

Haynes 188 alloy, plate at RT after 4000 hours at 870Â°C (1600Â°F)

Category : Metal , Nonferrous Metal , Cobalt Alloy , Superalloy

Material Notes:

Excellent high temperature strength and very good resistance to oxidizing environments up to 1095Â°C for prolonged exposure, and excellent resistance to sulfate deposit hot corrosion. Readily fabricated and formed, excellent resistance to molten chloride salts, and good resistance to gaseous sulfidation. Applications include a variety of fabricated component applications in the aerospace industry, commercial gas turbine engines for combustion cans, transition ducts and afterburner components. Data provided by the manufacturer, Haynes International, Inc.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Haynes-188-alloy-plate-at-RT-after-4000-hours-at-870C-1600F.php

Physical Properties	Metric	English	Comments
Density	8.98 g/cc	0.324 lb/inÂ³	at RT.

Mechanical Properties	Metric	English	Comments
Tensile Strength, Ultimate	1075 MPa	155900 psi	
Tensile Strength, Yield	475 MPa @Strain 0.200 %	68900 psi @Strain 0.200 %	
Elongation at Break	26.6 %	26.6 %	in 51 mm
Modulus of Elasticity	232 GPa	33600 ksi	RT
	153 GPa @Temperature 1000 Â°C	22200 ksi @Temperature 1830 Â°F	
	161 GPa @Temperature 900 Â°C	23400 ksi @Temperature 1650 Â°F	
	169 GPa @Temperature 800 Â°C	24500 ksi @Temperature 1470 Â°F	
	176 GPa @Temperature 700 Â°C	25500 ksi @Temperature 1290 Â°F	
	184 GPa @Temperature 600 Â°C	26700 ksi @Temperature 1110 Â°F	
	193 GPa	28000 ksi	

Mechanical Properties	Metric	English	Comments
	201 GPa @Temperature 500 Å°C	29200 ksi @Temperature 932 Å°F	
	@Temperature 400 Å°C	@Temperature 752 Å°F	
	209 GPa @Temperature 300 Å°C	30300 ksi @Temperature 572 Å°F	
	217 GPa @Temperature 200 Å°C	31500 ksi @Temperature 392 Å°F	
	225 GPa @Temperature 100 Å°C	32600 ksi @Temperature 212 Å°F	
Charpy Impact	12.0 J	8.85 ft-lb	after 8000 hours at 870Å°C

Thermal Properties	Metric	English	Comments
CTE, linear	11.9 Åµm/m-Å°C @Temperature 25.0 - 100 Å°C	6.61 Åµin/in-Å°F @Temperature 77.0 - 212 Å°F	
	12.6 Åµm/m-Å°C @Temperature 25.0 - 200 Å°C	7.00 Åµin/in-Å°F @Temperature 77.0 - 392 Å°F	
	13.2 Åµm/m-Å°C @Temperature 25.0 - 300 Å°C	7.33 Åµin/in-Å°F @Temperature 77.0 - 572 Å°F	
	13.8 Åµm/m-Å°C @Temperature 25.0 - 400 Å°C	7.67 Åµin/in-Å°F @Temperature 77.0 - 752 Å°F	
	14.5 Åµm/m-Å°C @Temperature 25.0 - 500 Å°C	8.06 Åµin/in-Å°F @Temperature 77.0 - 932 Å°F	
	15.2 Åµm/m-Å°C @Temperature 25.0 - 600 Å°C	8.44 Åµin/in-Å°F @Temperature 77.0 - 1110 Å°F	
	15.8 Åµm/m-Å°C @Temperature 25.0 - 700 Å°C	8.78 Åµin/in-Å°F @Temperature 77.0 - 1290 Å°F	
	16.5 Åµm/m-Å°C @Temperature 25.0 -	9.17 Åµin/in-Å°F @Temperature 77.0 -	

Thermal Properties	800 Å°C Metric	1470 Å°F English	Comments
	17.1 Åµm/m-Å°C	9.50 Åµin/in-Å°F	
	@Temperature 25.0 - 800 Å°C	@Temperature 77.0 - 1470 Å°F	
	17.9 Åµm/m-Å°C	9.94 Åµin/in-Å°F	
	@Temperature 25.0 - 1000 Å°C	@Temperature 77.0 - 1830 Å°F	
Specific Heat Capacity	0.403 J/g-Å°C	0.0963 BTU/lb-Å°F	RT
	0.423 J/g-Å°C	0.101 BTU/lb-Å°F	
	@Temperature 100 Å°C	@Temperature 212 Å°F	
	0.444 J/g-Å°C	0.106 BTU/lb-Å°F	
	@Temperature 200 Å°C	@Temperature 392 Å°F	
	0.465 J/g-Å°C	0.111 BTU/lb-Å°F	
	@Temperature 300 Å°C	@Temperature 572 Å°F	
	0.486 J/g-Å°C	0.116 BTU/lb-Å°F	
	@Temperature 400 Å°C	@Temperature 752 Å°F	
	0.502 J/g-Å°C	0.120 BTU/lb-Å°F	
	@Temperature 500 Å°C	@Temperature 932 Å°F	
	0.523 J/g-Å°C	0.125 BTU/lb-Å°F	
	@Temperature 600 Å°C	@Temperature 1110 Å°F	
	0.540 J/g-Å°C	0.129 BTU/lb-Å°F	
	@Temperature 700 Å°C	@Temperature 1290 Å°F	
	0.557 J/g-Å°C	0.133 BTU/lb-Å°F	
	@Temperature 800 Å°C	@Temperature 1470 Å°F	
	0.573 J/g-Å°C	0.137 BTU/lb-Å°F	
	@Temperature 900 Å°C	@Temperature 1650 Å°F	
	0.590 J/g-Å°C	0.141 BTU/lb-Å°F	
	@Temperature 1000 Å°C	@Temperature 1830 Å°F	
Thermal Conductivity	10.4 W/m-K	72.2 BTU-in/hr-ftÅ²-Å°F	RT

Thermal Properties	Metric	English	Comments
	@Temperature 100 Â°C	@Temperature 212 Â°F	
	14.3 W/m-K	99.2 BTU-in/hr-ftÂ²-Â°F	
	@Temperature 200 Â°C	@Temperature 392 Â°F	
	15.9 W/m-K	110 BTU-in/hr-ftÂ²-Â°F	
	@Temperature 300 Â°C	@Temperature 572 Â°F	
	17.5 W/m-K	121 BTU-in/hr-ftÂ²-Â°F	
	@Temperature 400 Â°C	@Temperature 752 Â°F	
	19.3 W/m-K	134 BTU-in/hr-ftÂ²-Â°F	
	@Temperature 500 Â°C	@Temperature 932 Â°F	
	21.1 W/m-K	146 BTU-in/hr-ftÂ²-Â°F	
	@Temperature 600 Â°C	@Temperature 1110 Â°F	
	23.0 W/m-K	160 BTU-in/hr-ftÂ²-Â°F	
	@Temperature 700 Â°C	@Temperature 1290 Â°F	
	24.8 W/m-K	172 BTU-in/hr-ftÂ²-Â°F	
	@Temperature 800 Â°C	@Temperature 1470 Â°F	
	25.5 W/m-K	177 BTU-in/hr-ftÂ²-Â°F	
	@Temperature 900 Â°C	@Temperature 1650 Â°F	
	27.6 W/m-K	192 BTU-in/hr-ftÂ²-Â°F	
	@Temperature 1000 Â°C	@Temperature 1830 Â°F	
Melting Point	1315 - 1410 Â°C	2399 - 2570 Â°F	
Solidus	1315 Â°C	2399 Â°F	
Liquidus	1410 Â°C	2570 Â°F	
Maximum Service Temperature, Air	1095 Â°C	2003 Â°F	

Component Elements Properties	Metric	English	Comments
Boron, B	<= 0.015 %	<= 0.015 %	
Carbon, C	0.050 - 0.15 %	0.050 - 0.15 %	

Component Elements Properties	Metric	English	Comments
Cobalt, Co	42 %	42 %	As remainder
Iron, Fe	<= 3.0 %	<= 3.0 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.000101 ohm-cm	0.000101 ohm-cm	RT
	0.000103 ohm-cm	0.000103 ohm-cm	
	@Temperature 100 Â°C	@Temperature 212 Â°F	
	0.000105 ohm-cm	0.000105 ohm-cm	
	@Temperature 200 Â°C	@Temperature 392 Â°F	
	0.0001077 ohm-cm	0.0001077 ohm-cm	
	@Temperature 300 Â°C	@Temperature 572 Â°F	
	0.0001105 ohm-cm	0.0001105 ohm-cm	
	@Temperature 400 Â°C	@Temperature 752 Â°F	
	0.0001127 ohm-cm	0.0001127 ohm-cm	
	@Temperature 500 Â°C	@Temperature 932 Â°F	
	0.0001148 ohm-cm	0.0001148 ohm-cm	
	@Temperature 600 Â°C	@Temperature 1110 Â°F	
	0.0001164 ohm-cm	0.0001164 ohm-cm	
	@Temperature 700 Â°C	@Temperature 1290 Â°F	
	0.0001175 ohm-cm	0.0001175 ohm-cm	
	@Temperature 800 Â°C	@Temperature 1470 Â°F	
	0.0001183 ohm-cm	0.0001183 ohm-cm	
	@Temperature 900 Â°C	@Temperature 1650 Â°F	
	0.0001191 ohm-cm	0.0001191 ohm-cm	
	@Temperature 1000 Â°C	@Temperature 1830 Â°F	

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