

Type 410 is hardenable, straight-chromium stainless steels which combine superior wear resistance of high carbon alloys with the excellent corrosion resistance of chromium stainless steels. Oil quenching these alloys 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 alloy is used where strength, hardness, and/or wear resistance must be combined with corrosion resistance.

## Specifications

ASTM: A176, A182, A193, A194, A240, A268, A276, A314, A336, A473, A479, A493, A511, A580

AMS: 5504, 5505, 5591, 5613, 5776

EN: 1.4006

UNS: S41000

## Chemical Composition, %

	Cr	Mn	Si	Ni	P	S	C
MIN	11.50	–	–	–	–	–	–
MAX	13.50	1.0	1.0	0.75	0.04	0.03	0.15

**Resistance to Corrosion:** Type 410 exhibits good corrosion resistance to atmospheric corrosion, potable water, and to mildly corrosive chemical environments because of the ability to form a tightly adherent oxide film which protects the surface from further attack. Exposure to chlorides in everyday type activities (e.g., food prep., sport activities...) is generally satisfactory when proper cleaning is performed after exposure to use.

## Features

- Good resistance to corrosion
- Good ductility
- Well suited for highly stressed parts

## Applications

- Automotive exhausts, manifolds and high temperature engine components
- Medical instruments and devices
- Petro-chemical applications

**Physical Properties**

**Density:** 0.276 lb/in<sup>3</sup>    **Modulus of Elasticity:** 29 x 10<sup>6</sup> psi (200 GPa)

**Melting Range:** 2700-2790°F (1482-1532°C)    **Specific Gravity:** 7.65

**Coefficient of Thermal Expansion**

Temperature Range		Coefficients	
°C	°F	cm/cm/°C	in/in/°F
20-200	68-392	10.5 x 10 <sup>-6</sup>	5.9 x 10 <sup>-6</sup>
20-600	68-1112	11.6 x 10 <sup>-6</sup>	6.5 x 10 <sup>-6</sup>

**Thermal Conductivity**

Temperature Range			
°C	°F	W/m-K	Btu/(hr-ft-°F)
100	212	(0.249)	14.4

**Electrical Resistivity**

Temperature Range			
°C	°F	microhm-cm	
20	68	56	

**Specific Heat**

Btu/lb.-°F - .11

**Mechanical Properties**

Typical Annealed Properties				
HRB	0.2% Offset Yield Strength Ksi (MPa)	Tensile Strength Ksi (MPa)	Elongation, Percent in 2" (51 mm)	Hardening Response HRC
82 - 96	30 (205) - 42 (290)	65 (450) - 74 (510)	20 - 34	38 - 45