

SAE 1010

Component Wt. %

C 0.08 - 0.13

Fe 99.18 - 99.62

Mn 0.3 - 0.6

P Max 0.04

S Max 0.05

Material Notes:

Used widely in low strength applications. Good formability, fair machinability, can be hardened by cyaniding. Suitable for magnet core applications

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Physical Properties Metric English Comments

Density 7.87 g/cc 0.284 lb/in³

Mechanical Properties

Hardness, Brinell 105 105 (HB)

Hardness, Knoop 123 123 Converted from Brinell hardness.

Hardness, Rockwell B 60 60 Converted from Brinell hardness. (HRB)

Hardness, Vickers 108 108 Converted from Brinell hardness.

Tensile Strength, Ultimate 365 MPa 52900 psi

Tensile Strength, Yield 305 MPa 44200 psi

Elongation at Break 20 % 20 % In 50 mm

Reduction of Area 40 % 40 %

Modulus of Elasticity 205 GPa 29700 ksi Typical for steel

Bulk Modulus 140 GPa 20300 ksi Typical for steel

Poisson's Ratio 0.29 0.29 Typical For Steel

Machinability 55 % 55 % Based on AISI 1212 steel. as 100% machinability. The machinability of Group I bar, rod, and wire products can be improved by cold drawing.

Shear Modulus 80 GPa 11600 ksi Typical for steel

Electrical Properties

Electrical Resistivity 1.43e-005 ohm-cm 1.43e-005 ohm-cm condition unknown

Thermal Properties

CTE, linear 20°C 12.2 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$ 6.78 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$ 0-100°C

CTE, linear 250°C 13.5 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$ 7.5 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$ 0-300°C (68-570°F)

CTE, linear 500°C 14.2 $\mu\text{m}/\text{m}\cdot^\circ\text{C}$ 7.89 $\mu\text{in}/\text{in}\cdot^\circ\text{F}$ 0-500°C (68-930°F)

Specific Heat Capacity 0.448 J/g·°C 0.107 BTU/lb·°F condition unknown; 50-100°C (122-212°F)

Specific Heat Capacity at Elevated Temperature 0.498 J/g·°C 0.119 BTU/lb·°F condition unknown; 150-200°C (302-390°F)

Specific Heat Capacity at Elevated Temperature 0.519 J/g·°C 0.124 BTU/lb·°F condition unknown; 200-250°C (390-480°F)

Specific Heat Capacity at Elevated Temperature 0.536 J/g·°C 0.128 BTU/lb·°F condition unknown; 250-300°C (480-570°F)

Specific Heat Capacity at Elevated Temperature 0.565 J/g·°C 0.135 BTU/lb·°F condition unknown; 300-350°C (570-660°F)

Specific Heat Capacity at Elevated Temperature 0.59 J/g·°C 0.141 BTU/lb·°F condition unknown; 350-400°C (660-750°F)

Specific Heat Capacity at Elevated Temperature 0.649 J/g·°C 0.155 BTU/lb·°F condition unknown; 400-450°C (750-930°F)

Specific Heat Capacity at Elevated Temperature 0.729 J/g·°C 0.174 BTU/lb·°F condition unknown; 550-600°C (1020-1110°F)

Specific Heat Capacity at Elevated Temperature 0.825 J/g·°C 0.197 BTU/lb·°F condition unknown; 650-700°C (1200-1290°F)

Thermal Conductivity 49.8 W/m·K 346 BTU-in/hr-ft²·°F Typical steel

