

Haynes 282[®] Nickel Alloy Sheet, Solution Annealed and Cold Worked

Category : Metal , Nonferrous Metal , Nickel Alloy

Material Notes:

Excellent High Temperature Strength HAYNES[®] 282[®] alloy is a wrought, gamma-prime strengthened superalloy developed for high temperature structural applications, especially those in aero and land-based gas turbine engines. It possesses a unique combination of creep strength, thermal stability, weldability, and fabricability not found in currently available commercial alloys. The 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. 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. Product Forms: HAYNES 282 alloy is designed for use in the form of plate, sheet, strip, foil, billet, bar, wire welding products, pipe, and tubing. 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, a two-step age hardening treatment is required to put the alloy into the high-strength condition. The treatment includes 1850[°]F (1010[°]C) / 2 hours / AC (air cool) + 1450[°]F (788[°]C) / 8 hours / AC. Applications: Suitable for critical gas turbine applications, such as sheet fabrications, seamless and flash butt-welded rings, and cases found in compressor, combustor, and turbine sections. In augmented aircraft gas turbines, it is useful for exhaust and nozzle components. In land-based gas turbines, HAYNES 282 alloy is a good candidate for transition sections and other hot-gas-path components. Machining: HAYNES 282 alloy has similar machining characteristics to other nickel alloys used at high temperatures. Rough machining should be carried out prior to age-hardening, using the following guidelines. Final machining or finish grinding may be done after age-hardening. Data provided by the manufacturer, Haynes International, Inc.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Haynes-282-Nickel-Alloy-Sheet-Solution-Annealed-and-Cold-Worked.php

Physical Properties	Metric	English	Comments
Density	8.27 g/cc	0.299 lb/in ³	Solution Annealed Only

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell C	26	26	10% Cold-worked
	33	33	20% Cold-worked
	38	38	30% Cold-worked
	41	41	40% Cold-worked
	43	43	50% Cold-worked
Tensile Strength, Ultimate	909 MPa	132000 psi	10% cold reduction
	@Thickness 3.20 mm	@Thickness 0.126 in	
	999 MPa	145000 psi	

Mechanical Properties	Metric @ Thickness 3.20 mm	English @ Thickness 0.126 in	20% cold reduction Comments
	1141 MPa @Thickness 3.20 mm	165500 psi @Thickness 0.126 in	30% cold reduction
	1270 MPa @Thickness 3.20 mm	184000 psi @Thickness 0.126 in	40% cold reduction
	1382 MPa @Thickness 3.20 mm	200400 psi @Thickness 0.126 in	50% cold reduction
	1485 MPa @Thickness 3.20 mm	215400 psi @Thickness 0.126 in	60% cold reduction
Tensile Strength, Yield	605 MPa @Strain 0.200 %, Thickness 3.20 mm	87700 psi @Strain 0.200 %, Thickness 0.126 in	10% cold reduction
	790 MPa @Strain 0.200 %, Thickness 3.20 mm	115000 psi @Strain 0.200 %, Thickness 0.126 in	20% cold reduction
	963 MPa @Strain 0.200 %, Thickness 3.20 mm	140000 psi @Strain 0.200 %, Thickness 0.126 in	30% cold reduction
	1093 MPa @Strain 0.200 %, Thickness 3.20 mm	158500 psi @Strain 0.200 %, Thickness 0.126 in	40% cold reduction
	1204 MPa @Strain 0.200 %, Thickness 3.20 mm	174600 psi @Strain 0.200 %, Thickness 0.126 in	50% cold reduction
	1312 MPa @Strain 0.200 %, Thickness 3.20 mm	190300 psi @Strain 0.200 %, Thickness 0.126 in	60% cold reduction
Elongation at Break	5.6 % @Thickness 3.20 mm	5.6 % @Thickness 0.126 in	60% cold reduction
	6.6 % @Thickness 3.20 mm	6.6 % @Thickness 0.126 in	50% cold reduction
	8.9 % @Thickness 3.20 mm	8.9 % @Thickness 0.126 in	40% cold reduction
	15.5 %	15.5 %	

Mechanical Properties	Metric @ Thickness 3.20 mm	English @ Thickness 0.126 in	30% cold reduction Comments
	31.5 % @Thickness 3.20 mm	31.5 % @Thickness 0.126 in	20% cold reduction
	46.7 % @Thickness 3.20 mm	46.7 % @Thickness 0.126 in	10% cold reduction
Modulus of Elasticity	140 GPa @Temperature 1000 Â°C	20300 ksi @Temperature 1830 Â°F	Dynamic
	154 GPa @Temperature 900 Â°C	22300 ksi @Temperature 1650 Â°F	Dynamic
	166 GPa @Temperature 800 Â°C	24100 ksi @Temperature 1470 Â°F	Dynamic
	175 GPa @Temperature 700 Â°C	25400 ksi @Temperature 1290 Â°F	Dynamic
	183 GPa @Temperature 600 Â°C	26500 ksi @Temperature 1110 Â°F	Dynamic
	190 GPa @Temperature 500 Â°C	27600 ksi @Temperature 932 Â°F	Dynamic
	196 GPa @Temperature 400 Â°C	28400 ksi @Temperature 752 Â°F	Dynamic
	202 GPa @Temperature 300 Â°C	29300 ksi @Temperature 572 Â°F	Dynamic
	209 GPa @Temperature 200 Â°C	30300 ksi @Temperature 392 Â°F	Dynamic
	213 GPa @Temperature 100 Â°C	30900 ksi @Temperature 212 Â°F	Dynamic
	217 GPa @Temperature 25.0 Â°C	31500 ksi @Temperature 77.0 Â°F	Dynamic
	0.319	0.319	

Poissons Ratio Mechanical Properties	Metric @ Temperature 25.0 Â°C	English @ Temperature 77.0 Â°F	Comments
	0.326	0.326	
	@Temperature 100 Â°C	@Temperature 212 Â°F	
	0.335	0.335	
	@Temperature 200 Â°C	@Temperature 392 Â°F	
	0.335	0.335	
	@Temperature 300 Â°C	@Temperature 572 Â°F	
	0.337	0.337	
	@Temperature 400 Â°C	@Temperature 752 Â°F	
	0.341	0.341	
	@Temperature 500 Â°C	@Temperature 932 Â°F	
	0.346	0.346	
	@Temperature 600 Â°C	@Temperature 1110 Â°F	
	0.352	0.352	
	@Temperature 700 Â°C	@Temperature 1290 Â°F	
	0.355	0.355	
	@Temperature 800 Â°C	@Temperature 1470 Â°F	
	0.357	0.357	
	@Temperature 900 Â°C	@Temperature 1650 Â°F	
	0.363	0.363	
	@Temperature 1000 Â°C	@Temperature 1830 Â°F	
Shear Modulus	51.0 GPa	7400 ksi	Dynamic
	@Temperature 1000 Â°C	@Temperature 1830 Â°F	
	57.0 GPa	8270 ksi	Dynamic
	@Temperature 900 Â°C	@Temperature 1650 Â°F	
	61.0 GPa	8850 ksi	Dynamic
	@Temperature 800 Â°C	@Temperature 1470 Â°F	

Mechanical Properties	Metric	English	Comments
	@Temperature 700 Å°C	@Temperature 1290 Å°F	Dynamic
	68.0 GPa	9860 ksi	
	@Temperature 600 Å°C	@Temperature 1110 Å°F	Dynamic
	71.0 GPa	10300 ksi	
	@Temperature 500 Å°C	@Temperature 932 Å°F	Dynamic
	73.0 GPa	10600 ksi	
	@Temperature 400 Å°C	@Temperature 752 Å°F	Dynamic
	76.0 GPa	11000 ksi	
	@Temperature 300 Å°C	@Temperature 572 Å°F	Dynamic
	78.0 GPa	11300 ksi	
	@Temperature 200 Å°C	@Temperature 392 Å°F	Dynamic
	80.0 GPa	11600 ksi	
	@Temperature 100 Å°C	@Temperature 212 Å°F	Dynamic
	82.0 GPa	11900 ksi	
	@Temperature 25.0 Å°C	@Temperature 77.0 Å°F	Dynamic

Thermal Properties	Metric	English	Comments
CTE, linear	12.1 Åµm/m-Å°C	6.72 Åµin/in-Å°F	
	@Temperature 25.0 - 100 Å°C	@Temperature 77.0 - 212 Å°F	
	12.4 Åµm/m-Å°C	6.89 Åµin/in-Å°F	
	@Temperature 25.0 - 200 Å°C	@Temperature 77.0 - 392 Å°F	
	12.8 Åµm/m-Å°C	7.11 Åµin/in-Å°F	
	@Temperature 25.0 - 300 Å°C	@Temperature 77.0 - 572 Å°F	
	13.1 Åµm/m-Å°C	7.28 Åµin/in-Å°F	
	@Temperature 25.0 - 400 Å°C	@Temperature 77.0 - 752 Å°F	
	13.5 Åµm/m-Å°C	7.50 Åµin/in-Å°F	
	@Temperature 25.0 - 500 Å°C	@Temperature 77.0 - 932 Å°F	

Thermal Properties	Metric	English	Comments
Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0001261 ohm-cm	0.0001261 ohm-cm	
	@Temperature 25.0 Â°C	@Temperature 77.0 Â°F	
	0.0001278 ohm-cm	0.0001278 ohm-cm	
	@Temperature 100 Â°C	@Temperature 212 Â°F	
	0.0001299 ohm-cm	0.0001299 ohm-cm	
	@Temperature 200 Â°C	@Temperature 392 Â°F	
	0.0001299 ohm-cm	0.0001299 ohm-cm	
	@Temperature 1000 Â°C	@Temperature 1830 Â°F	
	0.0001318 ohm-cm	0.0001318 ohm-cm	
	@Temperature 300 Â°C	@Temperature 572 Â°F	
	0.0001326 ohm-cm	0.0001326 ohm-cm	
	@Temperature 900 Â°C	@Temperature 1650 Â°F	
	0.0001334 ohm-cm	0.0001334 ohm-cm	
	@Temperature 400 Â°C	@Temperature 752 Â°F	
0.0001345 ohm-cm	0.0001345 ohm-cm		
@Temperature 800 Â°C	@Temperature 1470 Â°F		
0.000135 ohm-cm	0.000135 ohm-cm		
@Temperature 500 Â°C	@Temperature 932 Â°F		
0.0001355 ohm-cm	0.0001355 ohm-cm		
@Temperature 700 Â°C	@Temperature 1290 Â°F		
0.0001362 ohm-cm	0.0001362 ohm-cm		
@Temperature 600 Â°C	@Temperature 1110 Â°F		

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