

Haynes HR-160® alloy, solution annealed sheet

Category : Metal , Nonferrous Metal , Nickel Alloy , Superalloy

Material Notes:

Outstanding resistance to various forms of high-temperature corrosion attack, excellent resistance to sulfidation and chloride attack in both reducing and oxidizing atmospheres. Excellent forming and welding characteristics. Applications include a variety of fabricated components in municipal, industrial, hazardous, and nuclear waste heat recovery systems. Also suitable for utility boilers, sulfur plants, high-temperature furnaces, kilns, calciners, resource recovery units, cement kilns, pulp and paper recovery boilers, coal gasification systems, and fluidized-bed-combustion systems. Data provided by the manufacturer, Haynes International, Inc.

Order this product through the following link:

http://www.lookpolymers.com/polymer_Haynes-HR-160-alloy-solution-annealed-sheet.php

Physical Properties	Metric	English	Comments
Density	8.08 g/cc	0.292 lb/in ³	at RT

Mechanical Properties	Metric	English	Comments
Tensile Strength, Ultimate	758 MPa	110000 psi	
	33.0 MPa	4790 psi	
	@Temperature 1204 °C	@Temperature 2199 °F	
	46.0 MPa	6670 psi	
	@Temperature 1149 °C	@Temperature 2100 °F	
	68.0 MPa	9860 psi	
	@Temperature 1093 °C	@Temperature 1999 °F	
	129 MPa	18700 psi	
	@Temperature 982 °C	@Temperature 1800 °F	
	241 MPa	35000 psi	
	@Temperature 871 °C	@Temperature 1600 °F	
	421 MPa	61100 psi	
	@Temperature 760 °C	@Temperature 1400 °F	
	519 MPa	75300 psi	
	@Temperature 649 °C	@Temperature 1200 °F	

Mechanical Properties	Metric ^{Pa}	English ^{psi}	Comments
	@Temperature 538 Â°C	@Temperature 1000 Â°F	
Tensile Strength, Yield	353 MPa	51200 psi	
	@Strain 0.200 %	@Strain 0.200 %	
	14.0 MPa	2030 psi	
	@Strain 0.200 %, Temperature 1204 Â°C	@Strain 0.200 %, Temperature 2199 Â°F	
	19.0 MPa	2760 psi	
	@Strain 0.200 %, Temperature 1149 Â°C	@Strain 0.200 %, Temperature 2100 Â°F	
	32.0 MPa	4640 psi	
	@Strain 0.200 %, Temperature 1093 Â°C	@Strain 0.200 %, Temperature 1999 Â°F	
	66.0 MPa	9570 psi	
	@Strain 0.200 %, Temperature 982 Â°C	@Strain 0.200 %, Temperature 1800 Â°F	
	110 MPa	16000 psi	
	@Strain 0.200 %, Temperature 871 Â°C	@Strain 0.200 %, Temperature 1600 Â°F	
	212 MPa	30700 psi	
	@Strain 0.200 %, Temperature 760 Â°C	@Strain 0.200 %, Temperature 1400 Â°F	
	215 MPa	31200 psi	
	@Strain 0.200 %, Temperature 649 Â°C	@Strain 0.200 %, Temperature 1200 Â°F	
	225 MPa	32600 psi	
	@Strain 0.200 %, Temperature 538 Â°C	@Strain 0.200 %, Temperature 1000 Â°F	
Elongation at Break	63 %	63 %	in 50.8 mm
	41 %	41 %	
	@Temperature 871 Â°C	@Temperature 1600 Â°F	in 50.8 mm
	47 %	47 %	
	@Temperature 760 Â°C	@Temperature 1400 Â°F	in 50.8 mm
	51 %	51 %	

Mechanical Properties	Metric	English	in 50.8 mm Comments
	@Temperature 982 Â°C	@Temperature 1800 Â°F	
	53 %	53 %	
	@Temperature 1093 Â°C	@Temperature 1999 Â°F	in 50.8 mm
	62 %	62 %	
	@Temperature 649 Â°C	@Temperature 1200 Â°F	in 50.8 mm
	73 %	73 %	
	@Temperature 538 Â°C	@Temperature 1000 Â°F	in 50.8 mm
	91 %	91 %	
	@Temperature 1204 Â°C	@Temperature 2199 Â°F	in 50.8 mm
	107 %	107 %	
	@Temperature 1149 Â°C	@Temperature 2100 Â°F	in 50.8 mm
Modulus of Elasticity	211 GPa	30600 ksi	RT
	137 GPa	19900 ksi	
	@Temperature 980 Â°C	@Temperature 1800 Â°F	
	145 GPa	21000 ksi	
	@Temperature 925 Â°C	@Temperature 1700 Â°F	
	150 GPa	21800 ksi	
	@Temperature 870 Â°C	@Temperature 1600 Â°F	
	154 GPa	22300 ksi	
	@Temperature 815 Â°C	@Temperature 1500 Â°F	
	158 GPa	22900 ksi	
	@Temperature 760 Â°C	@Temperature 1400 Â°F	
	163 GPa	23600 ksi	
	@Temperature 705 Â°C	@Temperature 1300 Â°F	
	168 GPa	24400 ksi	

Mechanical Properties	Metric	English	Comments
	173 GPa	25100 ksi	
	@Temperature 650 Â°C	@Temperature 1200 Â°F	
	177 GPa	25700 ksi	
	@Temperature 595 Â°C	@Temperature 1100 Â°F	
	177 GPa	25700 ksi	
	@Temperature 540 Â°C	@Temperature 1000 Â°F	
	180 GPa	26100 ksi	
	@Temperature 480 Â°C	@Temperature 896 Â°F	
	183 GPa	26500 ksi	
	@Temperature 425 Â°C	@Temperature 797 Â°F	
	187 GPa	27100 ksi	
	@Temperature 370 Â°C	@Temperature 698 Â°F	
	192 GPa	27800 ksi	
	@Temperature 315 Â°C	@Temperature 599 Â°F	
	197 GPa	28600 ksi	
	@Temperature 260 Â°C	@Temperature 500 Â°F	
	201 GPa	29200 ksi	
	@Temperature 205 Â°C	@Temperature 401 Â°F	
	204 GPa	29600 ksi	
	@Temperature 150 Â°C	@Temperature 302 Â°F	
	208 GPa	30200 ksi	
	@Temperature 90.0 Â°C	@Temperature 194 Â°F	
	210 GPa	30500 ksi	
	@Temperature 40.0 Â°C	@Temperature 104 Â°F	

Thermal Properties	Metric	English	Comments
CTE, linear	13.0 Âµm/m-Â°C	7.22 Âµin/in-Â°F	
	@Temperature 25.0 - 95.0 Â°C	@Temperature 77.0 - 203 Â°F	
	13.7 Âµm/m-Â°C	7.61 Âµin/in-Â°F	

Thermal Properties	Metric @Temperature 25.0 - 203 Â°C	English @Temperature 77.0 - 409 Â°F	Comments
	14.0 Âµm/m-Â°C	7.78 Âµin/in-Â°F	
	@Temperature 25.0 - 315 Â°C	@Temperature 77.0 - 599 Â°F	
	14.4 Âµm/m-Â°C	8.00 Âµin/in-Â°F	
	@Temperature 25.0 - 425 Â°C	@Temperature 77.0 - 797 Â°F	
	14.9 Âµm/m-Â°C	8.28 Âµin/in-Â°F	
	@Temperature 25.0 - 540 Â°C	@Temperature 77.0 - 1000 Â°F	
	15.5 Âµm/m-Â°C	8.61 Âµin/in-Â°F	
	@Temperature 25.0 - 600 Â°C	@Temperature 77.0 - 1110 Â°F	
	15.7 Âµm/m-Â°C	8.72 Âµin/in-Â°F	
	@Temperature 25.0 - 700 Â°C	@Temperature 77.0 - 1290 Â°F	
	16.6 Âµm/m-Â°C	9.22 Âµin/in-Â°F	
	@Temperature 25.0 - 800 Â°C	@Temperature 77.0 - 1470 Â°F	
	17.1 Âµm/m-Â°C	9.50 Âµin/in-Â°F	
	@Temperature 25.0 - 900 Â°C	@Temperature 77.0 - 1650 Â°F	
Specific Heat Capacity	0.462 J/g-Â°C	0.110 BTU/lb-Â°F	RT
	0.653 J/g-Â°C	0.156 BTU/lb-Â°F	
	@Temperature 700 Â°C	@Temperature 1290 Â°F	
	0.672 J/g-Â°C	0.161 BTU/lb-Â°F	
	@Temperature 800 Â°C	@Temperature 1470 Â°F	
	0.689 J/g-Â°C	0.165 BTU/lb-Â°F	
	@Temperature 900 Â°C	@Temperature 1650 Â°F	
	0.719 J/g-Â°C	0.172 BTU/lb-Â°F	
	@Temperature 1100 Â°C	@Temperature 2010 Â°F	

Electrical Properties	Metric	English	Comments
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Electrical Properties	0.0001112 ohm-cm Metric	0.0001112 ohm-cm English	RT Comments
	0.0001231 ohm-cm	0.0001231 ohm-cm	
	@Temperature 700 Â°C	@Temperature 1290 Â°F	
	0.0001238 ohm-cm	0.0001238 ohm-cm	
	@Temperature 800 Â°C	@Temperature 1470 Â°F	
	0.0001245 ohm-cm	0.0001245 ohm-cm	
	@Temperature 900 Â°C	@Temperature 1650 Â°F	
	0.0001252 ohm-cm	0.0001252 ohm-cm	
	@Temperature 1000 Â°C	@Temperature 1830 Â°F	
	0.0001259 ohm-cm	0.0001259 ohm-cm	
	@Temperature 1100 Â°C	@Temperature 2010 Â°F	
	0.0001267 ohm-cm	0.0001267 ohm-cm	
	@Temperature 1200 Â°C	@Temperature 2190 Â°F	

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