

Haynes R-41 alloy, 1.27 mm thick sheet, solution heat treated at 1079Â°C, water quenched, 30 minutes at 1066Â°C, air cooled, aged 16 hours at 760Â°C (1400Â°F)

Category : Metal , Nonferrous Metal , Nickel Alloy , Superalloy

Material Notes:

Vacuum melted, exceptionally high strength at temperature between 649-982Â°C. Precipitation-hardening type, strength developed by various solutioning and aging heat treatments. Applications include afterburner parts and nozzle diaphragm partitions in current gas turbine engines. Formed with success on drop-hammers, expanding mandrels and stretch formers. Data provided by the manufacturer, Haynes International, Inc.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Haynes-R-41-alloy-127-mm-thick-sheet-solution-heat-treated-at-1079C-water-quenched-30-minutes-at-1066C-air-cooled-aged-16-hours-at-760C-1400F.php

Physical Properties	Metric	English	Comments
Density	8.25 g/cc	0.298 lb/inÂ³	

Mechanical Properties	Metric	English	Comments
Tensile Strength, Ultimate	1047 MPa	151900 psi	
	179 MPa	26000 psi	
	@Temperature 982 Â°C	@Temperature 1800 Â°F	
	677 MPa	98200 psi	
	@Temperature 871 Â°C	@Temperature 1600 Â°F	
	858 MPa	124000 psi	
	@Temperature 760 Â°C	@Temperature 1400 Â°F	
Tensile Strength, Yield	958 MPa	139000 psi	
	@Temperature 538 Â°C	@Temperature 1000 Â°F	
	970 MPa	141000 psi	
	@Temperature 649 Â°C	@Temperature 1200 Â°F	
	799 MPa	116000 psi	
	@Strain 0.200 %	@Strain 0.200 %	
	80.0 MPa	11600 psi	
	@Strain 0.200 %,	@Strain 0.200 %,	

Mechanical Properties	Temperature 982 Å°C Metric	Temperature 1800 Å°F English	Comments
	450 MPa	65300 psi	
	@Strain 0.200 %, Temperature 871 Å°C	@Strain 0.200 %, Temperature 1600 Å°F	
	535 MPa	77600 psi	
	@Strain 0.200 %, Temperature 760 Å°C	@Strain 0.200 %, Temperature 1400 Å°F	
	746 MPa	108000 psi	
	@Strain 0.200 %, Temperature 538 Å°C	@Strain 0.200 %, Temperature 1000 Å°F	
	748 MPa	108000 psi	
	@Strain 0.200 %, Temperature 649 Å°C	@Strain 0.200 %, Temperature 1200 Å°F	
Modulus of Elasticity	150 GPa	21800 ksi	
	@Temperature 927 Å°C	@Temperature 1700 Å°F	
	160 GPa	23200 ksi	
	@Temperature 871 Å°C	@Temperature 1600 Å°F	
	163 GPa	23600 ksi	
	@Temperature 843 Å°C	@Temperature 1550 Å°F	
	166 GPa	24100 ksi	
	@Temperature 816 Å°C	@Temperature 1500 Å°F	
	171 GPa	24800 ksi	
	@Temperature 760 Å°C	@Temperature 1400 Å°F	
178 GPa	25800 ksi		
@Temperature 677 Å°C	@Temperature 1250 Å°F		
179 GPa	26000 ksi		
@Temperature 649 Å°C	@Temperature 1200 Å°F		
182 GPa	26400 ksi		
@Temperature 593 Å°C	@Temperature 1100 Å°F		
		27300 ksi	

Mechanical Properties	Metric	English	Comments
	188 GPa @Temperature 538 Â°C	@ Temperature 1000 Â°F	
	190 GPa @Temperature 482 Â°C	27600 ksi @Temperature 900 Â°F	
	198 GPa @Temperature 371 Â°C	28700 ksi @Temperature 700 Â°F	
	204 GPa @Temperature 260 Â°C	29600 ksi @Temperature 500 Â°F	
	213 GPa @Temperature 149 Â°C	30900 ksi @Temperature 300 Â°F	
	218 GPa @Temperature 25.0 Â°C	31600 ksi @Temperature 77.0 Â°F	
Poissons Ratio	0.31	0.31	27Â°C (80Â°F)
	0.31 @Temperature 149 Â°C	0.31 @Temperature 300 Â°F	
	0.32 @Temperature 482 Â°C	0.32 @Temperature 900 Â°F	
	0.32 @Temperature 371 Â°C	0.32 @Temperature 700 Â°F	
	0.32 @Temperature 260 Â°C	0.32 @Temperature 500 Â°F	
	0.33 @Temperature 760 Â°C	0.33 @Temperature 1400 Â°F	
	0.33 @Temperature 677 Â°C	0.33 @Temperature 1250 Â°F	
	0.33 @Temperature 649 Â°C	0.33 @Temperature 1200 Â°F	
	0.34 @Temperature 843 Â°C	0.34 @Temperature 1550 Â°F	

Mechanical Properties	Metric	English	Comments
	8.36		
	@Temperature 927 Â°C	@Temperature 1700 Â°F	
Shear Modulus	83.0 GPa	12000 ksi	27Â°C
	55.0 GPa	7980 ksi	
	@Temperature 927 Â°C	@Temperature 1700 Â°F	
	61.0 GPa	8850 ksi	
	@Temperature 843 Â°C	@Temperature 1550 Â°F	
	64.0 GPa	9280 ksi	
	@Temperature 760 Â°C	@Temperature 1400 Â°F	
	67.0 GPa	9720 ksi	
	@Temperature 677 Â°C	@Temperature 1250 Â°F	
	69.0 GPa	10000 ksi	
	@Temperature 593 Â°C	@Temperature 1100 Â°F	
	72.0 GPa	10400 ksi	
	@Temperature 482 Â°C	@Temperature 900 Â°F	
	75.0 GPa	10900 ksi	
	@Temperature 371 Â°C	@Temperature 700 Â°F	
	77.0 GPa	11200 ksi	
	@Temperature 260 Â°C	@Temperature 500 Â°F	
	81.0 GPa	11700 ksi	
	@Temperature 149 Â°C	@Temperature 300 Â°F	

Thermal Properties	Metric	English	Comments
CTE, linear	13.5 Âµm/m-Â°C	7.50 Âµin/in-Â°F	
	@Temperature 21.0 - 538 Â°C	@Temperature 69.8 - 1000 Â°F	
	14.0 Âµm/m-Â°C	7.78 Âµin/in-Â°F	
	@Temperature 21.0 - 649 Â°C	@Temperature 69.8 - 1200 Â°F	

Thermal Properties	14.8 $\mu\text{m}/\text{m}\cdot\text{Å}^\circ\text{C}$ Metric	8.22 $\mu\text{in}/\text{in}\cdot\text{Å}^\circ\text{F}$ English	Comments
	@Temperature 21.0 - 760 $\text{Å}^\circ\text{C}$	@Temperature 69.8 - 1400 $\text{Å}^\circ\text{F}$	
	15.2 $\mu\text{m}/\text{m}\cdot\text{Å}^\circ\text{C}$	8.44 $\mu\text{in}/\text{in}\cdot\text{Å}^\circ\text{F}$	
	@Temperature 21.0 - 871 $\text{Å}^\circ\text{C}$	@Temperature 69.8 - 1600 $\text{Å}^\circ\text{F}$	
	16.3 $\mu\text{m}/\text{m}\cdot\text{Å}^\circ\text{C}$	9.06 $\mu\text{in}/\text{in}\cdot\text{Å}^\circ\text{F}$	
	@Temperature 21.0 - 927 $\text{Å}^\circ\text{C}$	@Temperature 69.8 - 1700 $\text{Å}^\circ\text{F}$	
	16.8 $\mu\text{m}/\text{m}\cdot\text{Å}^\circ\text{C}$	9.33 $\mu\text{in}/\text{in}\cdot\text{Å}^\circ\text{F}$	
	@Temperature 21.0 - 982 $\text{Å}^\circ\text{C}$	@Temperature 69.8 - 1800 $\text{Å}^\circ\text{F}$	
Specific Heat Capacity	0.452 J/g- $\text{Å}^\circ\text{C}$	0.108 BTU/lb- $\text{Å}^\circ\text{F}$	
	@Temperature 21.0 $\text{Å}^\circ\text{C}$	@Temperature 69.8 $\text{Å}^\circ\text{F}$	
Thermal Conductivity	11.5 W/m-K	79.8 BTU-in/hr-ft Å^2 - $\text{Å}^\circ\text{F}$	
	@Temperature 149 $\text{Å}^\circ\text{C}$	@Temperature 300 $\text{Å}^\circ\text{F}$	
	12.5 W/m-K	86.8 BTU-in/hr-ft Å^2 - $\text{Å}^\circ\text{F}$	
	@Temperature 204 $\text{Å}^\circ\text{C}$	@Temperature 399 $\text{Å}^\circ\text{F}$	
	13.6 W/m-K	94.4 BTU-in/hr-ft Å^2 - $\text{Å}^\circ\text{F}$	
	@Temperature 260 $\text{Å}^\circ\text{C}$	@Temperature 500 $\text{Å}^\circ\text{F}$	
	14.7 W/m-K	102 BTU-in/hr-ft Å^2 - $\text{Å}^\circ\text{F}$	
	@Temperature 316 $\text{Å}^\circ\text{C}$	@Temperature 601 $\text{Å}^\circ\text{F}$	
	16.8 W/m-K	117 BTU-in/hr-ft Å^2 - $\text{Å}^\circ\text{F}$	
	@Temperature 427 $\text{Å}^\circ\text{C}$	@Temperature 801 $\text{Å}^\circ\text{F}$	
	18.8 W/m-K	130 BTU-in/hr-ft Å^2 - $\text{Å}^\circ\text{F}$	
	@Temperature 538 $\text{Å}^\circ\text{C}$	@Temperature 1000 $\text{Å}^\circ\text{F}$	
	20.0 W/m-K	139 BTU-in/hr-ft Å^2 - $\text{Å}^\circ\text{F}$	
	@Temperature 593 $\text{Å}^\circ\text{C}$	@Temperature 1100 $\text{Å}^\circ\text{F}$	
	21.0 W/m-K	146 BTU-in/hr-ft Å^2 - $\text{Å}^\circ\text{F}$	
	@Temperature 644 $\text{Å}^\circ\text{C}$	@Temperature 1190 $\text{Å}^\circ\text{F}$	

Thermal Properties	Metric /m-K	English	Comments
	@Temperature 704 Â°C	153 BTU-in/hr-ftÂ²-Â°F @Temperature 1300 Â°F	
	23.1 W/m-K @Temperature 760 Â°C	160 BTU-in/hr-ftÂ²-Â°F @Temperature 1400 Â°F	
	24.1 W/m-K @Temperature 816 Â°C	167 BTU-in/hr-ftÂ²-Â°F @Temperature 1500 Â°F	
	25.1 W/m-K @Temperature 871 Â°C	174 BTU-in/hr-ftÂ²-Â°F @Temperature 1600 Â°F	
Melting Point	1310 - 1345 Â°C	2390 - 2453 Â°F	
Solidus	1310 Â°C	2390 Â°F	

Electrical Properties	Metric	English	Comments
Magnetic Permeability	<= 1.002 @Temperature 21.0 Â°C	<= 1.002 @Temperature 69.8 Â°F	200 Oersted

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