



Technical Data

Ferguson Metals, Inc. ♦ Hamilton, Ohio
Stainless Steel
Martensitic
Type 410 UNS(S41000)

GENERAL PROPERTIES

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.

Type 410 alloy is available as plate, sheet, strip and flat bars.

APPLICATIONS

A major use for Type 410 heat treatable stainless steel 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.

When sufficient amounts of carbon are added to straight-chromium stainless steels, the alloy then has the capability to transform its microstructure through proper heat treatment (hardening) into one that will possess optimum strength, hardness, edge retention, and wear resistance. The presence of sufficient chromium will impart the necessary corrosion resistance and form chromium carbide particles that enhance the wear resistance of the given alloy. The higher the carbon content, the greater the amount of chromium carbide particles, and the greater the strength and hardness for heat treatable straight-chromium stainless steels.

Other applications for Type 410 heat treatable stainless steel include dental and surgical instruments, nozzles, valve parts, hardened steel balls and seats for oil well pumps, separating screens and strainers, springs, shears, and wear surfaces.

CHEMICAL COMPOSITION

Element	In Weight Percent
Carbon	0.15 max
Manganese	1.00 max
Silicon	1.00 max
Chromium	11.50-13.50
Nickel	0.75 max
Sulfur	0.03 max
Phosphorus	0.04 max

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 preparation, sport activities...) is generally satisfactory when proper cleaning is performed after exposure to use.

PHYSICAL PROPERTIES

The values reported below are typical for Type 410 alloy in the annealed condition.

Density	0.276 lb/in ³
Specific Gravity	7.65
Melting Range	2700-2790°F 1482-1532°C
Modulus of Elasticity	29 x 10 ⁶ psi (200 GPa)

COEFFICIENT OF THERMAL EXPANSION

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

THERMAL CONDUCTIVITY

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

SPECIFIC HEAT

Btu/lb.°F
 .11

ELECTRICAL RESISTIVITY

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

MECHANICAL PROPERTIES

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

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

Data are typical, and should not be construed as maximum or minimum values for specification or for final design. Data on any particular piece of material may vary from those shown herein.