

## Haynes HR-120® alloy, solution heat-treated aged at 1400°F for 1000 hours

Category : Metal , Superalloy , Iron Base

### Material Notes:

Excellent strength at elevated temperatures, combined with good resistance to carburizing and sulfidizing environments. Applications include bar frame heat treating baskets, wire mesh furnace belts and basket liners, muffles and retorts, heat treating fixtures, waste incinerators, radiant tubes, cast link belt pins, recuperators, and fluidized bed components. Data provided by the manufacturer, Haynes International, Inc.

Order this product through the following link:

[http://www.lookpolymers.com/polymer\\_Haynes-HR-120-alloy-solution-heat-treated-aged-at-1400F-for-1000-hours.php](http://www.lookpolymers.com/polymer_Haynes-HR-120-alloy-solution-heat-treated-aged-at-1400F-for-1000-hours.php)

Physical Properties	Metric	English	Comments
Density	8.07 g/cc	0.292 lb/in <sup>3</sup>	at RT.

Mechanical Properties	Metric	English	Comments
Tensile Strength, Ultimate	725 MPa	105000 psi	
Tensile Strength, Yield	340 MPa @Strain 0.200 %	49300 psi @Strain 0.200 %	
Elongation at Break	24 %	24 %	in 1.4 inches
Modulus of Elasticity	197 GPa	28600 ksi	RT
	128 GPa @Temperature 1000 °C	18600 ksi @Temperature 1830 °F	
	136 GPa @Temperature 900 °C	19700 ksi @Temperature 1650 °F	
	143 GPa @Temperature 800 °C	20700 ksi @Temperature 1470 °F	
	152 GPa @Temperature 700 °C	22000 ksi @Temperature 1290 °F	
	159 GPa @Temperature 600 °C	23100 ksi @Temperature 1110 °F	
	165 GPa	23900 ksi	

Mechanical Properties	@Temperature 500 Â°C Metric	@Temperature 932 Â°F English	Comments
	174 GPa	25200 ksi	
	@Temperature 400 Â°C	@Temperature 752 Â°F	
	182 GPa	26400 ksi	
	@Temperature 300 Â°C	@Temperature 572 Â°F	
	188 GPa	27300 ksi	
	@Temperature 200 Â°C	@Temperature 392 Â°F	
	194 GPa	28100 ksi	
	@Temperature 100 Â°C	@Temperature 212 Â°F	

Thermal Properties	Metric	English	Comments
CTE, linear	14.3 Âµm/m-Â°C	7.94 Âµin/in-Â°F	
	@Temperature 25.0 - 100 Â°C	@Temperature 77.0 - 212 Â°F	
	14.9 Âµm/m-Â°C	8.28 Âµin/in-Â°F	
	@Temperature 25.0 - 200 Â°C	@Temperature 77.0 - 392 Â°F	
	15.3 Âµm/m-Â°C	8.50 Âµin/in-Â°F	
	@Temperature 25.0 - 300 Â°C	@Temperature 77.0 - 572 Â°F	
	15.8 Âµm/m-Â°C	8.78 Âµin/in-Â°F	
	@Temperature 25.0 - 400 Â°C	@Temperature 77.0 - 752 Â°F	
	16.1 Âµm/m-Â°C	8.94 Âµin/in-Â°F	
	@Temperature 25.0 - 500 Â°C	@Temperature 77.0 - 932 Â°F	
	16.4 Âµm/m-Â°C	9.11 Âµin/in-Â°F	
	@Temperature 25.0 - 600 Â°C	@Temperature 77.0 - 1110 Â°F	
	16.9 Âµm/m-Â°C	9.39 Âµin/in-Â°F	
	@Temperature 25.0 - 700 Â°C	@Temperature 77.0 - 1290 Â°F	
	17.3 Âµm/m-Â°C	9.61 Âµin/in-Â°F	
	@Temperature 25.0 - 800 Â°C	@Temperature 77.0 - 1470 Â°F	
	17.6 Âµm/m-Â°C	9.78 Âµin/in-Â°F	

Thermal Properties	Metric @ Temperature 25.0 - 900 Â°C	English @ Temperature 77.0 - 1650 Â°F	Comments
	17.8 Âµm/m-Â°C	9.89 Âµin/in-Â°F	
	@Temperature 25.0 - 1000 Â°C	@Temperature 77.0 - 1830 Â°F	
Specific Heat Capacity	0.467 J/g-Â°C	0.112 BTU/lb-Â°F	RT
	0.483 J/g-Â°C	0.115 BTU/lb-Â°F	
	@Temperature 100 Â°C	@Temperature 212 Â°F	
	0.500 J/g-Â°C	0.120 BTU/lb-Â°F	
	@Temperature 200 Â°C	@Temperature 392 Â°F	
	0.522 J/g-Â°C	0.125 BTU/lb-Â°F	
	@Temperature 300 Â°C	@Temperature 572 Â°F	
	0.531 J/g-Â°C	0.127 BTU/lb-Â°F	
	@Temperature 400 Â°C	@Temperature 752 Â°F	
	0.558 J/g-Â°C	0.133 BTU/lb-Â°F	
	@Temperature 500 Â°C	@Temperature 932 Â°F	
	0.607 J/g-Â°C	0.145 BTU/lb-Â°F	
	@Temperature 600 Â°C	@Temperature 1110 Â°F	
	0.647 J/g-Â°C	0.155 BTU/lb-Â°F	
	@Temperature 700 Â°C	@Temperature 1290 Â°F	
	0.655 J/g-Â°C	0.157 BTU/lb-Â°F	
	@Temperature 800 Â°C	@Temperature 1470 Â°F	
	0.660 J/g-Â°C	0.158 BTU/lb-Â°F	
	@Temperature 900 Â°C	@Temperature 1650 Â°F	
	0.663 J/g-Â°C	0.158 BTU/lb-Â°F	
	@Temperature 1000 Â°C	@Temperature 1830 Â°F	
	0.667 J/g-Â°C	0.159 BTU/lb-Â°F	
	@Temperature 1100 Â°C	@Temperature 2010 Â°F	
	0.671 J/g-Â°C	0.160 BTU/lb-Â°F	

Thermal Properties	Metric @ Temperature 1200 °C	English @ Temperature 2190 °F	Comments
Thermal Conductivity	11.4 W/m-K	79.1 BTU-in/hr-ft <sup>2</sup> - °F	RT
	12.6 W/m-K @Temperature 100 °C	87.4 BTU-in/hr-ft <sup>2</sup> - °F @Temperature 212 °F	
	14.3 W/m-K @Temperature 200 °C	99.2 BTU-in/hr-ft <sup>2</sup> - °F @Temperature 392 °F	
	15.9 W/m-K @Temperature 300 °C	110 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 572 °F	
	17.5 W/m-K @Temperature 400 °C	121 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 752 °F	
	19.0 W/m-K @Temperature 500 °C	132 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 932 °F	
	20.6 W/m-K @Temperature 600 °C	143 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 1110 °F	
	22.2 W/m-K @Temperature 700 °C	154 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 1290 °F	
	23.8 W/m-K @Temperature 800 °C	165 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 1470 °F	
	25.4 W/m-K @Temperature 900 °C	176 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 1650 °F	
	27.1 W/m-K @Temperature 1000 °C	188 BTU-in/hr-ft <sup>2</sup> -°F @Temperature 1830 °F	
Melting Point	1300 °C	2370 °F	

Component Elements Properties	Metric	English	Comments
Aluminum, Al	0.10 %	0.10 %	
Boron, B	0.0040 %	0.0040 %	

Component Elements Properties	Metric	English	Comments
Chromium, Cr	25 %	25 %	
Cobalt, Co	<= 3.0 %	<= 3.0 %	
Iron, Fe	33 %	33 %	
Manganese, Mn	0.70 %	0.70 %	
Molybdenum, Mo	<= 2.5 %	<= 2.5 %	
Nickel, Ni	37 %	37 %	
Niobium, Nb (Columbium, Cb)	0.70 %	0.70 %	
Nitrogen, N	0.20 %	0.20 %	
Silicon, Si	0.60 %	0.60 %	
Tungsten, W	<= 2.5 %	<= 2.5 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0001052 ohm-cm	0.0001052 ohm-cm	RT
	0.0001231 ohm-cm	0.0001231 ohm-cm	
	@Temperature 700 Â°C	@Temperature 1290 Â°F	
	0.0001245 ohm-cm	0.0001245 ohm-cm	
	@Temperature 800 Â°C	@Temperature 1470 Â°F	
	0.0001257 ohm-cm	0.0001257 ohm-cm	
	@Temperature 900 Â°C	@Temperature 1650 Â°F	
	0.0001266 ohm-cm	0.0001266 ohm-cm	
	@Temperature 1000 Â°C	@Temperature 1830 Â°F	
	0.0001278 ohm-cm	0.0001278 ohm-cm	
	@Temperature 1100 Â°C	@Temperature 2010 Â°F	
	0.0001287 ohm-cm	0.0001287 ohm-cm	
	@Temperature 1200 Â°C	@Temperature 2190 Â°F	

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