

SAE 1018

Component Wt. %

C 0.14 - 0.2

Fe 98.81 - 99.26

Mn 0.6 - 0.9

P Max 0.04

S Max 0.05

#### Material Notes:

Supplied as killed, semikilled, rimmed, and capped steel. Good weldability, relatively soft and strengthen with cold work during forming or drawing. Widely used in cold forming operations such as heading, upsetting, and extrusion. Used in the as-rolled condition as bar, shapes, sheet, and strip.

#### Physical Properties Metric English Comments

Density 7.87 g/cc 0.284 lb/in<sup>3</sup> Typical for steel

#### Mechanical Properties

Hardness, Brinell 131 131

Hardness, Knoop 150 150 Converted from Brinell hardness.

Hardness, Rockwell B 73 73 Converted from Brinell hardness.

Hardness, Vickers 136 136 Converted from Brinell hardness.

Tensile Strength, Ultimate 450 MPa 65300 psi

Tensile Strength, Yield 380 MPa 55100 psi

Elongation at Break 16 % 16 % in 50 mm

Reduction of Area 40 % 40 %

Modulus of Elasticity 200 GPa 29000 ksi Typical for steel

Bulk Modulus 140 GPa 20300 ksi Typical for steel

Poisson's Ratio 0.29 0.29 Typical For Steel

Shear Modulus 80 GPa 11600 ksi Typical for steel

#### Electrical Properties

Electrical Resistivity 1.59e-005 ohm-cm 1.59e-005 ohm-cm annealed condition; 0°C

(32°F)

Electrical Resistivity at Elevated Temperature 2.19e-005 ohm-cm 2.19e-005 ohm-cm annealed condition; 100°C (212°F)

Electrical Resistivity at Elevated Temperature 2.93e-005 ohm-cm 2.93e-005 ohm-cm annealed condition; 200°C (390°F)

#### Thermal Properties

CTE, linear 20°C 11.5  $\mu\text{m}/\text{m}\cdot^\circ\text{C}$  6.39  $\mu\text{in}/\text{in}\cdot^\circ\text{F}$  Typical steel

CTE, linear 250°C 12.2  $\mu\text{m}/\text{m}\cdot^\circ\text{C}$  6.78  $\mu\text{in}/\text{in}\cdot^\circ\text{F}$  Typical for steel ; 0-300°C (68-570°F)

CTE, linear 500°C 13.9  $\mu\text{m}/\text{m}\cdot^\circ\text{C}$  7.72  $\mu\text{in}/\text{in}\cdot^\circ\text{F}$  Typical for steel ; 0-500°C (68-930°F)

CTE, linear 1000°C 14.7  $\mu\text{m}/\text{m}\cdot^\circ\text{C}$  8.17  $\mu\text{in}/\text{in}\cdot^\circ\text{F}$  Typical steel

Specific Heat Capacity 0.486 J/g-°C 0.116 BTU/lb-°F annealed; 50-100°C (122-212°F)

Thermal Conductivity 51.9 W/m-K 360 BTU-in/hr-ft<sup>2</sup>-°F Typical steel

