

## Haynes Multimet® alloy, 1.6 mm thick sheet, 1177°C heat treatment, rapid air cooled

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-16-mm-thick-sheet-1177C-heat-treatment-rapid-air-cooled.php](http://www.lookpolymers.com/polymer_Haynes-Multimet-alloy-16-mm-thick-sheet-1177C-heat-treatment-rapid-air-cooled.php)

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

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	159	159	Converted from Rockwell B hardness.
Hardness, Knoop	176	176	Converted from Rockwell B hardness.
Hardness, Rockwell B	92	92	
Hardness, Vickers	201	201	Converted from Rockwell B hardness.
Tensile Strength, Ultimate	814 MPa	118000 psi	
	18.0 MPa	2610 psi	
	@Temperature 1288 °C	@Temperature 2350 °F	
	23.0 MPa	3340 psi	
	@Temperature 1260 °C	@Temperature 2300 °F	
	33.0 MPa	4790 psi	
	@Temperature 1204 °C	@Temperature 2199 °F	
	48.0 MPa	6960 psi	
	@Temperature 1149 °C	@Temperature 2100 °F	
	90.0 MPa	13100 psi	
	@Temperature 1093 °C	@Temperature 1999 °F	

Mechanical Properties	170 MPa Metric	24700 psi English	Comments
	@Temperature 982 Â°C	@Temperature 1800 Â°F	
	268 MPa	38900 psi	
	@Temperature 871 Â°C	@Temperature 1600 Â°F	
	403 MPa	58500 psi	
	@Temperature 760 Â°C	@Temperature 1400 Â°F	
	507 MPa	73500 psi	
	@Temperature 649 Â°C	@Temperature 1200 Â°F	
	647 MPa	93800 psi	
	@Temperature 538 Â°C	@Temperature 1000 Â°F	
	676 MPa	98000 psi	
	@Temperature 427 Â°C	@Temperature 801 Â°F	
Tensile Strength, Yield	400 MPa	58000 psi	
	@Strain 0.200 %	@Strain 0.200 %	
	21.0 MPa	3050 psi	
	@Strain 0.200 %, Temperature 1204 Â°C	@Strain 0.200 %, Temperature 2199 Â°F	
	30.0 MPa	4350 psi	
	@Strain 0.200 %, Temperature 1149 Â°C	@Strain 0.200 %, Temperature 2100 Â°F	
	58.0 MPa	8410 psi	
	@Strain 0.200 %, Temperature 1093 Â°C	@Strain 0.200 %, Temperature 1999 Â°F	
	117 MPa	17000 psi	
	@Strain 0.200 %, Temperature 982 Â°C	@Strain 0.200 %, Temperature 1800 Â°F	
	207 MPa	30000 psi	
	@Strain 0.200 %, Temperature 871 Â°C	@Strain 0.200 %, Temperature 1600 Â°F	
	247 MPa	35800 psi	
	@Strain 0.200 %, Temperature 760 Â°C	@Strain 0.200 %, Temperature 1400 Â°F	

Mechanical Properties	259 MPa Metric	37600 psi English	Comments
	@Strain 0.200 %, Temperature 649 Å°C	@Strain 0.200 %, Temperature 1200 Å°F	
	<b>274 MPa</b>	<b>39700 psi</b>	
	@Strain 0.200 %, Temperature 538 Å°C	@Strain 0.200 %, Temperature 1000 Å°F	
	<b>292 MPa</b>	<b>42400 psi</b>	
	@Strain 0.200 %, Temperature 427 Å°C	@Strain 0.200 %, Temperature 801 Å°F	
<b>Elongation at Break</b>	<b>49 %</b>	<b>49 %</b>	<b>in 50.8 mm</b>
	<b>7.0 %</b>	<b>7.0 %</b>	
	@Temperature 1288 Å°C	@Temperature 2350 Å°F	<b>in 50.8 mm</b>
	<b>12 %</b>	<b>12 %</b>	
	@Temperature 760 Å°C	@Temperature 1400 Å°F	<b>in 50.8 mm</b>
	<b>15 %</b>	<b>15 %</b>	
	@Temperature 871 Å°C	@Temperature 1600 Å°F	<b>in 50.8 mm</b>
	<b>19 %</b>	<b>19 %</b>	
	@Temperature 1260 Å°C	@Temperature 2300 Å°F	<b>in 50.8 mm</b>
	<b>28 %</b>	<b>28 %</b>	
	@Temperature 649 Å°C	@Temperature 1200 Å°F	<b>in 50.8 mm</b>
	<b>29 %</b>	<b>29 %</b>	
	@Temperature 1204 Å°C	@Temperature 2199 Å°F	<b>in 50.8 mm</b>
	<b>36 %</b>	<b>36 %</b>	
	@Temperature 1149 Å°C	@Temperature 2100 Å°F	<b>in 50.8 mm</b>
	<b>38 %</b>	<b>38 %</b>	
	@Temperature 1093 Å°C	@Temperature 1999 Å°F	<b>in 50.8 mm</b>
	<b>51 %</b>	<b>51 %</b>	
	@Temperature 982 Å°C	@Temperature 1800 Å°F	<b>in 50.8 mm</b>
	<b>54 %</b>	<b>54 %</b>	

Mechanical Properties	Metric	English	Comments
	54 % @Temperature 427 Â°C	54 % @Temperature 801 Â°F	in 50.8 mm
	54 % @Temperature 538 Â°C	54 % @Temperature 1000 Â°F	in 50.8 mm
Modulus of Elasticity	200 GPa	29000 ksi	
	124 GPa @Temperature 871 Â°C	18000 ksi @Temperature 1600 Â°F	
	152 GPa @Temperature 649 Â°C	22000 ksi @Temperature 1200 Â°F	
	152 GPa @Temperature 760 Â°C	22000 ksi @Temperature 1400 Â°F	
	165 GPa @Temperature 427 Â°C	23900 ksi @Temperature 801 Â°F	
	172 GPa @Temperature 538 Â°C	24900 ksi @Temperature 1000 Â°F	
Poissons Ratio	0.298	0.298	RT
	0.315 @Temperature 426 Â°C	0.315 @Temperature 799 Â°F	
	0.319 @Temperature -78.0 Â°C	0.319 @Temperature -108 Â°F	
	0.325 @Temperature 650 Â°C	0.325 @Temperature 1200 Â°F	
	0.339 @Temperature 816 Â°C	0.339 @Temperature 1500 Â°F	
Shear Modulus	77.0 GPa	11200 ksi	Calculated

Thermal Properties	Metric	English	Comments
	15.3 Âµm/m-Â°C	8.50 Âµin/in-Â°F	

CTE linear Thermal Properties	Metric @ Temperature 23.0 - 300 Â°C	English @ Temperature 73.4 - 572 Â°F	Comments
	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	
	@Temperature 23.0 - 1100 Â°C	@Temperature 73.4 - 2010 Â°F	
<b>Specific Heat Capacity</b>	0.435 J/g-Â°C	0.104 BTU/lb-Â°F	
	@Temperature >=100 Â°C	@Temperature >=212 Â°F	
<b>Thermal Conductivity</b>	15.9 W/m-K	110 BTU-in/hr-ftÂ²-Â°F	
	@Temperature 300 Â°C	@Temperature 572 Â°F	
	17.3 W/m-K	120 BTU-in/hr-ftÂ²-Â°F	
	@Temperature 400 Â°C	@Temperature 752 Â°F	
	18.6 W/m-K	129 BTU-in/hr-ftÂ²-Â°F	
	@Temperature 500 Â°C	@Temperature 932 Â°F	
	20.0 W/m-K	139 BTU-in/hr-ftÂ²-Â°F	

Thermal Properties	Metric	English	Comments
	20.0 W/m-K	139 BTU-in/hr-ft <sup>2</sup> -°F	
	@Temperature 600 °C	@Temperature 1110 °F	
	@Temperature 200 °C	@Temperature 392 °F	
Melting Point	1288 - 1354 °C	2350 - 2469 °F	
Solidus	1288 °C	2350 °F	
Liquidus	1354 °C	2469 °F	

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

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

## Contact Songhan Plastic Technology Co.,Ltd.

Website : [www.lookpolymers.com](http://www.lookpolymers.com)

Email : [sales@lookpolymers.com](mailto:sales@lookpolymers.com)

Tel : +86 021-51131842

Mobile : +86 13061808058

Skype : lookpolymers

Address : United North Road 215,Fengxian District, Shanghai City,China