MW Components

Alloy Steel Grade 4140 Fact Sheet

AISI 4140 Steel, normalized at 870°C (1600°F), air cooled, 25 mm (1 in.) round

Subcategories: Alloy Steel; AISI 4000 Series Steel; Low Alloy Steel; Carbon Steel; Medium Carbon Steel

Close Analogs:

Key Words: AFNOR 40 CD 4, AFNOR 42 CD 4 (France), ASTM A322, ASTM A331, ASTM A505, ASTM A519, ASTM A646, B.S. 708 A 42 (UK), B.S. 708 M 40 (UK), B.S. 709 M 40 (UK), JIS SCM 4 , JIS SCM 4, JIS SCM440, SS14 2244 (Sweden), MIL SPEC MIL-S-16974, SAE J404, SAE J412, SAE J770, DIN 1.7225, UNS G41400, AMS 6381, AMS 6382, AMS 6390, AMS 6395, IS 1570 40Cr1Mo28, IS 4367 40Cr1Mo28, IS 5517 40Cr1Mo28

Component	Weight %
C	Max 0.33
Cr	0.80-1.1
Fe	97.03-98.22
Mn	0.40-0.60
Mo	0.15-0.25
P	Max 0.035
Si	0.15-0.30
S	Max 0.040

Physical Properties	Metric	English	Comments	Cold Head	Hot Forge	Wire Form
Density	7.85 g/cc	0.284 lb/in³				

Mechanical Properties	Metric	English	Comments	Cold Head	Hot Forge	Wire Form
Hardness, Brinell	302	302				
Hardness, Knoop	328	328	Converted from Brinell hardness.			
Hardness, Rockwell B	99	99	Converted from Brinell hardness.			

Hardness, Rockwell C	32	32	Converted from Brinell hardness.			
Hardness, Vickers	319	319	Converted from Brinell hardness.			
Tensile Strength, Ultimate	1020 MPa	148000 psi				
Tensile Strength, Yield	655 MPa	95000 psi				
Elongation at Break	17.70%	17.70%	in 50 mm			
Reduction of Area	46.80%	46.80%				
Modulus of Elasticity	205 GPa	29700 ksi	Typical for steel			
Bulk Modulus	160 GPa	23200 ksi	Typical for steel			
Poissons Ratio	0.29	0.29	Calculated			
Machinability	65.00%	65.00%	Based on AISI 1212 as 100% machinability.			
Shear Modulus	80.0 GPa	11600 ksi	Typical for steel			
Electrical Properties	**Metric**	**English**	**Comments**	**Cold Head**	**Hot Forge**	**Wire Form**
Electrical Resistivity	0.0000220 ohm-cm	0.0000220 ohm-cm				
	0.0000263 ohm-cm	0.0000263 ohm-cm				
	0.0000326 ohm-cm	0.0000326 ohm-cm				
	0.0000475 ohm-cm	0.0000475 ohm-cm				
	0.0000646 ohm-cm	0.0000646 ohm-cm				
Thermal Properties	**Metric**	**English**	**Comments**	**Cold Head**	**Hot Forge**	**Wire Form**
CTE, linear	12.2 µm/m-°C	6.78 µin/in-°F				
	Temperature 0.000 - 100 °C	Temperature 32.0 - 212 °F				
	13.7 µm/m-°C	7.61 µin/in-°F				
	Temperature 20.0 -400 °C	Temperature 68.0 - 752 °F				
	14.6 µm/m-°C	8.11 µin/in-°F				
	Temperature 20.0 - 600 °C	Temperature 68.0 -1110 °F				

Specific Heat Capacity	0.473 J/g-°C	0.113 BTU/lb-°F
	Temperature 150 - 200 °C	Temperature 302 - 392 °F
	0.519 J/g-°C	0.124 BTU/lb-°F
	Temperature 350 - 400 °C	Temperature 662 - 752 °F
	0.561 J/g-°C	0.134 BTU/lb-°F
	Temperature 550 - 600 °C	Temperature 1020 - 1110 °F
Thermal Conductivity	33.0 /m-K	229 BTU-in/hr-ft²-°F
	Temperature 600 °C	Temperature 1110 °F
	37.7 /m-K	262 BTU-in/hr-ft²-°F
	Temperature 400 °C	Temperature 752 °F
	42.2 /m-K	293 BTU-in/hr-ft²-°F
	Temperature 200 °C	Temperature 392 °F
	42.6 /m-K	296 BTU-in/hr-ft²-°F
	Temperature 100 °C	Temperature 212 °F