

ATI Allegheny Ludlum AL 625HP™ Stainless Steel

Category : Metal , Nonferrous Metal , Nickel Alloy , Superalloy

Material Notes:

Nickel-based superalloy. Characteristics: exceptional fatigue resistance, excellent resistance to oxidation and corrosion, outstanding strength and toughness over a range of temperatures from cryogenic to 2000°F. Applications: aerospace, chemical processing. Information provided by Allegheny Ludlum

Order this product through the following link:

http://www.lookpolymers.com/polymer_ATI-Allegheny-Ludlum-AL-625HP-Stainless-Steel.php

Physical Properties	Metric	English	Comments
Density	8.44 g/cc	0.305 lb/in ³	

Mechanical Properties	Metric	English	Comments
Tensile Strength, Ultimate	940 MPa	136000 psi	
Tensile Strength, Yield	485 MPa	70300 psi	
Elongation at Break	46 %	46 %	
Modulus of Elasticity	205 GPa	29700 ksi	
	160 GPa	23200 ksi	
	@Temperature 760 °C	@Temperature 1400 °F	
	170 GPa	24700 ksi	
	@Temperature 649 °C	@Temperature 1200 °F	
Poissons Ratio	185 GPa	26800 ksi	
	@Temperature 427 °C	@Temperature 801 °F	
	195 GPa	28300 ksi	
Poissons Ratio	@Temperature 204 °C	@Temperature 399 °F	
	0.306	0.306	
	0.31	0.31	
	@Temperature 204 °C	@Temperature 399 °F	
	0.316	0.316	
Poissons Ratio	@Temperature 427 °C	@Temperature 801 °F	
	0.324	0.324	
	@Temperature 649 °C	@Temperature 1200 °F	

Mechanical Properties	0.328 Metric	0.328 English	Comments
	@Temperature 760 °C	@Temperature 1400 °F	
Shear Modulus	57.0 GPa	8270 ksi	
	@Temperature 871 °C	@Temperature 1600 °F	
	63.0 GPa	9140 ksi	
	@Temperature 649 °C	@Temperature 1200 °F	
	70.0 GPa	10200 ksi	
	@Temperature 427 °C	@Temperature 801 °F	
	75.0 GPa	10900 ksi	
	@Temperature 204 °C	@Temperature 399 °F	
	79.0 GPa	11500 ksi	
	@Temperature 21.0 °C	@Temperature 69.8 °F	

Thermal Properties	Metric	English	Comments
CTE, linear	12.8 $\mu\text{m}/\text{m}\cdot\text{°C}$	7.11 $\mu\text{in}/\text{in}\cdot\text{°F}$	
	@Temperature 20.0 - 93.0 °C	@Temperature 68.0 - 199 °F	
	14.0 $\mu\text{m}/\text{m}\cdot\text{°C}$	7.78 $\mu\text{in}/\text{in}\cdot\text{°F}$	
	@Temperature 21.0 - 528 °C	@Temperature 69.8 - 982 °F	
	16.2 $\mu\text{m}/\text{m}\cdot\text{°C}$	9.00 $\mu\text{in}/\text{in}\cdot\text{°F}$	
	@Temperature 21.0 - 927 °C	@Temperature 69.8 - 1700 °F	
Specific Heat Capacity	0.410 J/g·°C	0.0980 BTU/lb·°F	
Thermal Conductivity	7.30 W/m-K	50.7 BTU-in/hr-ft ² -°F	
	@Temperature -157 °C	@Temperature -251 °F	
	9.20 W/m-K	63.8 BTU-in/hr-ft ² -°F	
	@Temperature -18.0 °C	@Temperature -0.400 °F	
	12.6 W/m-K	87.4 BTU-in/hr-ft ² -°F	
	@Temperature 204 °C	@Temperature 399 °F	
	15.7 W/m-K	109 BTU-in/hr-ft ² -°F	
	@Temperature 427 °C	@Temperature 801 °F	
	19.0 W/m-K	132 BTU-in/hr-ft ² -°F	

Thermal Properties	Metric	English	Comments
	@Temperature 649 °C	@Temperature 1200 °F	
	22.8 W/m-K	158 BTU-in/hr-ft ² -°F	
	@Temperature 871 °C	@Temperature 1600 °F	
Melting Point	1280 - 1350 °C	2340 - 2460 °F	
Solidus	1280 °C	2340 °F	
Liquidus	1350 °C	2460 °F	

Component Elements Properties	Metric	English	Comments
Aluminum, Al	<= 0.40 %	<= 0.40 %	
Carbon, C	<= 0.030 %	<= 0.030 %	
Chromium, Cr	20 - 23 %	20 - 23 %	
Cobalt, Co	<= 1.0 %	<= 1.0 %	
Iron, Fe	<= 5.0 %	<= 5.0 %	As Remainder
Manganese, Mn	<= 0.50 %	<= 0.50 %	
Molybdenum, Mo	8.0 - 10 %	8.0 - 10 %	
Nb + Ta	3.15 - 4.15 %	3.15 - 4.15 %	
Nickel, Ni	>= 58 %	>= 58 %	
Phosphorous, P	<= 0.015 %	<= 0.015 %	
Silicon, Si	<= 0.15 %	<= 0.15 %	
Sulfur, S	<= 0.015 %	<= 0.015 %	
Titanium, Ti	<= 0.40 %	<= 0.40 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0001289 ohm-cm	0.0001289 ohm-cm	
	@Temperature 21.0 °C	@Temperature 69.8 °F	
	0.0001319 ohm-cm	0.0001319 ohm-cm	
	@Temperature 93.0 °C	@Temperature 199 °F	
Electrical Resistivity	0.0001339 ohm-cm	0.0001339 ohm-cm	
	@Temperature 204 °C	@Temperature 399 °F	
Electrical Resistivity	0.0001359 ohm-cm	0.0001359 ohm-cm	

Electrical Properties	Metric @Temperature 427 °C	English @Temperature 801 °F	Comments
	0.0001369 ohm-cm	0.0001369 ohm-cm	
	@Temperature 760 °C	@Temperature 1400 °F	
	0.0001379 ohm-cm	0.0001379 ohm-cm	
	@Temperature 649 °C	@Temperature 1200 °F	
Magnetic Permeability	1.0006	1.0006	200 Oersted
	@Temperature 23.9 °C	@Temperature 75.0 °F	

Descriptive Properties	Value	Comments
Corrosion Rate mils per year	>200	10% Hydrochloric Acid, Boiling
	0	Aqua Regia, Ambient
	0	20% Formaldehyde, Boiling
	0	20% Cupric Chloride, Ambient
	0	45% Ferric Chloride, Ambient
	0	10% Ammonium Sulfate, Boiling
	1	40% Nitric Acid, Boiling
	1.8	"Green Death Solution", Boiling
	2	10% Sulfuric Acid, Boiling

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