

**ALLOY DESCRIPTION**

One of the strongest heat-treatable alloys for screw machine applications. This alloy, while commonly found in forging applications, offers good machinability and high strength. Corrosion resistance is only fair; however, weldability is good with arc and resistance methods. In many applications this alloy can be substituted for 2024.

**TYPICAL MECHANICAL PROPERTIES**

Temper	Tensile (.500" Dia. Specimen)					Hardness	Shear		Fatigue*		Modulus	
	Ultimate		Yield		Elongation/4D		Brinell 500kg 10 mm	Ultimate Shearing Strength		Endurance Limit - R.R. Moore Type		Modulus of Elasticity
	KSI	MPa	KSI	MPa		%		KSI	MPa	KSI	MPa	KSI x 10 <sup>3</sup>
0	27	186	14	97	18	45	18	125	13	90	10.6	73.1
T4,T451	62	427	42	290	20	105	38	260	20	140	10.6	73.1
T6,T651	70	483	60	414	13	135	42	290	18	125	10.6	73.1

\*5 x 10E8 cycles of reversed stress

**COMPARATIVE CHARACTERISTICS**

Temper	Corrosion Resistance		Cold Workability <sup>3</sup>	Machinability <sup>3</sup>	Anodize Response <sup>3</sup>	Brazeability <sup>4</sup>	Weldability <sup>4</sup>		
	General <sup>1</sup>	Stress <sup>2</sup>					Gas	Arc	Spot
0	-	-	B	D	C	D	D	D	B
T4,T451	D	C	C	B	C	D	D	B	B
T6,T651	D	C	D	B	C	D	D	B	B

- Ratings A through E are relative ratings in decreasing order of merit, based on exposures to sodium chloride solution by intermittent spraying or immersion. Alloys with A and B ratings can be used in industrial and seacoast atmospheres without protection. Alloys with C, D and E ratings generally should be protected at least on faying surfaces.
- Stress-corrosion cracking ratings are based on service experience and laboratory tests of specimens exposed to the 3.5% sodium chloride alternate immersion test.
  - A= No known instance of failure in service or in laboratory tests.
  - B= No known instance of failure in service; limited failures in laboratory tests of short transverse specimens.
  - C= Service failures with sustained tension stress acting in short transverse direction relative to grain structure; limited failures in laboratory tests of long transverse specimens.
  - D= Limited service failures with sustained longitudinal or long transverse.
- Ratings A through D for Workability (cold), A through E for Machinability and A through C for Anodize Response, are relative ratings in decreasing order of merit.
- Ratings A through D for Weldability and Brazeability are relative ratings defined as follows:
  - A= Generally weldable by all commercial procedures and methods.
  - B= Weldable with special techniques or for specific applications that justify preliminary trials or testing to develop welding procedure and weld performance.
  - C= Limited weldability because of crack sensitivity or loss in resistance to corrosion and mechanical properties.
  - D= No commonly used welding methods have been developed.

**APPLICABLE SPECIFICATIONS**

Cold Finished	Extruded
ASTM B211	ASTM B221
AMS-QQ-A-225/4	AMS-QQ-A-200/2
AMS 4121	AMS 4153

**CHEMICAL COMPOSITION LIMITS**

Weight %	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Others	
									Each	Total
Minimum	0.50	-	3.9	0.40	0.20	-	-	-	-	-
Maximum	1.2	0.7	5.0	1.2	0.8	0.10	0.25	0.15	0.05	0.15

**TYPICAL PHYSICAL PROPERTIES**

Characteristic		English	Metric
Nominal Density (68 °F/20 °C)		0.101 lbs./in. <sup>3</sup>	2.80 Mg/m <sup>3</sup>
Melting Range		945 °F - 1180 °F	507 °C - 638 °C
Specific Heat (212 °F/100 °C)		-	-
Coefficient of Thermal Expansion	Linear 68 °F-212 °F 20 °C-100 °C	12.5 micro in./in.-°F	22.5 micro m/m -°K
	Volumetric 68 °F/20 °C	3.62 x 10 <sup>-5</sup> in. <sup>3</sup> /in. <sup>3</sup> -°F	65.1 x 10 <sup>-6</sup> m <sup>3</sup> /m <sup>3</sup> -°K
Thermal Conductivity (68 °F/20 °C)	O Temper	111 BTU/ft. - hr. - °F	192 W/m - °K
	T4,T451	77.4 BTU/ft. - hr. - °F	134 W/m - °K
	T6,T651	89.5 BTU/ft. - hr. - °F	155 W/m - °K
Electrical Conductivity (68 °F/20 °C)	Equal Volume	O Temper	50% IACS
		T4,T451	34% IACS
		T6,T651	40% IACS
	Equal Weight	O Temper	159% IACS
		T4,T451	108% IACS
		T6,T651	127% IACS