



# ALLOY 2026 PRODUCTS

## ALCOA AEROSPACE TECHNICAL FACT SHEET

*New Generation Highly Damage Tolerant • Highly Formable • Extrusion Alloy*

### DESCRIPTION

Alcoa developed Extrusion Alloy 2026 as an improvement over Alloys 2024 and 2224 extrusions, and is a candidate alloy for aerospace structural applications where the governing selection criteria are high damage tolerance, good fatigue resistance and a high degree of manufacturability.

Benefits of Alloy 2026-T3511 extrusions include:

- >10% higher minimum tensile strength
- Higher strength relative to 2024-T3511
- Higher fracture toughness than 2024-T3511
- Better resistance to fatigue crack growth
- Reduction of coarse-grain “recrystallization layer”
- Low machining distortion

### APPLICATION

Alcoa Extrusion Alloy 2026 was developed as an improvement over incumbent Alloys 2024 and 2224 extrusions in aerospace structural applications where the governing selection criteria are high damage tolerance, good fatigue resistance and a high degree of manufacturability. The improved resistance to fatigue crack propagation and higher fracture toughness of Alloy 2026 permit increased intervals between inspections and improved residual strength. In addition to improved damage tolerance, extrusion Alloy 2026-T3511 also has significantly higher “A”- basis minimum strengths than 2024-T3511 and 2224-T3511.

Extrusion Alloy 2026-T3511 also reduces manufacturing costs compared to Alloys 2024-T3511 and 2224-T3511 through improved formability and by providing a thinner coarse recrystallized surface layer, which requires less machining and improves buy/fly.

2026-T3511 extrusion is currently available in a thickness ranging from < 0.249 – 3.250 in.

Alloy 2026 is also available in the T8511 temper for thin extrusions suitable for applications that require an additional increase in yield strength.

### COMMERCIAL STATUS

Alloy 2026-T3511 is registered with Aluminum Association and Aerospace Materials Specification 4338 was approved for Alloy 2026-T3511 extrusions up to 3.25 in. (82.6mm) thickness.<sup>1</sup>

The T8511 temper for Alloy 2026 extrusions is registered with the Aluminum Association, but only preliminary mechanical property data have been produced.

### CHEMICAL COMPOSITION LIMITS (WT. %)

	<b>Alloy 2026</b>	<b>Alloy 2024</b>	<b>Alloy 2224</b>
Zn	0.10 max	0.25 max	0.25 max
Mg	1.00 – 1.60	1.2 – 1.8	1.2 – 1.8
Cu	3.60 – 4.30	3.4 – 4.9	3.8 – 4.4
Zr	0.05 – 0.25	-----	-----
Cr	-----	0.10 max	0.10 max
Si	0.05 max	0.50 max	0.12 max
Fe	0.07 max	0.50 max	0.15 max
Mn	0.30 – 0.80	0.30 – 0.90	0.30 – 0.90
Ti	0.06 max	0.15 max	0.15 max
Others Each	0.05 max	0.05 max	0.05 max
Others Total	0.15 max	0.15 max	0.15 max
Remainder	Aluminum	Aluminum	Aluminum

PRODUCT SPECIFICATIONS ARE SUBJECT TO CHANGE WITHOUT NOTICE

**AEAP-ALCOA ENGINEERED AEROSPACE PRODUCTS**

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## STATIC MECHANICAL PROPERTIES

Extrusion Alloy 2026-T3511 has significantly higher “A” - basis minimum strength, higher fracture toughness and better fatigue crack growth resistance (FCGR) than Alloys 2024-T3511 and 2224-T3511.

### A - BASIS MECHANICAL PROPERTY MINIMA

1.00 in. thick extrusion

	Alloy 2026	Alloy 2024	Alloy 2224
F <sub>ty</sub> , ksi			
L	53	46	50
LT	46	37	40
F <sub>tu</sub> , ksi			
L	72	65	69
LT	66	56	60
C <sub>ys</sub> , ksi			
L	47	41	46
LT	46	40	40
el, %			
L	11	10	10

#### Corrosion Resistance

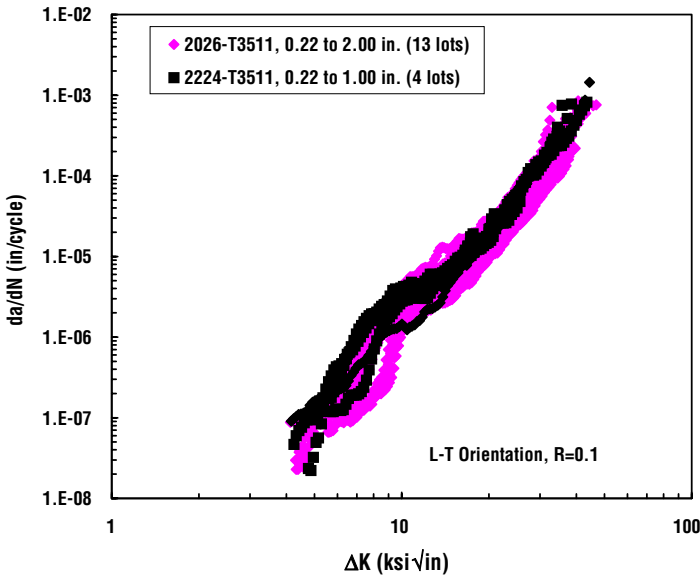
Both exfoliation (EXCO) and stress-corrosion cracking (SCC) test results per ASTM G34 and G44 respectively indicate that 2026-T3511 has similar exfoliation corrosion resistance to 2024-T3511 and 2224-T3511 extrusions. Exfoliation and stress-corrosion cracking may occur when exposed parts are subjected to corrosive environments without surface protection. Therefore, similar protection measures as currently used on 2024-T3511 and 2224-T3511 parts should be applied to 2026-T3511.

## DURABILITY AND DAMAGE TOLERANCE

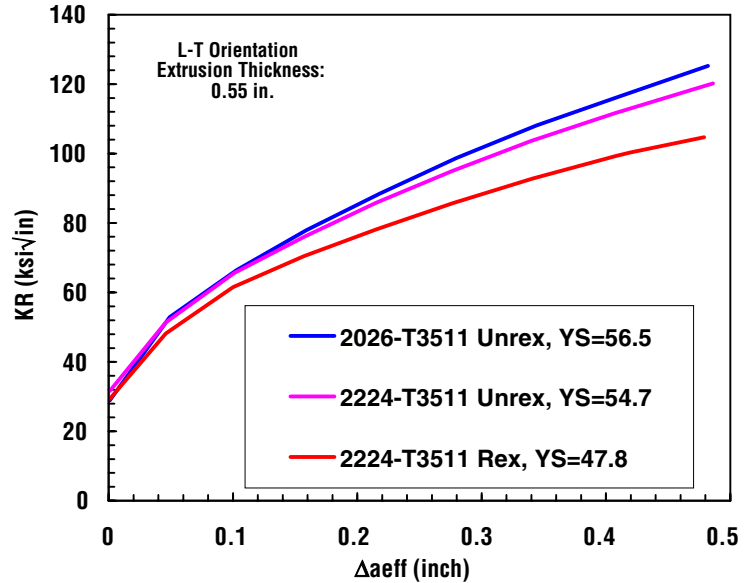
Alcoa 2026-T3511 extrusion alloy provides significantly improved damage tolerance as measured by FCGR and plane strain and plane stress fracture toughness compared to incumbent extrusion Alloys 2024-T3511 and 2224-T3511. The improvements in FCGR and fracture toughness are dependent upon the extrusion profile thickness. Particularly in the case of plane stress fracture toughness, as indicated by R-curve tests, which shows a significant improvement in toughness due to the ability of 2026-T3511 to inhibit recrystallization.

**FCG Rates (da/dN) for 2X24-T3511 Extrusions**

R=+0.1, RH>90%, Freq=25Hz, L-T



**Plane Stress Fracture Toughness for 2026 and 2224 Extrusions**



## MANUFACTURING CONSIDERATIONS

Stretch forming experiments conducted at several aerospace facilities demonstrated that Alloy 2026-T3511 is formed easily with more consistent spring-back when compared with 2024-T3511 extrusions after stretch forming. In addition, cost savings may be realized in terms of improved buy/fly due to the thinner layer of recrystallized grains of Alloy 2026-T3511 relative to incumbent alloys.

1. AMS Specification AMS 4338, 2003 February.

#### Contact & Procurement Information

For additional information on Extrusion Alloy 2026, contact your local Alcoa Aerospace Sales Account Manager.

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