

CPS Technologies

Fiber Reinforced Aluminum™ (FRA)

FRA is a novel **patented composite** consisting of randomly oriented, discontinuous, ceramic fibers reinforcing a high-strength aluminum matrix. FRA is ideal for **high temperature and high friction applications** such as bearing liners, races, and bushings. FRA is a drop-in replacement for specialty high performance alloys.

Performance

- High-strength (80 ksi UTS at room temperature), isotropic
- Retains 80% of strength at 400 °F, more than 3X traditional aluminum alloys
- Superior wear resistance compared to hardened steel at one-third the density (2.96 g/cm³)
- Superior formability compared to other composites (machinable, weldable, and forgeable)
- 30% decreased CTE compared to 6061 Al

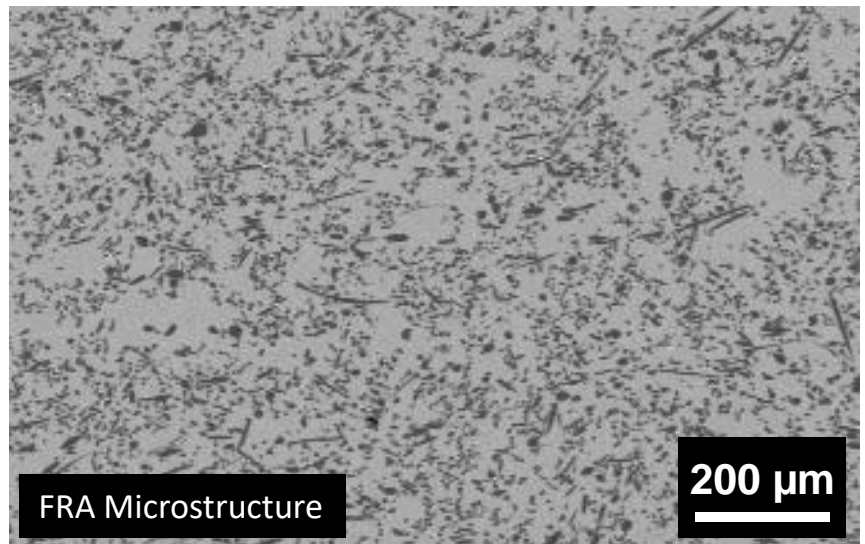
Military Vehicles

- Fixed-wing
- Helicopters
- Tilt rotor
- UAVs
- Combat vehicles

Commercial Markets

- Aerospace
- Motor sports
- Heavy trucks
- Turbomachinery
- Oilfield Drilling

Available as cast billet or machined components



CPS Technologies
111 S. Worcester Street
Norton, MA 02766

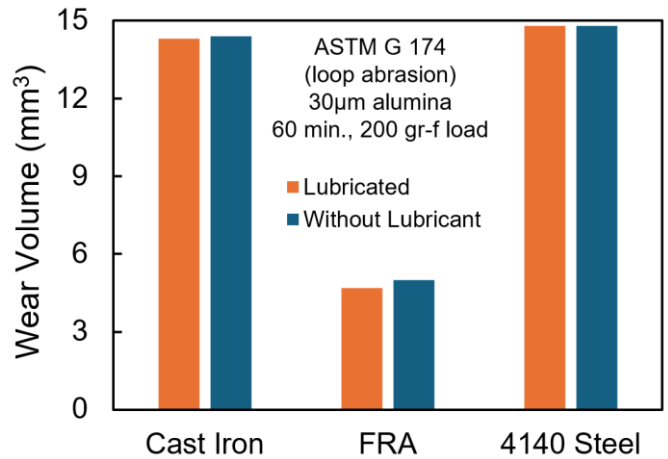
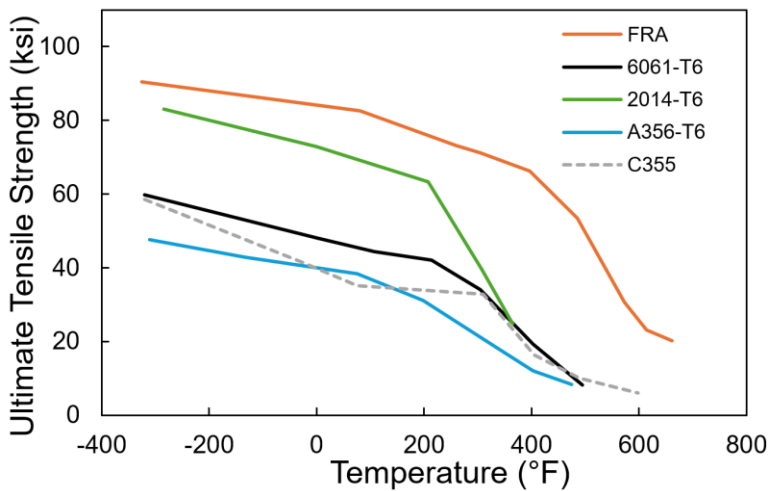
Steve Kachur, PhD
Vice President of Technology
skachur@cpstechnologiesolutions.com

Joe Englin
Director of Business Development
jenglin@cpstechnologiesolutions.com



Fiber Reinforced Aluminum™ (FRA)

CPS is actively expanding FRA applications, improving performance, and extending manufacturability. Additional products and properties are summarized below:



Property	Test Temperature, °F					
	70	100	200	300	400	500
FTU, ksi	77.0	75.5	72.3	65.1	62.0	40.0
FTY, ksi	64.0	64.1	63.7	59.3	50.9	35.0
FCY (1%), ksi	67.4	67.1	63.6	56.5	45.8	30.0
Flex Strength (1%), ksi	55.8	--	--	--	--	--
Tensile Modulus, Msi	13.5	13.2	13.2	12.9	12.1	10.9
Comp. Modulus, MSI	14.4	14.0	13.5	13.0	12.0	11.0
Elongation, %	1.8	2.0	>2.5	>2.5	>2.5	>2.5
K _{ic} , ksi √in	18.1	--	--	--	--	--
CTE, ppm/°F	9.4	9.4	9.4	9.4	9.4	9.4
K, W/m-K	91.6	92.9	97.4	101.8	106.3	110.7