# **Kaiser**Select<sup>®</sup> PLATE ALLOY 7099-T7651 **HIGH STRENGTH** FOR LIGHTWEIGHT STRUCTURES

#### **PRODUCT DESCRIPTION**

- Engineered to provide an optimum combination of strength, stress corrosion cracking (SCC) resistance and fracture toughness
- The high strength of KaiserSelect<sup>®</sup> 7099-T7651 provides a new alloy option for airframe lightweighting and is ideal for wing structures such as ribs, spars and skins, as well as fuselage applications such as frames and floor beams
- Available in thicknesses ranging from 1" to 6" (25 mm to 152 mm)
- AA7099 is a less quench sensitive Al-Mg-Zn-Cu-Zr alloy engineered for high strength properties in thicker sections

#### **PERFORMANCE CHARACTERISTICS**

- Up to 15% higher ultimate strength and up to 20% higher yield strength than 7050-T7451
- 7099-T7651 plate is especially suited for aerospace applications requiring high strength levels balanced with good fracture toughness and good resistance to stress corrosion cracking
- As a KaiserSelect<sup>®</sup> product, 7099-T7651 has exceptional lot to lot consistency, flatness and low repeatable reduced distortion both during and after machining. These enhanced characteristics facilitate complex machining with high metal removal rates and less part repositioning while maintaining final machined part dimensional tolerances

### PROCESSING CHARACTERISTICS

- The over-aged T7651 temper is obtained through a two stage aging treatment
- An optimized thermal cycle delivers a unique combination of properties throughout the thickness range to achieve both high strength and corrosion performance





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# **CHEMICAL COMPOSITION LIMITS (WT%)**

										OTHERS	
Weight %	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	Zr	Each	Total
Minimum	-	-	1.4	-	1.6	-	7.4	-	0.05	-	-
Maximum	0.12	0.15	2.1	0.04	2.3	0.04	8.4	0.06	0.15	0.05	0.15

## PROPERTIES

	THICKNESS				
Property (English / Metric)	Orientation	1 in / 25 mm	4 in / 102 mm	6 in / 152 mm	
Tensile strength <sup>(1)</sup> : ksi / MPa	L	83 / 572	77 / 531	76 / 524	
Yield strength <sup>(1)</sup> : ksi / MPa	L	79 / 545	73 / 503	70 / 483	
Elongation <sup>(1)</sup> : % (4D)	L	11	9	8	
Toughness K <sub>Ic</sub> per ASTM E399 <sup>(2)</sup> : ksi√in / MPa√m	L-T	27 / 30	26 / 29	25 / 28	
SCC min per ASTM G47: ksi / MPa	ST	- 25 / 170		170	
EXCO rating per ASTM G34		Better or equal to EB			
Density: lbs/in <sup>3</sup> / g/cm <sup>3</sup>		0.103 / 2.85			
Young's Modulus, E: ksi x 10 <sup>3</sup> / GPa	L	10.2 / 70.0			
Young's Modulus Compression, $\rm E_{o}:~ksi~x~10^{3}~/~GPa$	L	10.7 / 73.5			

(1) Aluminum Association Temper Registration Property Minimums (T99 Basis) (2) Fracture toughness properties are typicals.

# **T7651 FATIGUE CRACK GROWTH CHART**

Fatigue crack growth rate was tested using a center rack tension (CCT) specimen according to ASTM E647. Typical L-T orientation fatigue crack growth (FCG) curves are shown for 3.9" to 5.9" (100 mm to 150 mm) gauge specimens. Specimens from T/4, W/3 position.

1.00E-03

1.00E-04

1.00E-05

1.00E-06

1.00

10.00

∆K (ksi √in)

da/dN (inch/cycle)



S/N fatigue was tested using an open hole test specimen according to ASTM E466. A typical L-T orientation curve is shown for a 4" (102 mm) gauge specimen.



100.00





