Haynes 282Â® Nickel Alloy Sheet, Solution Annealed and Age-hardened

Category : Metal , Nonferrous Metal , Nickel Alloy

Material Notes:

Excellent High Temperature Strength HAYNESÂ® 282Â® 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 1700Â°F (649 to 927Â°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 2100Â°F (1121 to 1149Â°C). After component fabrication, a two-step age hardening treatment is required to put the alloy into the high-strength condition. The treatment includes 1850Â°F (1010Â°C) / 2 hours / AC (air cool) + 1450Â°F (788Â°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-Age-hardened.php

Physical Properties	Metric	English	Comments
Density	8.27 g/cc	0.299 lb/inÂ³	Solution Annealed
	8.29 g/cc	0.299 lb/inÂ³	Age-hardened

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell C	30	30	Age-hardened
Tensile Strength, Ultimate	115 MPa @Temperature 1000 Â°C	16700 psi @Temperature 1830 Â°F	
	447 MPa @Temperature 900 Â°C	64800 psi @Temperature 1650 Â°F	
	730 MPa	106000 psi	

Mechanical Properties	Metric	English	Comments
	@Temperature 800 Â°C	@Temperature 1470 Â°F	
	945 MPa @Temperature 700 Â°C	137000 psi @Temperature 1290 Â°F	
	980 MPa @Temperature 600 Â°C	142000 psi @Temperature 1110 Â°F	
	1132 MPa @Temperature 25.0 Â°C	164200 psi @Temperature 77.0 Â°F	
Tensile Strength, Yield	75.0 MPa @Strain 0.200 %, Temperature 1000 Â°C	10900 psi @Strain 0.200 %, Temperature 1830 Â°F	
	396 MPa @Strain 0.200 %, Temperature 900 Â°C	57400 psi @Strain 0.200 %, Temperature 1650 Â°F	
	580 MPa @Strain 0.200 %, Temperature 800 Â°C	84100 psi @Strain 0.200 %, Temperature 1470 Â°F	
	625 MPa @Strain 0.200 %, Temperature 700 Â°C	90600 psi @Strain 0.200 %, Temperature 1290 Â°F	
	631 MPa @Strain 0.200 %, Temperature 600 Â°C	91500 psi @Strain 0.200 %, Temperature 1110 Â°F	
	699 MPa @Strain 0.200 %, Temperature 25.0 Â°C	101000 psi @Strain 0.200 %, Temperature 77.0 Â°F	
Elongation at Break	23 % @Temperature 800 Â°C	23 % @Temperature 1470 Â°F	
	24 % @Temperature 700 Â°C	24 % @Temperature 1290 Â°F	
	30.0 % @Temperature 25.0 Â°C	30.0 % @Temperature 77.0 Â°F	

Mechanical Properties	Metric	English	Comments
	31 % @Temperature 600 Â°C	@Temperature 1110 Â°F	
	34 % @Temperature 900 Â°C	34 % @Temperature 1650 Â°F	
	64 % @Temperature 1000 Â°C	64 % @Temperature 1830 Â°F	
Creep Strength	12.0 MPa @Temperature 982 Â°C, Time 3.60e+6 sec	1740 psi @Temperature 1800 Â°F, Time 1000 hour	1% Creep
	25.0 MPa @Temperature 982 Â°C, Time 360000 sec	3630 psi @Temperature 1800 Â°F, Time 100 hour	0.5% Creep
	29.0 MPa @Temperature 927 Â°C, Time 3.60e+6 sec	4210 psi @Temperature 1700 Â°F, Time 1000 hour	0.5% Creep
	57.0 MPa @Temperature 927 Â°C, Time 360000 sec	8270 psi @Temperature 1700 Â°F, Time 100 hour	0.5% Creep
	62.0 MPa @Temperature 871 Â°C, Time 3.60e+6 sec	8990 psi @Temperature 1600 Â°F, Time 1000 hour	0.5% Creep
	117 MPa @Temperature 871 Â°C, Time 360000 sec	17000 psi @Temperature 1600 Â°F, Time 100 hour	0.5% Creep
	124 MPa @Temperature 816 Â°C, Time 3.60e+6 sec	18000 psi @Temperature 1500 Â°F, Time 1000 hour	0.5% Creep
	207 MPa @Temperature 816 Â°C, Time 360000 sec	30000 psi @Temperature 1500 Â°F, Time 100 hour	0.5% Creep

Mechanical Properties	Metric	English	Comments
	@Temperature 760 Â°C, Time 3.60e+6 sec	@Temperature 1400 Â°F, Time 1000 hour	0.5% Creep
	317 MPa @Temperature 760 Â°C, Time 360000 sec	46000 psi @Temperature 1400 Â°F, Time 100 hour	0.5% Creep
	352 MPa @Temperature 704 Â°C, Time 3.60e+6 sec	51100 psi @Temperature 1300 Â°F, Time 1000 hour	0.5% Creep
	483 MPa @Temperature 704 Â°C, Time 360000 sec	70100 psi @Temperature 1300 Â°F, Time 100 hour	0.5% Creep
	538 MPa @Temperature 649 Â°C, Time 3.60e+6 sec	78000 psi @Temperature 1200 Â°F, Time 1000 hour	0.5% Creep
Rupture Strength	17.0 MPa @Temperature 982 Â°C, Time 3.60e+6 sec	2470 psi @Temperature 1800 Â°F, Time 1000 hour	
	38.0 MPa @Temperature 982 Â°C, Time 360000 sec	5510 psi @Temperature 1800 Â°F, Time 100 hour	
	41.0 MPa @Temperature 927 Â°C, Time 3.60e+6 sec	5950 psi @Temperature 1700 Â°F, Time 1000 hour	
	83.0 MPa @Temperature 871 Â°C, Time 3.60e+6 sec	12000 psi @Temperature 1600 Â°F, Time 1000 hour	
	83.0 MPa @Temperature 927 Â°C, Time 360000 sec	12000 psi @Temperature 1700 Â°F, Time 100 hour	
	152 MPa @Temperature 871 Â°C, Time 360000 sec	22000 psi @Temperature 1600 Â°F,	

Mechanical Properties	Metric	English	Comments
	159 MPa @Temperature 816 Â°C, Time 3.60e+6 sec	Time 100 hour 23100 psi @Temperature 1500 Â°F, Time 1000 hour	
	225 MPa @Temperature 816 Â°C, Time 360000 sec	32600 psi @Temperature 1500 Â°F, Time 100 hour	
	262 MPa @Temperature 760 Â°C, Time 3.60e+6 sec	38000 psi @Temperature 1400 Â°F, Time 1000 hour	
	386 MPa @Temperature 704 Â°C, Time 3.60e+6 sec	56000 psi @Temperature 1300 Â°F, Time 1000 hour	
	386 MPa @Temperature 760 Â°C, Time 360000 sec	56000 psi @Temperature 1400 Â°F, Time 100 hour	
	517 MPa @Temperature 704 Â°C, Time 360000 sec	75000 psi @Temperature 1300 Â°F, Time 100 hour	
	552 MPa @Temperature 649 Â°C, Time 3.60e+6 sec	80100 psi @Temperature 1200 Â°F, Time 1000 hour	
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

Mechanical Properties	Metric	English	Comments
	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
Poissons Ratio	0.319 @Temperature 25.0 Â°C	0.319 @Temperature 77.0 Â°F	
	0.326 @Temperature 100 Â°C	0.326 @Temperature 212 Â°F	
	0.335 @Temperature 200 Â°C	0.335 @Temperature 392 Â°F	
	0.335 @Temperature 300 Â°C	0.335 @Temperature 572 Â°F	
	0.337 @Temperature 400 Â°C	0.337 @Temperature 752 Â°F	
	0.341 @Temperature 500 Â°C	0.341 @Temperature 932 Â°F	
	0.346 @Temperature 600 Â°C	0.346 @Temperature 1110 Â°F	
	0.352	0.352	

Mechanical Properties	Metric	English	Comments
	@Temperature 700 Â°C	@Temperature 1290 Â°F	
	0.355 @Temperature 800 Â°C	0.355 @Temperature 1470 Â°F	
	0.357 @Temperature 900 Â°C	0.357 @Temperature 1650 Â°F	
	0.363 @Temperature 1000 Â°C	0.363 @Temperature 1830 Â°F	
Shear Modulus	51.0 GPa @Temperature 1000 Â°C	7400 ksi @Temperature 1830 Â°F	Dynamic
	57.0 GPa @Temperature 900 Â°C	8270 ksi @Temperature 1650 Â°F	Dynamic

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