

**ALLOY DESCRIPTION**

This alloy is used in aerospace applications such as space booster and fuel tanks. The alloy is readily weldable. It is useful over a temperature range of -452° to 600 °F. The alloy also has good fracture toughness. The T8 temper is resistant to stress corrosion cracking.

**TYPICAL MECHANICAL PROPERTIES (LONGITUDINAL)**

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>
T351	52	359	36	248	17	95	-	-	-	-	10.6	73.1
T851	66	455	51	352	10	125	-	-	15	103	10.6	73.1
T37	57	393	46	317	11	-	-	-	15	103	10.6	73.1
T87	69	476	57	393	10	-	-	-	15	103	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
T351	D	C	C	B	B	D	A	A	A
T851	D	B	D	B	B	D	A	A	A

- 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.

**CHEMICAL COMPOSITION LIMITS**

										Others	
Weight %	Si	Fe	Cu	Mn	Mg	Zn	Ti	V	Zr	Each	Total
Minimum	-	-	5.8	0.20	-	-	0.02	0.05	0.10	-	-
Maximum	0.20	0.30	6.8	0.40	0.02	0.10	0.10	0.15	0.25	0.05	0.15

**TYPICAL PHYSICAL PROPERTIES**

Characteristic		English	Metric
Nominal Density (68 °F/20 °C)		0.103 lbs./in. <sup>3</sup>	2.84 Mg/m <sup>3</sup>
Melting Range		1010 °F - 1190 °F	543 °C - 643 °C
Specific Heat (212 °F/100 °C)		0.206 BTU/lb. - °F	864 J/kg - °K
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 x 10 <sup>-6</sup> m <sup>3</sup> /m <sup>3</sup> -°K
Thermal Conductivity (68 °F/20 °C)	T351	67 BTU/ft. - hr. - °F	116 W/m - °K
	T851	75 BTU/ft. - hr. - °F	130 W/m - °K
Electrical Conductivity (68 °F/20 °C)	Equal Volume	T351	28% IACS
		T851	30% IACS