

AISI 1040 Steel, as cold drawn, 22-32 mm (0.875-1.25 in) round

Categories: [Metal](#); [Ferrous Metal](#); [Carbon Steel](#); [AISI 1000 Series Steel](#); [Medium Carbon Steel](#)


Material Notes: Typical uses include machine, plow, and carriage bolts, tie wire, cylinder head studs, and machined parts, U-bolts, concrete reinforcing rods, forgings, and non-critical springs.



Key Words: UNS G10400, ASTM A29, ASTM A108, ASTM A510, ASTM A519, ASTM A546, ASTM A576, ASTM A682, MIL SPEC MIL-S-11310 (CS1040), SAE J403, SAE J412, SAE J414, DIN 1.1186, JIS S 40 C, BS 970 060A40, BS 970 080A40, BS 970 080M40 (EN8), BS 2 S 93

Vendors: No vendors are listed for this material. Please [click here](#) if you are a supplier and would like information on how to add your listing to this material.

Physical Properties	Metric	English	Comments
Density	7.845 g/cc	0.2834 lb/in ³	Chemical composition of 0.435% C, 0.69% Mn, 0.20% Si, annealed at 860°C (1580°F).

Mechanical Properties	Metric	English	Comments
Hardness, Brinell	170	170	
Hardness, Knoop	191	191	Converted from Brinell
Hardness, Rockwell B	86	86	Converted from Brinell
Hardness, Vickers	178	178	Converted from Brinell
Tensile Strength, Ultimate	585 MPa	84800 psi	
Tensile Strength, Yield	515 MPa	74700 psi	
Elongation at Break	12 %	12 %	in 50 mm
Reduction of Area	35 %	35 %	
Modulus of Elasticity	200 GPa	29000 ksi	Typical for steel
Bulk Modulus	160 GPa	23200 ksi	Typical for steels
Poissons Ratio	0.29	0.29	Typical For Steel
Shear Modulus	80.0 GPa	11600 ksi	Typical for steels
Izod Impact	45.0 J	33.2 ft-lb	annealed at 790°C (1450°F)
	49.0 J	36.1 ft-lb	as rolled
	65.0 J	47.9 ft-lb	normalized at 900°C (1650°F)

Electrical Properties	Metric	English	Comments
Electrical Resistivity 	0.0000171 ohm-cm @Temperature 20.0 °C	0.0000171 ohm-cm @Temperature 68.0 °F	
	0.0000221 ohm-cm @Temperature 100 °C	0.0000221 ohm-cm @Temperature 212 °F	
	0.0000296 ohm-cm @Temperature 200 °C	0.0000296 ohm-cm @Temperature 392 °F	
	0.0000493 ohm-cm @Temperature 400 °C	0.0000493 ohm-cm @Temperature 752 °F	
	0.0000763 ohm-cm @Temperature 600 °C	0.0000763 ohm-cm @Temperature 1110 °F	
	0.0000932 ohm-cm @Temperature 700 °C	0.0000932 ohm-cm @Temperature 1290 °F	
	0.0001111 ohm-cm @Temperature 800 °C	0.0001111 ohm-cm @Temperature 1470 °F	
	0.0001149 ohm-cm @Temperature 900 °C	0.0001149 ohm-cm @Temperature 1650 °F	
	0.0001179 ohm-cm @Temperature 1000 °C	0.0001179 ohm-cm @Temperature 1830 °F	

Thermal Properties	Metric	English	Comments
CTE, linear 	11.3 µm/m-°C @Temperature 20.0 - 100 °C	6.28 µin/in-°F @Temperature 68.0 - 212 °F	Composition of 0.40% C, 0.11% Mn, 0.01% P, 0.03% S, 0.03% Si, 0.03% Cu.
	12.1 µm/m-°C @Temperature 20.0 - 200 °C	6.72 µin/in-°F @Temperature 68.0 - 392 °F	Composition of 0.40% C, 0.11% Mn, 0.01% P, 0.03% S, 0.03% Si, 0.03% Cu.
	12.2 µm/m-°C @Temperature 20.0 - 300 °C	6.78 µin/in-°F @Temperature 68.0 - 572 °F	Composition of 0.40% C, 0.11% Mn, 0.01% P, 0.03% S, 0.03% Si, 0.03% Cu
	13.3 µm/m-°C @Temperature 20.0 - 400 °C	7.39 µin/in-°F @Temperature 68.0 - 752 °F	Composition of 0.40% C, 0.11% Mn, 0.01% P, 0.03% S, 0.03% Si, 0.03% Cu
	13.9 µm/m-°C @Temperature 20.0 - 500 °C	7.72 µin/in-°F @Temperature 68.0 - 932 °F	Composition of 0.40% C, 0.11% Mn, 0.01% P, 0.03% S, 0.03% Si, 0.03% Cu
	14.2 µm/m-°C @Temperature 20.0 - 600 °C	7.89 µin/in-°F @Temperature 68.0 - 1110 °F	Composition of 0.40% C, 0.11% Mn, 0.01% P, 0.03% S, 0.03% Si, 0.03% Cu
	14.8 µm/m-°C @Temperature 20.0 - 700 °C	8.22 µin/in-°F @Temperature 68.0 - 1290 °F	Composition of 0.40% C, 0.11% Mn, 0.01% P, 0.03% S, 0.03% Si, 0.03% Cu
Specific Heat Capacity 	0.486 J/g-°C @Temperature >=100 °C	0.116 BTU/lb-°F @Temperature >=212 °F	
	0.515 J/g-°C	0.123 BTU/lb-°F	

	@Temperature 150 - 200 °C	@Temperature 302 - 392 °F
	0.528 J/g-°C	0.126 BTU/lb-°F
	@Temperature 200 - 250 °C	@Temperature 392 - 482 °F
	0.548 J/g-°C	0.131 BTU/lb-°F
	@Temperature 250 - 300 °C	@Temperature 482 - 572 °F
	0.569 J/g-°C	0.136 BTU/lb-°F
	@Temperature 300 - 350 °C	@Temperature 572 - 662 °F
	0.586 J/g-°C	0.140 BTU/lb-°F
	@Temperature 350 - 400 °C	@Temperature 662 - 752 °F
	0.624 J/g-°C	0.149 BTU/lb-°F
	@Temperature 750 - 800 °C	@Temperature 1380 - 1470 °F
	0.649 J/g-°C	0.155 BTU/lb-°F
	@Temperature 450 - 500 °C	@Temperature 842 - 932 °F
	0.708 J/g-°C	0.169 BTU/lb-°F
	@Temperature 550 - 600 °C	@Temperature 1020 - 1110 °F
	0.770 J/g-°C	0.184 BTU/lb-°F
	@Temperature 650 - 700 °C	@Temperature 1200 - 1290 °F
	1.583 J/g-°C	0.3783 BTU/lb-°F
	@Temperature 700 - 750 °C	@Temperature 1290 - 1380 °F

Thermal Conductivity 	24.7 W/m-K	171 BTU-in/hr-ft²-°F
	@Temperature 800 °C	@Temperature 1470 °F
	29.8 W/m-K	207 BTU-in/hr-ft²-°F
	@Temperature 1200 °C	@Temperature 2190 °F
	30.1 W/m-K	209 BTU-in/hr-ft²-°F
	@Temperature 700 °C	@Temperature 1290 °F
	32.9 W/m-K	228 BTU-in/hr-ft²-°F
	@Temperature 1000 °C	@Temperature 1830 °F
	33.9 W/m-K	235 BTU-in/hr-ft²-°F
	@Temperature 600 °C	@Temperature 1110 °F
	38.2 W/m-K	265 BTU-in/hr-ft²-°F
	@Temperature 500 °C	@Temperature 932 °F
	41.7 W/m-K	289 BTU-in/hr-ft²-°F
	@Temperature 400 °C	@Temperature 752 °F
	45.7 W/m-K	317 BTU-in/hr-ft²-°F
	@Temperature 300 °C	@Temperature 572 °F
	48.1 W/m-K	334 BTU-in/hr-ft²-°F
	@Temperature 200 °C	@Temperature 392 °F
	50.7 W/m-K	352 BTU-in/hr-ft²-°F
	@Temperature 100 °C	@Temperature 212 °F
	51.9 W/m-K	360 BTU-in/hr-ft²-°F
	@Temperature 0.000 °C	@Temperature 32.0 °F

Component Elements Properties	Metric	English	Comments
Carbon, C	0.37 - 0.44 %	0.37 - 0.44 %	
Iron, Fe	98.6 - 99 %	98.6 - 99 %	As remainder
Manganese, Mn	0.60 - 0.90 %	0.60 - 0.90 %	
Phosphorous, P	<= 0.040 %	<= 0.040 %	
Sulfur, S	<= 0.050 %	<= 0.050 %	

[References](#) for this datasheet.

Some of the values displayed above may have been converted from their original units and/or rounded in order to display the information in a consistent format. Users requiring more precise data for scientific or engineering calculations can click on the property value to see the original value as well as raw conversions to equivalent units. We advise that you only use the original value or one of its raw conversions in your calculations to minimize rounding error. We also ask that you refer to MatWeb's [terms of use](#) regarding this information. [Click here](#) to view all the property values for this datasheet as they were originally entered into MatWeb.