

## ATI Allegheny Ludlum Stainless Steel Free Machining Grade Type 416, Tempered at 704°C (UNS S41600)

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

### Material Notes:

Allegheny Ludlum's 416 is a free-machining stainless steel specifically designed to exhibit improved machinability. These modifications retain, in so far as possible, the good mechanical properties and corrosion resistance of the basic or patent compositions which they represent. Sulfur is added to produce the free-machine characteristics. Type 416 is a martensitic 12 to 13% Cr free-machining stainless steel which can be hardened by heat treatment to higher strength and hardness levels. It has better machining properties than the austenitic grades, but lower corrosion resistance. Tensile strength and hardness below for samples oil quenched from 1800°F (982°C) then tempered at 704°C. Information provided by Allegheny Ludlum Corporation.

Order this product through the following link:

[http://www.lookpolymers.com/polymer\\_ATI-Allegheny-Ludlum-Stainless-Steel-Free-Machining-Grade-Type-416-Tempered-at-704C-UNS-S41600.php](http://www.lookpolymers.com/polymer_ATI-Allegheny-Ludlum-Stainless-Steel-Free-Machining-Grade-Type-416-Tempered-at-704C-UNS-S41600.php)

Physical Properties	Metric	English	Comments
Density	7.64 g/cc	0.276 lb/in <sup>3</sup>	

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	202	202	
Hardness, Rockwell B	100	100	
Tensile Strength, Ultimate	683 MPa @Temperature 23.0 °C	99100 psi @Temperature 73.4 °F	
Tensile Strength, Yield	517 MPa @Strain 0.200 %	75000 psi @Strain 0.200 %	
Elongation at Break	21 %	21 %	in 2" (50 mm)
Reduction of Area	60 %	60 %	
Modulus of Elasticity	200 GPa	29000 ksi	in tension
Fatigue Strength	340 MPa	49300 psi	test conditions not reported

Thermal Properties	Metric	English	Comments
CTE, linear	10.1 µm/m-°C @Temperature 20.0 - 100 °C	5.61 µin/in-°F @Temperature 68.0 - 212 °F	
	11.5 µm/m-°C @Temperature 20.0 -	6.39 µin/in-°F @Temperature 68.0 -	

Thermal Properties	500 °C Metric	932 °F English	Comments
	12.4 µm/m-°C	6.89 µin/in-°F	
	@Temperature 20.0 - 787 °C	@Temperature 68.0 - 1450 °F	
Thermal Conductivity	24.9 W/m-K	173 BTU-in/hr-ft <sup>2</sup> -°F	
Melting Point	1490 °C	2710 °F	
Maximum Service Temperature, Air	677 °C	1250 °F	oxidation resistance is good in continuous service

Component Elements Properties	Metric	English	Comments
Carbon, C	<= 0.15 %	<= 0.15 %	
Chromium, Cr	12 - 14 %	12 - 14 %	
Iron, Fe	86 %	86 %	as balance
Manganese, Mn	<= 1.25 %	<= 1.25 %	
Molybdenum, Mo	<= 0.60 %	<= 0.60 %	
Phosphorous, P	<= 0.060 %	<= 0.060 %	
Silicon, Si	<= 1.0 %	<= 1.0 %	
Sulfur, S	>= 0.15 %	>= 0.15 %	

Electrical Properties	Metric	English	Comments
Electrical Resistivity	0.0000570 ohm-cm	0.0000570 ohm-cm	

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