

# SUPREME STEEL INDUSTRIES



## AISI Type O1 Oil-hardening Tool Steel, oil quenched at 800°C, tempered at 425°C

Categories: [Metal](#); [Ferrous Metal](#); [Tool Steel](#); [Cold Work Steel](#); [Oil-Hardening Steel](#)

Material Notes: General purpose non-deforming low alloy for applications requiring extreme dimensional accuracy. Good abrasion resistance and toughness.

Key Words: UNS T31501, ASTM A681, FED QQ-T-570, SAE J437, SAE J438, DIN 1.2510, B

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Physical Properties	Metric	English	Comments
Density	7.83 g/cc	0.283 lb/in <sup>3</sup>	

Mechanical Properties	Metric	English	Comments
Hardness, Knoop	537	537	Converted from Rockwell C hardness.
Hardness, Rockwell C	50	50	
Hardness, Vickers	517	517	
Tensile Strength, Ultimate	1890 MPa	245000 psi	
Tensile Strength, Yield	1500 MPa	218000 psi	
Elongation at Break	0.00 %	0.00 %	in 50 mm
Modulus of Elasticity	214 GPa	31000 ksi	
Bulk Modulus	160 GPa	23200 ksi	Typical for steel
Poissons Ratio	0.30	0.30	Calculated
Shear Modulus	82.0 GPa	11900 ksi	Estimated from elastic modulus

Thermal Properties	Metric	English	Comments
CTE, linear	10.8 µm/m-°C @Temperature 38.0 - 260 °C	6.00 µin/in-°F @Temperature 100 - 500 °F	
	14.0 µm/m-°C @Temperature 38.0 - 540 °C	7.78 µin/in-°F @Temperature 100 - 1000 °F	

Processing Properties	Metric	English	Comments
Processing Temperature	175 - 280 °C	347 - 500 °F	Tempering Temperature
	790 - 815 °C	1460 - 1500 °F	Hardening Temperature
Annealing Temperature	760 - 790 °C	1400 - 1450 °F	

Component Elements Properties	Metric	English	Comments
Carbon, C	0.85 - 1.0 %	0.85 - 1.0 %	
Chromium, Cr	0.50 %	0.50 %	
Iron, Fe	98 %	98 %	
Manganese, Mn	1.2 %	1.2 %	
Phosphorous, P	<= 0.030 %	<= 0.030 %	
Silicon, Si	<= 0.50 %	<= 0.50 %	
Sulfur, S	<= 0.030 %	<= 0.030 %	
Tungsten, W	0.50 %	0.50 %	
Vanadium, V	<= 0.30 %	<= 0.30 %	

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