ATI Allegheny Ludlum Altemp® HX Nickel-Based superalloy

Category : Metal , Nonferrous Metal , Nickel Alloy , Superalloy

Material Notes:

Characteristics: outstanding resistance to oxidation at high temperatures, exceptional strength at elevated temperatures, good fabricability, good machinability in annealed condition, work hardening rate comparable to austenitic stainless steels, weldable by most fusion and resistance welding processes. Information provided by Allegheny Ludlum

Order this product through the following link:
http://www.lookpolymers.com/polymer_ATI-Allegheny-Ludlum-Altemp-HX-Nickel-Based-superalloy.php

Physical Properties	Metric	English	Comments
Specific Gravity	8.22 g/cc	8.22 g/cc	
Density	8.22 g/cc	0.297 lb/in³	

Mechanical Properties	Metric	English	Comments
Tensile Strength, Ultimate	720 MPa	104000 psi	
	37.0 MPa @Temperature 1204 °C	5370 psi @Temperature 2199 °F	
	90.0 MPa @Temperature 1093 °C	13100 psi @Temperature 1999 °F	
	252 MPa @Temperature 871 °C	36500 psi @Temperature 1600 °F	
	472 MPa @Temperature 649 °C	68500 psi @Temperature 1200 °F	
	687 MPa @Temperature 427 °C	99600 psi @Temperature 801 °F	
	713 MPa @Temperature 204 °C	103000 psi @Temperature 399 °F	
	819 MPa @Temperature -78.0 °C	119000 psi @Temperature -108 °F	
	1035 MPa @Temperature -196 °C	150100 psi @Temperature -321 °F	
Tensile Strength, Yield	324 MPa	47000 psi	

Mechanical Properties	Metric	English	Comments
	26.0 MPa @Temperature 1204 °C	3770 psi @Temperature 2199 °F	
	55.0 MPa @Temperature 1093 °C	7980 psi @Temperature 1999 °F	
	177 MPa @Temperature 871 °C	25700 psi @Temperature 1600 °F	
	272 MPa @Temperature 649 °C	39500 psi @Temperature 1200 °F	
	301 MPa @Temperature 427 °C	43700 psi @Temperature 801 °F	
	336 MPa @Temperature 204 °C	48700 psi @Temperature 399 °F	
Elongation at Break	31 % @Temperature 1204 °C	31 % @Temperature 2199 °F	
	37 % @Temperature 649 °C	37 % @Temperature 1200 °F	
	40 % @Temperature 1093 °C	40 % @Temperature 1999 °F	
	41 % @Temperature 204 °C	41 % @Temperature 399 °F	
	44 % @Temperature 427 °C	44 % @Temperature 801 °F	
	46 % @Temperature -196 °C	46 % @Temperature -321 °F	
	51 % @Temperature -78.0 °C	51 % @Temperature -108 °F	
	51 % @Temperature 871 °C	51 % @Temperature 1600 °F	
Creep Strength	21.0 MPa @Temperature 899 °C	3050 psi @Temperature 1650 °F	0.0001% per hour
	114 MPa	16500 psi	

Mechanical Properties	Metric	English	Comments
	@Temperature 649 °C	@Temperature 1200 °F	0.0001% per hour
Modulus of Elasticity	196 GPa	28400 ksi	
	126 GPa @Temperature 1000 °C	18300 ksi @Temperature 1830 °F	
	143 GPa @Temperature 800 °C	20700 ksi @Temperature 1470 °F	
	158 GPa @Temperature 600 °C	22900 ksi @Temperature 1110 °F	
	185 GPa @Temperature 200 °C	26800 ksi @Temperature 392 °F	
Charpy Impact	12.2 J	9.00 ft-lb	Solution treated plus 871°C for 500 hours
	12.2 J	9.00 ft-lb	Solution treated at 816°C plus 168 hours
	27.1 J	20.0 ft-lb	Solution treated plus 982°C for 500 hours
	48.8 J	36.0 ft-lb	Solution treated plus 1038°C for 50 hours
	39.3 J @Temperature 816 °C	29.0 ft-lb @Temperature 1500 °F	Solution treated plus 816°C for 168 hours

Thermal Properties	Metric	English	Comments
CTE, linear	13.9 µm/m-°C @Temperature 25.0 - 93.0 °C	7.72 µin/in-°F @Temperature 77.0 - 199 °F	
	15.1 µm/m-°C @Temperature 26.0 - 538 °C	8.39 µin/in-°F @Temperature 78.8 - 1000 °F	
	16.6 µm/m-°C @Temperature 26.0 - 982 °C	9.22 µin/in-°F @Temperature 78.8 - 1800 °F	
Specific Heat Capacity	0.485 J/g-°C	0.116 BTU/lb-°F	
	0.498 J/g-°C @Temperature 316 °C	0.119 BTU/lb-°F @Temperature 601 °F	
	0.582 J/g-°C	0.139 BTU/lb-°F	

Thermal Properties	Metric	English	Comments
	@Temperature 649 °C	@Temperature 1200 °F	
	0.860 J/g-°C @Temperature 1093 °C	0.206 BTU/lb-°F @Temperature 1999 °F	
Thermal Conductivity	9.10 W/m-K	63.2 BTU-in/hr-ft²-°F	
	14.1 W/m-K @Temperature 260 °C	97.9 BTU-in/hr-ft²-°F @Temperature 500 °F	
	20.8 W/m-K @Temperature 593 °C	144 BTU-in/hr-ft²-°F @Temperature 1100 °F	
	25.0 W/m-K @Temperature 816 °C	174 BTU-in/hr-ft²-°F @Temperature 1500 °F	
	27.2 W/m-K @Temperature 927 °C	189 BTU-in/hr-ft²-°F @Temperature 1700 °F	
Melting Point	1260 - 1355 °C	2300 - 2471 °F	
Solidus	1260 °C	2300 °F	
Liquidus	1355 °C	2471 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	0.080 %	0.080 %	
Chromium, Cr	22 %	22 %	
Cobalt, Co	>= 1.5 %	>= 1.5 %	
Iron, Fe	18.5 %	18.5 %	As Remainder
Manganese, Mn	0.50 %	0.50 %	
Molybdenum, Mo	9.0 %	9.0 %	
Nickel, Ni	>= 47.693 %	>= 47.693 %	
Phosphorous, P	0.025 %	0.025 %	
Silicon, Si	0.20 %	0.20 %	
Sulfur, S	0.0020 %	0.0020 %	
Tungsten, W	0.50 %	0.50 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0001158 ohm-cm @Temperature 21.0 °C	0.0001158 ohm-cm @Temperature 69.8 °F	
	0.000120 ohm-cm @Temperature 200 °C	0.000120 ohm-cm @Temperature 392 °F	
	0.000123 ohm-cm @Temperature 400 °C	0.000123 ohm-cm @Temperature 752 °F	
	0.000127 ohm-cm @Temperature 500 °C	0.000127 ohm-cm @Temperature 932 °F	
	0.000128 ohm-cm @Temperature 800 °C	0.000128 ohm-cm @Temperature 1470 °F	
	0.000129 ohm-cm @Temperature 1000 °C	0.000129 ohm-cm @Temperature 1830 °F	
Magnetic Permeability	<= 1.002	<= 1.002	

Contact Songhan Plastic Technology Co.,Ltd.

Website : www.lookpolymers.com
Email : sales@lookpolymers.com
Tel : +86 021-51131842
Mobile : +86 13061808058
Skype : lookpolymers
Address : United North Road 215,Fengxian District, Shanghai City,China