Haynes® 230® alloy, as cast vacuum investment casting, tested at 760°C (1400°F)

Subcategory: Metal; Nickel Base; Superalloy

Key Words: UNS N06230, AMS 5878, AMS 5891, DIN 17742 No.2.4733

Component	Wt. %	Component	Wt. %	Component	Wt. %
Al	0.3	Cr	22	Mo	2
B	Max 0.015	Fe	Max 3	Ni	57
C	0.1	La	0.02	Si	0.4
Co	Max 5	Mn	0.5	W	14

Material Notes:

Excellent high-temperature strength, outstanding resistance to oxidizing environments up to 1149°C, premier resistance to nitriding environments, and excellent long-term thermal stability. Applications include combustion cans, transition ducts, flameholders, thermocouple sheaths and other gas turbine components; used for catalyst grid supports in ammonia burners, high-strength thermocouple protection tubes, high-temperature heat exchangers, ducts, high-temperature bellows; furnace retorts, chains and fixtures, burner flame shrouds, recuperator internals, dampers, nitriding furnace internals, heat-treating baskets, grates, trays, sparger tubes, and cyclone internals.

Data provided by the manufacturer, Haynes International, Inc.

Physical Properties	Metric	English	Comments
Density	8.97 g/cc	0.324 lb/in³	at RT
Mechanical Properties			
Tensile Strength, Ultimate	385 MPa	55800 psi	
Tensile Strength, Yield	225 MPa	32600 psi	at 0.2% offset
Elongation at Break	32.3 %	32.3 %	in 5D
Reduction of Area	36 %	36 %	
Modulus of Elasticity	211 GPa	30600 ksi	RT
Modulus of Elasticity at Elevated Temperature	150 GPa	21800 ksi	1000°C (1830°F)
Modulus of Elasticity at Elevated Temperature	157 GPa	22800 ksi	900°C (1650°F)
Modulus of Elasticity at Elevated Temperature	164 GPa	23800 ksi	800°C (1470°F)

Modulus of Elasticity at Elevated Temperature	171 GPa	24800 ksi	700°C (1290°F)
Modulus of Elasticity at Elevated Temperature	177 GPa	25700 ksi	600°C (1110°F)
Modulus of Elasticity at Elevated Temperature	184 GPa	26700 ksi	500°C (930°F)
Modulus of Elasticity at Elevated Temperature	190 GPa	27600 ksi	400°C (750°F)
Modulus of Elasticity at Elevated Temperature	196 GPa	28400 ksi	300°C (570°F)
Modulus of Elasticity at Elevated Temperature	202 GPa	29300 ksi	200°C (390°F)
Modulus of Elasticity at Elevated Temperature	207 GPa	30000 ksi	100°C (212°F)
Charpy Impact	73 J	53.8 ft-lb	solution annealed, 41 J after 8000 hours at 650°C (1200°F), 28 J after 8000 hours at 760°C (1400°F), 28 J after 8000 hours at 870°C (1600°F)

Electrical Properties

Electrical Resistivity	0.000125 ohm-cm	0.000125 ohm-cm	RT
Electrical Resistivity at Elevated Temperature	0.000125 ohm-cm	0.000125 ohm-cm	1000°C (1830°F)
Electrical Resistivity at Elevated Temperature	0.0001258 ohm-cm	0.0001258 ohm-cm	100°C (212°F)
Electrical Resistivity at Elevated Temperature	0.0001265 ohm-cm	0.0001265 ohm-cm	200°C (390°F)
Electrical Resistivity at Elevated Temperature	0.0001271 ohm-cm	0.0001271 ohm-cm	900°C (1650°F)
Electrical Resistivity at Elevated Temperature	0.0001273 ohm-cm	0.0001273 ohm-cm	300°C (570°F)
Electrical Resistivity at Elevated Temperature	0.0001284 ohm-cm	0.0001284 ohm-cm	400°C (750°F)
Electrical Resistivity at Elevated Temperature	0.0001291 ohm-cm	0.0001291 ohm-cm	800°C (1470°F)
Electrical Resistivity at Elevated Temperature	0.0001302 ohm-cm	0.0001302 ohm-cm	500°C (930°F)
Electrical Resistivity at Elevated Temperature	0.0001307 ohm-cm	0.0001307 ohm-cm	700°C (1290°F)
Electrical Resistivity at Elevated Temperature	0.0001312 ohm-cm	0.0001312 ohm-cm	600°C (1110°F)

Thermal Properties

CTE, linear 20°C	12.7 µm/m-°C	7.06 µin/in-°F	25-100°C (77-212°F)
CTE, linear 250°C	13 µm/m-°C	7.22 µin/in-°F	25-200°C (77-390°F)
CTE, linear 500°C	13.3 µm/m-°C	7.39 µin/in-°F	25-300°C (77-570°F)
CTE, linear 500°C	13.7 µm/m-°C	7.61 µin/in-°F	25-400°C (77-750°F)
CTE, linear 500°C	14 µm/m-°C	7.78 µin/in-°F	25-500°C (77-930°F)
CTE, linear 1000°C	14.4 µm/m-°C	8 µin/in-°F	25-600°C (77-1110°F)
CTE, linear 1000°C	14.8 µm/m-°C	8.22 µin/in-°F	25-700°C (77-1290°F)
CTE, linear 1000°C	15.2 µm/m-°C	8.44 µin/in-°F	25-800°C (77-1470°F)
CTE, linear 1000°C	15.7 µm/m-°C	8.72 µin/in-°F	25-900°C (77-1650°F)
CTE, linear 1000°C	16.1 µm/m-°C	8.94 µin/in-°F	25-1000°C (77-1830°F)
Specific Heat Capacity	0.397 J/g-°C	0.0949 BTU/lb-°F	RT
Specific Heat Capacity at Elevated Temperature	0.419 J/g-°C	0.1 BTU/lb-°F	100°C (212°F)

Specific Heat Capacity at Elevated Temperature	0.435 J/g-°C	0.104 BTU/lb-°F	200°C (390°F)
Specific Heat Capacity at Elevated Temperature	0.448 J/g-°C	0.107 BTU/lb-°F	300°C (570°F)
Specific Heat Capacity at Elevated Temperature	0.465 J/g-°C	0.111 BTU/lb-°F	400°C (750°F)
Specific Heat Capacity at Elevated Temperature	0.473 J/g-°C	0.113 BTU/lb-°F	500°C (930°F)
Specific Heat Capacity at Elevated Temperature	0.486 J/g-°C	0.116 BTU/lb-°F	600°C (1110°F)
Specific Heat Capacity at Elevated Temperature	0.574 J/g-°C	0.137 BTU/lb-°F	700°C (1290°F)
Specific Heat Capacity at Elevated Temperature	0.595 J/g-°C	0.142 BTU/lb-°F	800°C (1470°F)
Specific Heat Capacity at Elevated Temperature	0.609 J/g-°C	0.146 BTU/lb-°F	900°C (1650°F)
Specific Heat Capacity at Elevated Temperature	0.617 J/g-°C	0.147 BTU/lb-°F	1000°C (1830°F)
Thermal Conductivity	8.9 W/m-K	61.8 BTU-in/hr-ft²-°F	RT
Thermal Conductivity at Elevated Temperature	10.4 W/m-K	72.2 BTU-in/hr-ft²-°F	100°C (212°F)
Thermal Conductivity at Elevated Temperature	12.4 W/m-K	86.1 BTU-in/hr-ft²-°F	200°C (390°F)
Thermal Conductivity at Elevated Temperature	14.4 W/m-K	99.9 BTU-in/hr-ft²-°F	300°C (570°F)
Thermal Conductivity at Elevated Temperature	16.4 W/m-K	114 BTU-in/hr-ft²-°F	400°C (750°F)
Thermal Conductivity at Elevated Temperature	18.4 W/m-K	128 BTU-in/hr-ft²-°F	500°C (930°F)
Thermal Conductivity at Elevated Temperature	20.4 W/m-K	142 BTU-in/hr-ft²-°F	600°C (1110°F)
Thermal Conductivity at Elevated Temperature	22.4 W/m-K	155 BTU-in/hr-ft²-°F	700°C (1290°F)
Thermal Conductivity at Elevated Temperature	24.4 W/m-K	169 BTU-in/hr-ft²-°F	800°C (1470°F)
Thermal Conductivity at Elevated Temperature	26.4 W/m-K	183 BTU-in/hr-ft²-°F	900°C (1650°F)
Thermal Conductivity at Elevated Temperature	28.4 W/m-K	197 BTU-in/hr-ft²-°F	1000°C (1830°F)
Melting Point	1301 - 1371 °C	2370 - 2500 °F	
Solidus	1301 °C	2370 °F	
Liquidus	1371 °C	2500 °F	

Some of the values displayed above may have been converted from their original units and/or rounded in order to display the information in a consistant format. Users requiring more precise data for scientific or engineering calculations can click on the property value to see the original value as well as raw conversions to equivalent units. We advise that you only use the original value or one of its raw conversions in your calculations to minimize rounding error.