

416 stainless steel is a free-machining martensitic stainless steel with 12-13% chromium that can be hardened by heat treatment to higher strength and hardness levels. In the annealed condition, it has better machining properties than typical austenitic stainless steels like 304 & 316. 416 is highly resistant to typical atmospheric conditions with maximum corrosion resistance obtained by hardening and polishing.

Typically free-machining grades are not welded due to problems stemming from the free-machining additives. If welded, 416 stainless must be annealed after welding at approximately 1450°F to improve ductility and corrosion resistance.

### Specifications

UNS: S41600    ASTM: A 484    ASTM: A 582    ASTM: A 314    AMS: 5610 Type II    Federal Spec: QQ-S-764B

### Chemical Composition, %

	Cr	Mn	Mo	C	Si	P	S	Fe
MIN	12.0	—	—	—	—	—	0.15	—
MAX	14.0	1.25	0.60	0.15	1.0	0.06	—	balance

### Features

- Best machining among stainless steels
- Hardenable by Heat Treatment to 26-32 RC
- Improved corrosion resistance to mild steels, but inferior to stainless such as 304L or 17-4

### Applications

- Axles, shafts and gears
- Automatic screw machine parts
- Pump and valve components

### Physical Properties

Density: 0.276lb/in<sup>3</sup>    Melting Point: 2714°F

Temperature, °F	212	390	930	1450
Coefficient of Thermal Expansion* in/in°F x 10 <sup>-6</sup>	5.6	—	6.4	6.9
Thermal Conductivity Btu • ft/ft <sup>2</sup> • hr • °F	171.8	—	—	—
Electrical Resistivity, micro Hm•in	25.2	28.4	—	—

\* 70°F to indicated temperature.

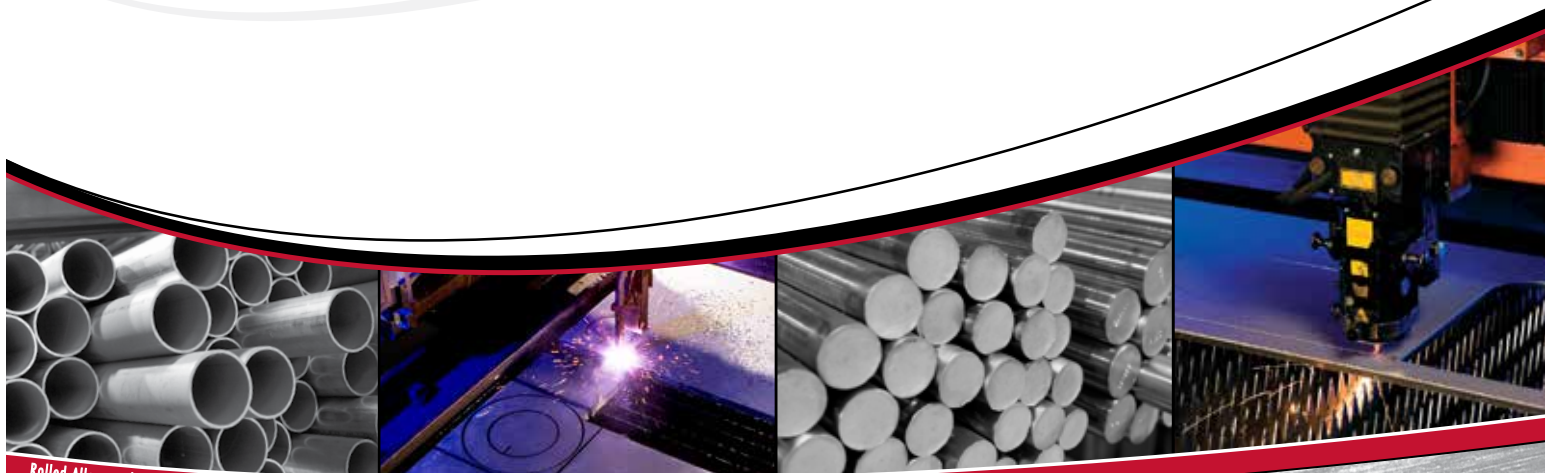
### Mechanical Properties

Temperature, °F	70	900	1000	1100	1200	1300	1400
Ultimate Tensile Strength, ksi	75-90	170	135	118	107	99	82
0.2% Yield Strength, ksi	40-50	138	110	98	82	75	59
Elongation, %	15-30	18	19	19	20	21	25
Reduction in Area, %	40-60	50	52	53	57	60	62
Hardness, Brinell	—	385	260	248	235	202	180

Values shown represent Room Temperature Properties (70°F) in the annealed condition, and the Effects of Heat Treatment (900 - 1400°F) on Room Temperature Properties.



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