

## Haynes Multimet® alloy, 12.7 mm (1/2 in.) thick plate, 1185°C heat treatment, water quenched

Category : Metal , Superalloy , Iron Base

### Material Notes:

Recommended for use in applications involving high stress at temperatures up to 816°C (1500°F), and moderate stresses up to 1093°C (2000°F). Excellent oxidation resistance, good ductility, and is readily fabricated. Current applications include aircraft, including tailpipes and tailcones, afterburner parts, exhaust manifolds, combustion chambers, turbine blades, buckets and nozzles. Excellent service for high temperature bolts. Data provided by the manufacturer, Haynes International, Inc.

Order this product through the following link:

[http://www.lookpolymers.com/polymer\\_Haynes-Multimet-alloy-127-mm-12-in-thick-plate-1185C-heat-treatment-water-quenched.php](http://www.lookpolymers.com/polymer_Haynes-Multimet-alloy-127-mm-12-in-thick-plate-1185C-heat-treatment-water-quenched.php)

Physical Properties	Metric	English	Comments
Density	8.20 g/cc	0.296 lb/in <sup>3</sup>	

Mechanical Properties	Metric	English	Comments
Tensile Strength, Ultimate	949 MPa	138000 psi	
	@Temperature -78.0 Å°C	@Temperature -108 Å°F	
Tensile Strength, Yield	1311 MPa	190100 psi	
	@Temperature -196 Å°C	@Temperature -321 Å°F	
Tensile Strength, Yield	513 MPa	74400 psi	
	@Strain 0.200 %, Temperature -78.0 Å°C	@Strain 0.200 %, Temperature -108 Å°F	
Elongation at Break	53 %	53 %	in 50.8 mm
	@Temperature -196 Å°C	@Temperature -321 Å°F	
Elongation at Break	63 %	63 %	in 50.8 mm
	@Temperature -78.0 Å°C	@Temperature -108 Å°F	
Modulus of Elasticity	207 GPa	30000 ksi	
	@Temperature -78.0 Å°C	@Temperature -108 Å°F	
Modulus of Elasticity	214 GPa	31000 ksi	
	@Temperature -196 Å°C	@Temperature -321 Å°F	
Poissons Ratio	0.298	0.298	RT

Mechanical Properties	0.315 Metric	0.315 English	Comments
	@Temperature 426 Â°C	@Temperature 799 Â°F	
	0.319	0.319	
	@Temperature -78.0 Â°C	@Temperature -108 Â°F	
	0.325	0.325	
	@Temperature 650 Â°C	@Temperature 1200 Â°F	
	0.339	0.339	
	@Temperature 816 Â°C	@Temperature 1500 Â°F	

Thermal Properties	Metric	English	Comments
CTE, linear	15.3 Âµm/m-Â°C	8.50 Âµin/in-Â°F	
	@Temperature 23.0 - 300 Â°C	@Temperature 73.4 - 572 Â°F	
	15.6 Âµm/m-Â°C	8.67 Âµin/in-Â°F	
	@Temperature 23.0 - 400 Â°C	@Temperature 73.4 - 752 Â°F	
	16.0 Âµm/m-Â°C	8.89 Âµin/in-Â°F	
	@Temperature 23.0 - 500 Â°C	@Temperature 73.4 - 932 Â°F	
	16.7 Âµm/m-Â°C	9.28 Âµin/in-Â°F	
	@Temperature 23.0 - 600 Â°C	@Temperature 73.4 - 1110 Â°F	
	17.2 Âµm/m-Â°C	9.56 Âµin/in-Â°F	
	@Temperature 23.0 - 700 Â°C	@Temperature 73.4 - 1290 Â°F	
17.5 Âµm/m-Â°C	9.72 Âµin/in-Â°F		
@Temperature 23.0 - 800 Â°C	@Temperature 73.4 - 1470 Â°F		
17.8 Âµm/m-Â°C	9.89 Âµin/in-Â°F		
@Temperature 23.0 - 1000 Â°C	@Temperature 73.4 - 1830 Â°F		
17.8 Âµm/m-Â°C	9.89 Âµin/in-Â°F		
@Temperature 23.0 - 900 Â°C	@Temperature 73.4 - 1650 Â°F		
18.4 Âµm/m-Â°C	10.2 Âµin/in-Â°F		

Thermal Properties	Metric	English	Comments
	@Temperature 23.0 - 1100 Å°C	@Temperature 73.4 - 2010 Å°F	
Specific Heat Capacity	0.435 J/g-Å°C	0.104 BTU/lb-Å°F	
	@Temperature >=100 Å°C	@Temperature >=212 Å°F	
Thermal Conductivity	15.9 W/m-K	110 BTU-in/hr-ftÅ²-Å°F	
	@Temperature 300 Å°C	@Temperature 572 Å°F	
	17.3 W/m-K	120 BTU-in/hr-ftÅ²-Å°F	
	@Temperature 400 Å°C	@Temperature 752 Å°F	
	18.6 W/m-K	129 BTU-in/hr-ftÅ²-Å°F	
	@Temperature 500 Å°C	@Temperature 932 Å°F	
	20.0 W/m-K	139 BTU-in/hr-ftÅ²-Å°F	
	@Temperature 600 Å°C	@Temperature 1110 Å°F	
	20.0 W/m-K	139 BTU-in/hr-ftÅ²-Å°F	
	@Temperature 200 Å°C	@Temperature 392 Å°F	
Melting Point	1288 - 1354 Å°C	2350 - 2469 Å°F	
Solidus	1288 Å°C	2350 Å°F	
Liquidus	1354 Å°C	2469 Å°F	

Optical Properties	Metric	English	Comments
Emissivity (0-1)	0.88	0.88	
	@Temperature 1090 Å°C	@Temperature 1990 Å°F	Oxidized

Component Elements Properties	Metric	English	Comments
Carbon, C	0.080 - 0.16 %	0.080 - 0.16 %	
Cb + Ta	0.75 - 1.25 %	0.75 - 1.25 %	
Chromium, Cr	20 - 22.5 %	20 - 22.5 %	
Cobalt, Co	18.5 - 21 %	18.5 - 21 %	
Iron, Fe	33 %	33 %	As remainder
Manganese, Mn	1.0 - 2.0 %	1.0 - 2.0 %	
Molybdenum, Mo	2.5 - 3.5 %	2.5 - 3.5 %	

Component Elements Properties	Metric	English	Comments
Nitrogen, N	0.10 - 0.20 %	0.10 - 0.20 %	
Silicon, Si	<= 1.0 %	<= 1.0 %	
Tungsten, W	2.0 - 3.0 %	2.0 - 3.0 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000930 ohm-cm @Temperature 22.0 Â°C	0.0000930 ohm-cm @Temperature 71.6 Â°F	

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