

HAYNES[®] 282[®] alloy

Principal Features

Excellent High Temperature Strength

HAYNES[®] 282[®] alloy (UNS N07208) is a wrought, gamma-prime strengthened superalloy developed for high temperature structural applications, especially 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. The excellent creep strength in the temperature range of 1200 to 1700°F (649 to 927°C) surpasses that of Waspaloy alloy, and approaches R-41 alloy without sacrificing weldability.

Easily Fabricated

This high level of creep strength in HAYNES[®] 282[®] alloy has been attained at a relatively low volume fraction of the strengthening gamma-prime phase, resulting in outstanding resistance to strain-age cracking (normally a problem with superalloys in this creep strength range).

Additionally, slow gamma-prime precipitation kinetics allow for the alloy to have excellent ductility in the as-annealed condition. Consequently, HAYNES[®] 282[®] alloy exhibits superior weldability and fabricability. Machineability is similar to that of Waspaloy.

Heat Treatment

HAYNES[®] 282[®] alloy is provided in the solution-annealed condition, in which it is readily formable. The typical solution-annealing temperature is in the range of 2050 to 2100°F (1121 to 1149°C). After component fabrication, an age hardening treatment is required to put the alloy into the high-strength condition. The standard two-step treatment includes 1850°F (1010°C) / 2 hours / AC (air cool) + 1450°F (788°C) / 8 hours / AC, but alternative heat treatments are available to optimize properties for specific performance requirements or for manufacturability.

NOTE: For information regarding ASME code related applications, please contact Vinay Deodeshmukh (765-456-6212; VDeodeshmukh@haynesintl.com).

Product Forms

HAYNES[®] 282[®] alloy is available in a full range of product forms and sizes, including plate, sheet and coil products from foil thickness up to cross-sections greater than 2" (>50mm) thick; Bar and wire from up to 9" in diameter, Reforge billet and ingot products from 4" up to 20" (100-500mm) diameters; and seamless and welded Pipe and tube in some standard sizes. Vacuum castings have also been produced for various applications, and powder products are available to support many Additive Manufacturing methods.

Applications

The features of HAYNES[®] 282[®] alloy make it suitable for critical gas turbine applications found in the combustors, turbine and exhaust sections, and nozzle components. Fabrication methods commonly employed include sheet and plate fabrications, seamless and flash butt-welded rings, closed die forgings and components directly machined from bar and heavy plate blanks. In industrial gas turbines, HAYNES[®] 282[®] alloy is defining performance standards for combustors and transition sections, and other hot-gas-path components requiring exceptional creep life and low cycle fatigue (LCF) resistance. Automotive turbocharger applications, such as seals and high temperature springs, benefit from the superior high-temperature properties. HAYNES[®] 282[®] alloy is also a strong candidate for use in Advanced Ultrasupercritical (A-USC) boiler and steam

turbines, Supercritical CO₂ power cycle, and concentrating solar power plant, where creep life is required to surpass 100,000 hours at 14.5 ksi (100 MPa) at 1400°F (760°C).

[Print Page](#)