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

41003 STAINLESS STEEL

UNS S41003

AK Steel

PRELIMINARY DATA

AK Steel 41003 is an economical ferritic stainless steel that provides excellent weldability, toughness and fabricating characteristics. These properties make the material an excellent choice for applications such as tubing and sheet for bus frames, coal hopper cars, street sweepers, chutes, storage tanks, ISO shipping container frames and other equipment requiring low life-cycle costs.

COMPOSITION

(ASTM A 240)

	%
Carbon	0.03 max.
Manganese	1.50 max.
Phosphorus	0.040 max.
Sulfur	0.030 max.
Silicon	1.00 max.
Chromium	10.50 - 12.50
Nickel	1.50 max.
Nitrogen	0.030 max.
Iron	Balance

AVAILABLE FORMS

AK Steel produces 41003 stainless steel in coils and cut length thicknesses from 0.075" to 0.250" (1.9 to 6.4 mm) in widths up to and including 48" (1219 mm). Lighter gauges are under development.

MECHANICAL PROPERTIES

Table 1
Mechanical Properties*

	UTS ksi (MPa)	0.2% YS ksi (MPa)	Elongation, % in 2" (50.8 mm)	Hardness, Rockwell
Typical	74.4 (513)	50.2 (346)	26	B81
Range	66.9 - 87.4 (461 - 603)	43.2 - 63.2 (298 - 436)	18 - 36	B75 - B94

*Cold rolled + annealed sheet nominally 0.100" (2.5 mm) thick.

Table 2
Minimum Properties Acceptable for Material Specification*

Condition	UTS ksi (MPa)	0.2% YS ksi (MPa)	Elongation, % in 2" (50.8 mm)	Hardness, Rockwell max.
Annealed	66 (455)	40 (275)	18.0	C20

*ASTM A 240

Table 3

Typical Charpy V-Notch Impact Properties*

Sample Condition	Test Temperature °F (°C)	Longitudinal Impact (ft-lbf/in^2) (J/cm^2)	Transverse Impact (ft-lbf/in^2) (J/cm^2)
Cold Rolled + Annealed + Pickled	Room Temperature	975 (205)	642 (135)
Cold Rolled + Annealed + Pickled	-22 (-30)	915 (192)	488 (103)

*Nominal 0.100" (2.5 mm) sheet.

CORROSION RESISTANCE

The corrosion resistance of AK Steel 41003 Stainless Steel is similar to other 11% chromium stainless steels like AK Steel 409 Ni and UNS 409.

WELDABILITY

The ferritic class of stainless steels is generally considered to be weldable by the common fusion and resistance techniques. Special consideration is required to avoid brittle weld fractures during fabrication by minimizing discontinuities, maintaining low weld heat input, and occasionally warming the part somewhat before forming.

AK Steel 41003 Stainless Steel is considered to have better weldability in heavy sections compared to 409. This is due to the addition of manganese and nickel which results in finer heat-affected zones (HAZ) and weld structures that improve impact toughness and formability in heavy sections. When weld filler is needed, AWS E/ER 309L is most often specified.

AK Steel 41003 Stainless Steel exhibits excellent tube welding characteristics due to its fine grain size, especially in sections over 0.100" (2.54 mm).

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 kilograms per cubic meter) – Multiply by 27,670

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Stainless Steel The Value Option