

ATI Allegheny Ludlum Stainless Steel Free Machining Grade Type 416, Tempered at 593°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 593°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-593C-UNS-S41600.php

| Physical Properties | Metric | English | Comments |
|---------------------|-----------|--------------------------|----------|
| Density | 7.64 g/cc | 0.276 lb/in ³ | |

| Mechanical Properties | Metric | English | Comments |
|----------------------------|---------------------------------|------------------------------------|------------------------------|
| Hardness, Brinell | 248 | 248 | |
| Hardness, Rockwell C | 24 | 24 | |
| Tensile Strength, Ultimate | 814 MPa @Temperature 23.0 °C | 118000 psi @Temperature 73.4 °F | |
| Tensile Strength, Yield | 676 MPa @Strain 0.200 % | 98000 psi @Strain 0.200 % | |
| Elongation at Break | 19 % | 19 % | in 2" (50 mm) |
| Reduction of Area | 53 % | 53 % | |
| Modulus of Elasticity | 200 GPa | 29000 ksi | in tension |
| Fatigue Strength | 410 MPa | 59500 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 $\mu\text{m}/\text{m}\cdot^{\circ}\text{C}$ | 6.89 $\mu\text{in}/\text{in}\cdot^{\circ}\text{F}$ | |
| | @Temperature 20.0 - 787 °C | @Temperature 68.0 - 1450 °F | |
| Thermal Conductivity | 24.9 W/m-K | 173 BTU-in/hr-ft ² -°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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