

TUNGSTEN – DATASHEET

SUMMARY PROPERTIES

Property

Symbol	W
Type	Refractory Metal
Atomic Number	74
CAS No.	7440337
Crystal Structure	Cubic
Density (gm/cc)	19.3
Melting Point (Degrees C)	3410
Recrystallisation Temp (Degrees C)	1200 to 1400

TUNGSTEN COMPOSITION

Substance	Symbol	% Composition	% Variation
Tungsten	W	99.95	+/- 0.002
Carbon	C	0.010	+10% Relative
Oxygen	O	0.010	+0.005
Nitrogen	N	0.010	+0.001
Iron	Fe	0.010	+0.001
Nickel	Ni	0.010	+0.001
Silicon	Si	0.010	+0.001

TUNGSTEN MACHINING

Tungsten in general is considered to have machining characteristics similar to gray cast iron due to its abrasiveness and feature of producing short chips.

Tungsten can be difficult to work due to its high hardness and low ductility. It is a strong, hard metal that is usually brittle at room temperature and sensitive to cracking. It needs to be handled with special care and worked with a higher skill than is required for the majority of metals and alloys. A key point is that Tungsten must be formed or cut at temperatures well above its transition temperature. If this is not adhered to then cracking or lamination may occur. Sufficient controls should be in place to ensure that the material remains at this temperature throughout the complete forming cycle. Beware using cold tooling as this rapidly chills the metal and can have a detrimental effect similar to not preheating the material. E.D.M. is the best method for machining Tungsten that requires metal removal. The following conventional machining methods can also be used with great care: Milling, turning, grinding, forming, joining, stamping, riveting and spinning.

Alloys with lower percentages of tungsten are more ductile than pure or high percentage compositions and have similar machining characteristics to stainless steels with comparable hardness. Due to their high elastic stiffness, tungsten alloys need higher cutting forces than the norm for most metals, and rigid tooling and sufficient spindle torque are essential for machining effectively. Some low percentage tungsten alloys are so ductile that they produce continuous chips under machining, and so requiring special machining techniques to control chips.

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