



**GENERAL PROPERTIES**

Type 410 is a hardenable, straight chromium stainless steel which combines superior wear resistance of high carbon alloys with the excellent corrosion resistance of chromium stainless steels. Oil quenching this alloy from temperatures between 1800°F to 1950°F (982-1066°C) produces the highest strength and/or wear resistance as well as corrosion resistance. Type 410 is used where strength, hardness, and/ or wear resistance must be combined with corrosion resistance.

**APPLICATIONS**

A major use for these grades of heat treatable stainless steels is in cutlery. Depending on the customer's end-use requirements, cutlery alloys are usually selected with respect to heat treating response, mechanical properties and fabricating characteristics.

**CHEMICAL COMPOSITION**

Chemistries represented by ASTM A240

Element	Percent by Weight Maximum Unless Range is Specified
Carbon	0.08-0.15
Manganese	1.00 maximum
Phosphorus	0.040 maximum
Sulfur	0.030 maximum
Silicon	1.00 maximum
Chromium	11.5-13.5
Iron	Balance

**RESISTANCE TO CORROSION**

Type 410 exhibits good corrosion resistance to atmospheric corrosion, potable water, and to mildly corrosive chemical environments because of their ability to form a tightly adherent oxide film which protects their surfaces from further attack.

Exposure to chlorides in everyday type activities (e.g., food preparation, sport activities...) is generally satisfactory when proper cleaning is performed after exposure to use.

**PHYSICAL PROPERTIES**

Property	Type 410
Specific Gravity	7.65
Density	Lbs/iin <sup>3</sup> g/cm <sup>3</sup> 0.276 7.64
Modulus of Elasticity	Psi GPa 29 x 10 <sup>6</sup> 200
Specific Heat Btu/lb. • °F	.11
Thermal Conductivity at 212°F (100°C)	Btu/(hr • ft • °F) W/m•K 14.4 24.9
Electrical Resistivity Microhm-cm 68°F (20°C)	56
Coefficient of Thermal Expansion	68 - 392°F, in/in°F 20-200°C, cm/cm/°C 5.9 x 10 <sup>-6</sup> 10.5 x 10 <sup>-6</sup>
	68-1112°F, in/in°F 20-600°C, cm/cm/°C 6.5 x 10 <sup>-6</sup> 11.6 x 10 <sup>-6</sup>
Melting Range	2700-2790°F 1482-1532°C

**MECHANICAL PROPERTIES**

Typical compositions, annealed mechanical properties and hardening response for Type 410 martensitic stainless steel are presented below.

Typical Annealed Properties for Type 410	
Hardness	B 82
Tensile Strength Ksi (MPa)	74 (510)
0.2% Offset Yield Strength Ksi (MPa)	42 (290)
Elongation Percent in 2" (51mm)	34%
Hardening Response	C 38-45