



## TUNGSTEN ALLOY PROPERTIES & STANDARD GRADES

GRADES	WA1790	WA1792	WA1795	WA1797	WA1890	WA1893	WA1895
Tungsten %	90	92.5	95	97	90	92.5	95
Binder	Ni/Fe	Ni/Fe	Ni/Fe	Ni/Fe	Ni/Cu	Ni/Cu	Ni/Cu
Density (g/cm <sup>3</sup> )	17.1	17.5	18.1	18.5	17.1	17.5	17.9
Density (lb/in <sup>3</sup> )	0.62	0.63	0.65	0.67	0.62	0.64	0.65
Hardness (HRC)	27	24	26	25	24	19	23
Ultimate Tensile Strength (Mpa/ksi)	920/135	900/130	825/120	800/115	720/105	760/110	760/110
Yield Strength .2% Offset (PSI)	88,000	90,000	90,000	85,000	90,000	88,000	85,000
Elongation (% on 25mm)	6	10	4	3	2	10	1
Modulus of Elasticity (PSI)	40 x 10 <sup>6</sup>	47 x 10 <sup>6</sup>	50 x 10 <sup>6</sup>	53 x 10 <sup>6</sup>	40 x 10 <sup>6</sup>	42 x 10 <sup>6</sup>	45 x 10 <sup>6</sup>
Proportional Elastic Limit (PSI)	45,000	46,000	44,000	45,000	45,000	45,000	45,000
Thermal Expansion Coefficient (x 10 <sup>-6</sup> /°C (20-400°C))	4.8	4.6	4.6	4.5	5.4	4.9	4.4
Thermal Conductivity (CGS units)	0.18	0.20	0.26	0.30	0.23	0.27	0.33
Electrical Conductivity (% IACS)	10	13	13	17	14	15	16
Magnetic Properties	Slight	Slight	Slight	Slight	None	None	None
ASTM B777-07 (Class)	1	2	3	4	1	2 (nominal)	3

**NOTES:**

1. Properties may vary depending upon size and shape of parts.
2. The composition above is standard; we can customize for manufacturing purposes in order to meet specific application requirements.



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<b>Thickness</b>	≤0.3mm	<b>Tolerance</b>	±0.015mm
<b>Thickness</b>	0.3-1.0mm	<b>Tolerance</b>	±0.03mm
<b>Thickness</b>	1.0 – 1,400 mm	<b>Tolerance</b>	±0.03mm
<b>Width</b>	Client defines	<b>Tolerance</b>	±0.04mm
<b>Length</b>	≥ ±0.5mm		

Tungsten is generally considered to possess machinability similar to gray cast iron because it is abrasive and produces short chips. C&L's tungsten alloy metals, however, have typical hardness in the range of HRC 24-32. The low thermal expansion allows the metals to be machined with tight tolerance control. Sharp tools and sulfur oil coolant are absolutely critical. We help our customers achieve the best machining results by providing further advice on turning, boring, roughing, finishing, tapping, drilling, grinding, milling, roughing, finishing, sawing/cutting, and stress relieving.

<b>SIZES IN STOCK</b>	
<b>RODS</b>	
<b>(OD x Length 8)</b>	
1/8	3/16 1/4 5/16 3/8 7/16 1/2 9/16 5/8 3/4 7/8 1 1 1/8 1 1/4 1 3/8 1 1/2 1 5/8 1 1/2
1 3/4	2 2 1/4 2 1/2
<b>(OD x Length 12)</b>	
1/8	3/16 1/4 5/16 3/8 7/16 1/2 9/16 5/8 3/4 7/8 1 1 1/8 1 1/4 1 3/8 1 1/2 1 5/8 1 1/2
1 3/4	2 2 1/4 2 1/2
<b>CRANKSHAFTS</b>	
1/2 x 0.75	1/2 x 1.00 1/2 x 1.1 1/2 x 1.2
5/8 x 0.75	5/8 x 1.00 5/8 x 1.2
3/4 x 0.75	3/4 x 1.00 3/4 x 1.2
7/8 x 0.5	7/8 x 0.75 7/8 x 1.00 7/8 x 1.1 7/8 x1.2 7/8 x1.5
1.0 x 1.00	1.0 x 1.1 1.0 x 1.2 1.0 x 1.5



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**FLAT BARS**

1/8 x 3 x 8	3/16 x 3/16 x 8	1/4 x 1/4 x 8	3/8 x 3/8 x 8	1/2 x 2 x 8
1/8 x 4 x 8	3/16 x 1 x 8	1/4 x 1 x 8	3/8 x 1 x 8	1/2 x 3 x 8
5/32 x 4 x 8	3/16 x 2 x 8	1/4 x 2 x 8	3/16 x 4 x 8	1/2 x 4 x 8
5/16 x 4 x 8	3/16 x 4 x 8	1/4 x 3 x 8		5/8 x 5/8 x 8
9/16 x 4 x 8		1/4 x 4 x 8		
5/8 x 4 x 8			3/4 x 3/4 x 8	1 x 1 x 8
			3/4 x 2 x 8	1 x 2 x 8
			3/4 x 3 x 8	1 x 3 x 8
			3/4 x 4 x 8	1 x 4 x 8
				2 x 4 x 8

**DISCS**

0.5 OD x 0.25 TH	0.625 OD x 0.25 TH	0.75 OD x 0.25 TH
0.875 OD x 0.25 TH	1.000 OD x 0.25 TH	1.25 OD x 0.25 TH – 1.5 OD x 0.25 TH