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410 Stainless Steel

DESCRIPTION
Type 410 Stainless Steel is a martensitic stainless steel that provides good corrosion resistance plus high strength and hardness. It is magnetic in both the annealed and hardened conditions. A wide range of properties can be developed with different heat treatments.

PRODUCT FORMS
Sheet, Strip

SPECIFICATIONS
ASTM A240

TYPICAL APPLICATIONS
Flat springs, knives, kitchen utensils and hand tools

FORMING
Type 410 has reasonably good cold working properties and can be moderately drawn and formed in the annealed condition.

PROCESSING
Annealing: Heat slowly to 1500 -1650°F, cool to 1100°F in furnace, air cool. Process Annealing: Heat to 1350 -1450°F, air cool. Hardening: Heat to 1700 – 1850°F, air cool or oil quench. Follow by stress-relief or temper. Stress Relieving: Heat at 300 – 800°F for 1 to 2 hours, air cool.

WELDING
The martensitic alloys have limited weldability due to their hardenability. Corrosion: Type 410 provides good corrosion resistance to air, water and some chemicals. It shows satisfactory resistance to nitric acid, concentrated sulfuric acid, dilute acetic acid and naphtha. Resistance to food acids is good.

TEMPERING:
Flat springs, knives, kitchen utensils and hand tools

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CHEMICAL COMPOSITION

Element	**Type 410**
Carbon	0.08 - 0.15
Manganese	1.00 max.
Sulfur	0.030 max.
Phosphorus	0.040 max.
Silicon	1.00 max.
Chromium	11.5 - 13.5
Nickel	0.75 max.

MECHANICAL PROPERTIES

Type	**Yield Strength 0.2% offset** (KSI)	**Tensile Strength** (KSI)	**% Elongation** (2” Gauge Length)
410 Ann	30 min.	65 min.	20 min.

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PHYSICAL PROPERTIES

Density (lb./in^2) @ RT		0.28
Modulus of Elasticity in Tension (psi x 10^6)		29.0
Specific Heat (BTU/o F/lb.)	32 to 212 oF	0.11
Thermal Conductivity (BTU/hr/ft^2/ft)	212 oF	14.4
	932 oF	16.6
Mean Coefficient of Thermal Expansion (in. x 10^-6 per o F)	32 to 212 oF	5.5
	32 to 1,200 oF	6.5
Electrical Resistivity (micro ohms - cm)	at 70 oF	22.5