

HAYNES[®] R-41 alloy

Principal Features

Vacuum-melted, nickel-based HAYNES[®] R-41 (UNS N07041) alloy has exceptionally high strength at temperatures in the range of 1200 to 1800°F (649 to 982°C). The alloy is a precipitation-hardening type and strength is developed by various solution annealing and aging heat treatments. Because of its high strength and good oxidation resistance, the alloy is being used in afterburner parts and nozzle diaphragm partitions in current gas turbine engines. In the annealed condition, the alloy is ductile and has essentially the same forming characteristics as 18-8 stainless steel and other nickel-based alloys. It is stronger, however, and has a greater resistance to forming. The alloy has been formed with success on drop hammers, expanding mandrels and stretch formers. R-41 alloy is now being replaced in many applications by HAYNES[®] 282[®] alloy, due to the superior fabricability of 282[®] alloy.

Mechanical properties can be tailored by selecting various combinations of solution annealing and aging treatments. In general, higher solution heat treating temperatures result in better room-temperature ductility and improved formability. Stress-rupture strength is also improved by this type of treatment. Lower solution annealing temperatures produce higher tensile strengths at temperatures up to about 1700°F (927°C). The effect of solution heat treating temperature can be seen in tensile and stress-rupture data.