a readily fabricable alloy. Potential applications include hot gas components in aerospace and industrial gas turbines.

[HAYNES® 244® alloy](#)

HAYNES® 244® alloy is an age-hardenable, nickel-molybdenum-chromium-tungsten alloy with an extended operating temperature range to 1400°F (760°C). This alloy offers improved yield strength and creep rupture strength, versus HAYNES® 242® alloy, as well as a lower thermal expansion. Additionally, the alloy has excellent low-cycle fatigue and good oxidation resistance. The higher strength and lower thermal expansion provides better dimensional control, sealing, and containment characteristics for aero engine designers.

[HAYNES® 282® alloy](#)

HAYNES® 282® alloy is a wrought, gamma-prime strengthened superalloy developed for high-temperature structural applications, especially for those in aero and industrial gas turbine engines. It possesses a unique combination of creep strength, thermal stability, weldability, and fabricability not found in currently available commercial alloys. This alloy has excellent creep strength in the temperature range of 1200 to 1700°F (649° to 927°C), surpassing that of Waspaloy alloy and approaching that of R-41 alloy. The features of this alloy make it suitable for critical gas turbine applications, such as sheet fabrications, forged rings and cases, exhaust and nozzle structures, and other hot-gas-path components.

Note: Haynes has patented a newly developed alternative age-hardening treatment for 282® alloy for enhanced containment properties. For additional information, please contact Brandon Furr, +1 832-835-4681, BFurr@haynesintl.com.

[HAYNES® 230® alloy](#)

HAYNES® 230® alloy is a nickel-chromium-tungsten-molybdenum alloy that offers the best combination of high-temperature strength, resistance to oxidizing environments up to 2100°F (1149°C) for prolonged exposures, excellent long-term thermal stability, and fabricability of any major high-temperature alloy. It is used for combustion cans, transition ducts, flame holders, thermocouple sheaths, and other important gas turbine components.

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HAYNES® 214® alloy

HAYNES® 214® alloy is a nickel-chromium-aluminum-iron alloy designed to provide the optimum high-temperature oxidation resistance for a wrought material, while at the same time allowing for conventional forming and joining. This alloy offers outstanding oxidation resistance to 2300°F (1260°C) and is used in demanding, specialized gas turbine parts, such as honeycomb seals combustor splash plates and other static oxidation-limited parts.

HAYNES® 242® alloy

HAYNES® 242® alloy is an age-hardenable, nickel-molybdenum-chromium alloy which derives its strength from a long-range ordering reaction upon aging. This alloy offers excellent strength to 1300°F (705°C), low thermal expansion characteristics, good oxidation resistance up to 1500°F (815°C), excellent low-cycle fatigue properties, very good thermal stability, and fabricability. It is used in gas turbine seal rings, containment, and high-strength fasteners.

HAYNES® 188 alloy

HAYNES® 188 alloy is a cobalt-nickel-chromium-tungsten alloy that offers excellent high-temperature strength and superior oxidation resistance up to 2000°F (1095°C) and thermal stability. This alloy is used extensively in demanding military and civil aircraft gas turbine engine combustors, transition ducts, and after-burner components.

HASTELLOY® X alloy

HASTELLOY® X alloy is a nickel-chromium-iron-molybdenum alloy that has been in service in aerospace applications. The alloy offers very good balance of high-temperature strength, oxidation resistance, and fabricability. This alloy is widely used for aircraft and industrial gas turbine engine fabricated combustor and exhaust components, such as transition ducts, combustor cans, spray bars and flame holders, afterburners, and tailpipes.

HAYNES® 25 alloy

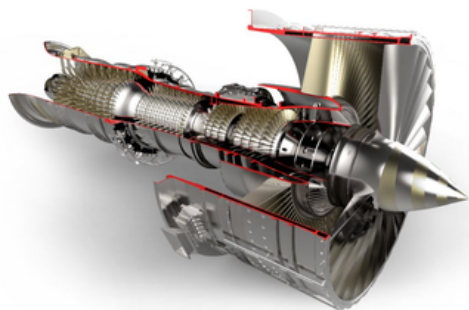
HAYNES® 25 alloy offers excellent strength, good oxidation resistance to 1800°F (980°C), and relatively good resistance to wear and galling. Used in gas turbine parts.

HAYNES® Ti-3Al-2.5V alloy

HAYNES® Ti-3Al-2.5-V alloy was developed for aircraft hydraulic and fuel systems transmission lines, primarily because of its high strength-to-weight ratio. This ratio proves to be a major advantage when used for hydraulic tubing lines to provide required strength levels, but more importantly, reducing weight by as much as 43% when compared to stainless steel.

Aerospace Applications:

- Afterburners
- Combustors
- Manifolds
- Cases
- Hydraulic lines
- Rings
- Honeycomb Seals
- Shrouds
- Heat shields
- Fuel systems
- Exhaust ducts
- Fasteners
- Bleed Air Systems



Note: A range of common aerospace alloys—including HAYNES® Waspaloy, 718, 625, X-750, 263, and R-41, 617 and HASTELLOY® S are available in various product forms. HAYNES® wire and powder products are readily available and widely used in additive manufacturing (AM) processes such as Laser Powder Bed Fusion (LPBF), Laser Powder Directed Energy Deposition (LP-DED), Wire Arc Additive Manufacturing (WAAM), and Laser Wire Directed Energy Deposition (LW-DED).