

## ATI Allegheny Ludlum AL 433™ Ferritic Stainless Steel, Annealed

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

### Material Notes:

AL 433™ is a stainless steel in the ferritic family of alloys with Type 409 and Type 439. The AL 433 alloy contains 20% chromium for pitting and crevice corrosion resistance in the presence of chlorides and resistance to oxidation at elevated temperatures. An addition of 0.5% copper adds to corrosion resistance. Columbium (niobium) in the amount of about 0.5% is added for elevated temperature strength and also provides resistance to intergranular corrosion. The AL 433 alloy has a body-centered cubic, ferritic microstructure at all temperatures below the melting point. Fine columbium carbides may be visible in the ferrite matrix microstructure. The AL 433 alloy can be machined, welded and formed like other stabilized, ferritic stainless steels. AL 433 alloy is an excellent candidate for elevated temperature applications where strength, combined with fabricability are needed. Information provided by Allegheny Ludlum Corporation.

Order this product through the following link:

[http://www.lookpolymers.com/polymer\\_ATI-Allegheny-Ludlum-AL-433-Ferritic-Stainless-Steel-Annealed.php](http://www.lookpolymers.com/polymer_ATI-Allegheny-Ludlum-AL-433-Ferritic-Stainless-Steel-Annealed.php)

Physical Properties	Metric	English	Comments
Density	7.80 g/cc	0.282 lb/in <sup>3</sup>	

Mechanical Properties	Metric	English	Comments
Hardness, Rockwell B	79	79	typical
Tensile Strength, Ultimate	286 MPa	41500 psi	typical
	@Temperature 649 °C	@Temperature 1200 °F	
	401 MPa	58200 psi	typical
	@Temperature 204 °C	@Temperature 400 °F	
	492 MPa	71400 psi	
	@Temperature 23.0 °C	@Temperature 73.4 °F	
Tensile Strength, Yield	286 MPa	41500 psi	typical
	@Temperature 649 °C	@Temperature 1200 °F	
	324 MPa	47000 psi	
	@Temperature 23.0 °C	@Temperature 73.4 °F	
	401 MPa	58200 psi	typical
	@Temperature 204 °C	@Temperature 400 °F	
Elongation at Break	32 %	32 %	typical in 2" (50 mm)
Modulus of Elasticity	200 GPa	29000 ksi	

Thermal Properties	Metric	English	Comments
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Thermal Properties	Metric $\mu\text{m}/\text{m}\cdot^{\circ}\text{C}$	English $\mu\text{in}/\text{in}\cdot^{\circ}\text{F}$	Comments
CTE, linear	@Temperature 20.0 - 100 °C	@Temperature 68.0 - 212 °F	
	10.8 $\mu\text{m}/\text{m}\cdot^{\circ}\text{C}$	6.00 $\mu\text{in}/\text{in}\cdot^{\circ}\text{F}$	
	@Temperature 20.0 - 260 °C	@Temperature 68.0 - 500 °F	
	11.25 $\mu\text{m}/\text{m}\cdot^{\circ}\text{C}$	6.250 $\mu\text{in}/\text{in}\cdot^{\circ}\text{F}$	
	@Temperature 20.0 - 480 °C	@Temperature 68.0 - 896 °F	
	11.7 $\mu\text{m}/\text{m}\cdot^{\circ}\text{C}$	6.50 $\mu\text{in}/\text{in}\cdot^{\circ}\text{F}$	
Specific Heat Capacity	0.460 J/g-°C	0.110 BTU/lb-°F	
	@Temperature 20.0 °C	@Temperature 68.0 °F	
Thermal Conductivity	20.93 W/m-K	145.3 BTU-in/hr-ft <sup>2</sup> -°F	

Component Elements Properties	Metric	English	Comments
Carbon, C	0.010 %	0.010 %	
Chromium, Cr	20 %	20 %	
Copper, Cu	0.50 %	0.50 %	
Iron, Fe	78 %	78 %	as balance
Manganese, Mn	0.30 %	0.30 %	
Nickel, Ni	0.25 %	0.25 %	
Niobium, Nb (Columbium, Cb)	<= 0.80 %	<= 0.80 %	
Nitrogen, N	0.019 %	0.019 %	
Phosphorous, P	0.021 %	0.021 %	
Silicon, Si	0.39 %	0.39 %	
Sulfur, S	0.0010 %	0.0010 %	

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