P R O D U C T D A T A S H E E T

410 STAINLESS STEEL

UNS S41000

AK Steel

AK Steel Type 410 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.

Applications requiring moderate corrosion resistance and high mechanical properties are ideal for this alloy. Typical uses include flat springs, knives, kitchen utensils and hand tools.

COMPOSITION

	%
Carbon	0.15 max.
Manganese	1.00 max.
Phosphorus	0.040 max.
Sulfur	0.030 max.
Silicon	1.00 max.
Chromium	11.50 - 13.50

AVAILABLE FORMS

AK Steel produces Type 410 Stainless Steel in coils and cut lengths in thicknesses 0.010" to 0.145" (0.25 mm to 3.68 mm) and widths up to and including 26" (660 mm).

SPECIFICATIONS

AK Steel Type 410 Stainless Steel sheet and strip is covered by the following specifications:

AMS 5504
ASTM A 240

MECHANICAL PROPERTIES

Typical Annealed Mechanical Properties

UTS ksi (MPa)	0.2% YS ksi (MPa)	Elongation % in 2" (50.8 mm)	Hardness Rockwell
75 (517)	45 (310)	25	B80

Fatigue Strength*

Test Temperature °F (°C)	Endurance Limit ksi (MPa) - 10^7 cycles
70 (21)	58.0 (400)
700 (371)	49.0 (338)
850 (454)	43.5 (296)
1000 (538)	27.0 (186)

*Heat treated to 110 ksi (758 MPa) YS.

PHYSICAL PROPERTIES

Density, 0.28 lbs/in^3
7.74 g/cm^3

Electrical Resistivity, microhm-in (microhm-cm) 70°F (21°C) – 22.50 (57)

Specific Heat, BTU/lb/°F (kJ/kg•K)
32 - 212°F (0 - 100°C) – 0.11 (0.46)

Thermal Conductivity, BTU/hr/ft^2/ft/°F (W/m•K)
at 212°F (100°C) – 14.4 (24.9)
at 932°F (500°C) – 16.6 (28.7)

Coefficient of Thermal Expansion, in/in/°F (µm/m•K)
32 - 212°F (0 - 100°C) – 5.5 x 10^{-6} (9.9)
32 - 1200°F (0 - 649°C) – 6.5 x 10^{-6} (11.6)

Modulus of Elasticity, ksi (MPa)
29 x 10^3 (200 x 10^3)

CORROSION RESISTANCE

AK Steel 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 naptha. Resistance to food acids is good.

AK STEEL 410 STAINLESS STEEL DATA SHEET

HEAT TREATMENTS

Annealing: Heat slowly to 1500 - 1650°F (816 - 899°C), cool to 1100°F (593°C) in furnace, air cool.

Process Annealing: Heat to 1350 - 1450°F (732 - 788°C), air cool.

Hardening: Heat to 1700 - 1850°F (927 - 1010°C), air cool or oil quench. Follow by stress-relief or temper.

Stress Relieving: Heat at 300 - 800°F (149 - 427°C) for 1 to 2 hours, air cool.

Tempering: Heat to 1100 - 1400°F (593 - 760°C) for 1 to 4 hours, air cool.

WELDABILITY

The martensitic class of stainless steels has limited weldability due to its hardenability. Special consideration is required to avoid cold cracking by preheating to 550°F (260°C). Post-weld heat treatment should be considered to achieve required properties. This particular alloy is generally considered to have the best weldability of this stainless class. A major difference is the lower carbon content for this alloy which eliminates the need for post-weld heat treating. When a weld filler is needed, AWS E/ER 410, 410 NiMo, and 309L are most often specified. Type 410 is well known in reference literature and more information can be obtained in this way.

FORMABILITY

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

METRIC CONVERSION

Data in this publication are presented in U.S. customary units. Approximate metric equivalents may be obtained by performing the following calculations:

Length (inches to millimeters) – Multiply by 25.4

Strength (ksi to megapascals or meganewtons per square meter) – Multiply by 6.8948

Temperature (Fahrenheit to Celsius) – (°Fahrenheit - 32) Multiply by 0.5556

Density (pounds per cubic inch to kilo-grams per cubic meter) – Multiply by 27,670

The information and data in this product data sheet are accurate to the best of our knowledge and belief, but are intended for general information only. Applications suggested for the materials are described only to help readers make their own evaluations and decisions, and are neither guarantees nor to be construed as express or implied warranties of suitability for these or other applications.

Data referring to mechanical properties and chemical analyses are the result of tests performed on specimens obtained from specific locations with prescribed sampling procedures; any warranty thereof is limited to the values obtained at such locations and by such procedures. There is no warranty with respect to values of the materials at other locations.

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AK Steel

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Stainless Steel The Value Option

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