

ATI Allegheny Ludlum 420 Martensitic Stainless Steel

Category : Metal , Ferrous Metal , Martensitic , Stainless Steel , T 400 Series Stainless Steel

Material Notes:

Characteristics: superior wear resistance, hardenable, excellent corrosion resistance. Applications: cutlery, dental and surgical instruments, nozzles, valve parts, hardened steel ball and seats for oil well pumps, separating screens and strainers, springs, shears, and wear surfaces.

Information provided by Allegheny Ludlum

Order this product through the following link:

http://www.lookpolymers.com/polymer_ATI-Allegheny-Ludlum-420-Martensitic-Stainless-Steel.php

Physical Properties	Metric	English	Comments
Specific Gravity	7.73 g/cc	7.73 g/cc	
Density	7.68 g/cc	0.277 lb/in ³	

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell B	85	85	
	87	87	
Hardness, Rockwell C	23	23	Hardened+Tempered 1200°F
	36	36	Hardened+Tempered 1000°F
	44	44	Hardened+Tempered 550°F
	45	45	Hardened+Tempered 600°F
	46	46	Hardened+Tempered 800°F
	46	46	Hardened+Tempered 900°F
Tensile Strength, Ultimate	48	48	Hardened+Tempered 400°F
	586 MPa	85000 psi	Annealed
	838 MPa	122000 psi	Hardened 1900°F, Tempered 1200°F
	1093 MPa	158500 psi	Hardened 1900°F, Tempered 1000°F
	1583 MPa	229600 psi	Hardened 1900°F, Tempered 550°F
	1606 MPa	232900 psi	Hardened 1900°F, Tempered 600°F
	1606 MPa	232900 psi	Hardened 1900°F, Tempered 900°F
	1627 MPa	236000 psi	Hardened 1900°F, Tempered 800°F
	1759 MPa	255100 psi	Hardened 1900°F, Tempered 400°F

Mechanical Properties	Metric	English	Comments
	951 MPa	138000 psi	Hardened 1900°F, Tempered 1000°F
	1213 MPa	175900 psi	Hardened 1900°F, Tempered 550°F
	1234 MPa	179000 psi	Hardened 1900°F, Tempered 600°F
	1236 MPa	179300 psi	Hardened 1900°F, Tempered 900°F
	1280 MPa	186000 psi	Hardened 1900°F, Tempered 800°F
	1311 MPa	190100 psi	Hardened 1900°F, Tempered 400°F
	310 MPa	45000 psi	Annealed
	@Strain 0.200 %	@Strain 0.200 %	
Elongation at Break	29 %	29 %	Annealed

Thermal Properties	Metric	English	Comments
CTE, linear	11.2 $\mu\text{m}/\text{m}\cdot^{\circ}\text{C}$	6.22 $\mu\text{in}/\text{in}\cdot^{\circ}\text{F}$	
	@Temperature 20.0 - 200 °C	@Temperature 68.0 - 392 °F	
	12.5 $\mu\text{m}/\text{m}\cdot^{\circ}\text{C}$	6.94 $\mu\text{in}/\text{in}\cdot^{\circ}\text{F}$	
	@Temperature 20.0 - 600 °C	@Temperature 68.0 - 1110 °F	
Specific Heat Capacity	0.460 J/g-°C	0.110 BTU/lb-°F	
Thermal Conductivity	24.2 W/m-K	168 BTU-in/hr-ft ² -°F	
	@Temperature 100 °C	@Temperature 212 °F	
Melting Point	1454 - 1510 °C	2649 - 2750 °F	
Solidus	1454 °C	2649 °F	
Liquidus	1510 °C	2750 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	0.15 - 0.40 %	0.15 - 0.40 %	
Chromium, Cr	12 - 14 %	12 - 14 %	
Iron, Fe	83 - 87.9 %	83 - 87.9 %	as balance
Manganese, Mn	<= 1.0 %	<= 1.0 %	
Nickel, Ni	<= 0.50 %	<= 0.50 %	

Component Elements Properties	Metric	English	Comments
Silicon, Si	<= 1.0 %	<= 1.0 %	
Sulfur, S	<= 0.030 %	<= 0.030 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000560 ohm-cm	0.0000560 ohm-cm	

Descriptive Properties	Value	Comments
Corrosion Rate mils per year	0.068 (5% Phosphoric Acid at 49°C)	Hardened martensitic grades were tested after tempering at 204°C
	1.11 (5% Acetic Acid at 49°C)	Hardened martensitic grades were tested after tempering at 204°C
Pitting Potential, Volts vs. Sat. Calomel Electrode	0.581	100 ppm Chloride solution at 24°C, pH5. Samples had ground surface. Hardened martensitic grades were tested after tempering at 204°C.

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