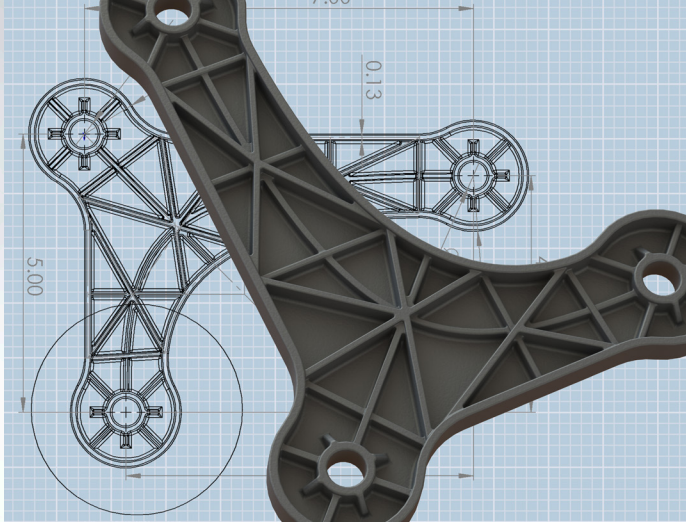

APPLICATION BULLETIN

Long Fiber Thermoplastics (LFT) for Brackets and Latches

Unlock opportunities for cost savings, lightweighting, & production efficiencies

Brackets and latches are traditionally made of cast aluminum or stamped steel. These metals are strong, durable, and familiar in applications across the consumer powersports, automotive aftermarket, aerospace, and heavy truck industries. However, metals also have known limitations that impact cost, processing, and design.

Long fiber thermoplastics (LFT) combine the structural integrity of metals with the lighter weight and cost-effectiveness of thermoplastic composites. As a result, designers are increasingly leveraging these benefits to advance innovation and product potential.

WHY LFT FOR BRACKETS & LATCHES

Reduced System Costs

- High volume production efficiency due to injection molding (shorter cycle times)
- Reduced secondary operations (no welding, surface treatments, etc.)

Weight Reduction

- LFT has lower density vs. metal, but still meets structural performance requirements
- Lightweighting helps meet sustainability goals related to lower fuel consumption and extended vehicle range

Design Flexibility

- Injection molding allows for complex geometries and part consolidation
- Advanced modeling and computer-aided engineering (CAE) tools for long fiber composites help validate and optimize part design

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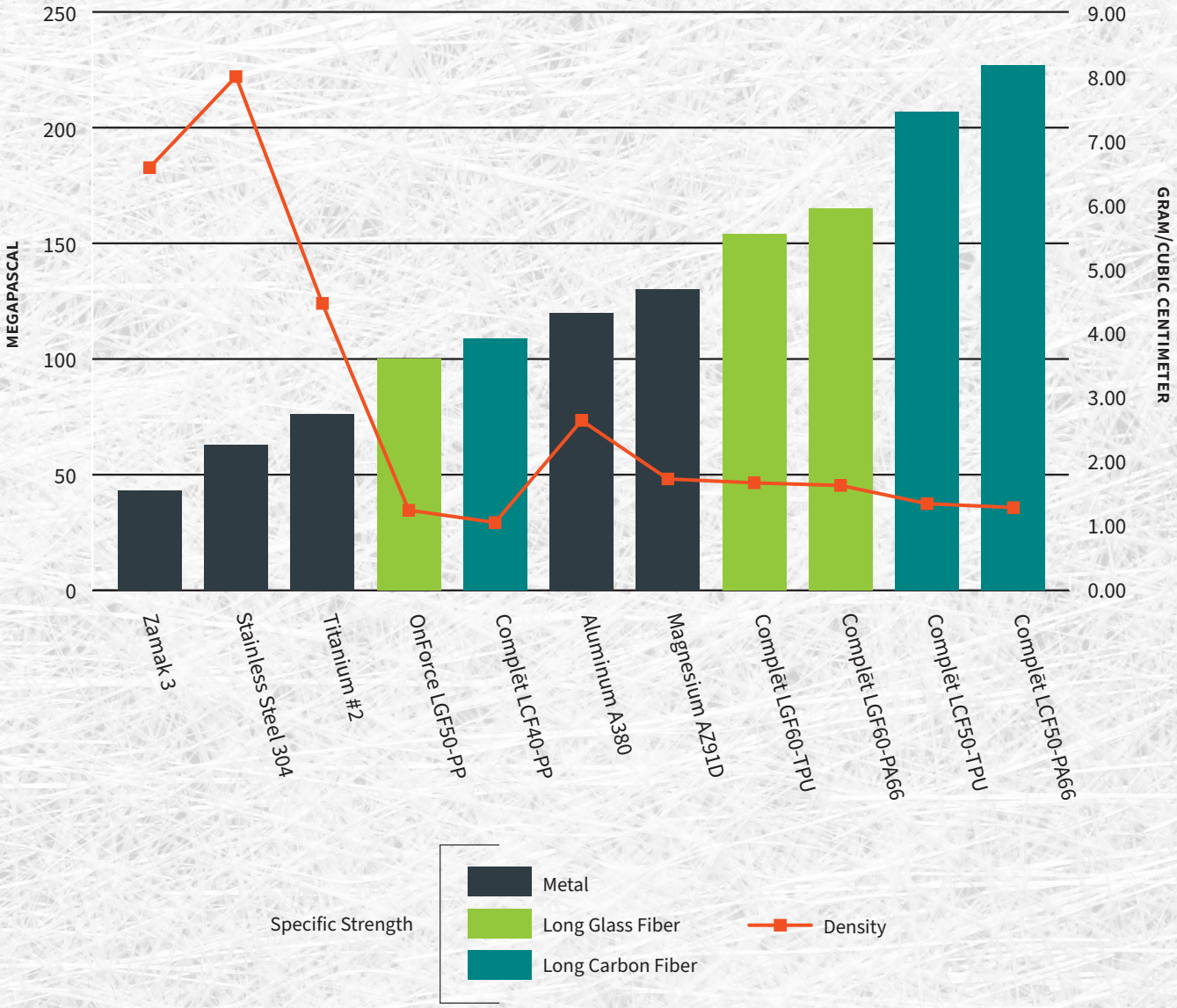
COMPARING PRODUCTION COST DRIVERS

	Cast Metal	Stamped Metal	Long Fiber Composite
Material typically used	Aluminum	Steel	Various base resins based on environmental conditions
PROCESS: Casting	X		
PROCESS: Stamping		X	
PROCESS: Injection Molding			X
POST-PROCESS: Machining	X		Not typically needed as LFT is a one-step process
POST-PROCESS: Drilling	X		
POST-PROCESS: Welding		X	
POST-PROCESS: Surface Treatments	X	X	

MATERIAL CHARACTERISTICS

Characteristic	Long Fiber Composite	Aluminum	Steel
PERFORMANCE: Specific Gravity (g/cc)	1.03–1.71	2.76	7.8–7.9
PERFORMANCE: Specific Strength (Strength-to-Weight ratio)	Excellent	Good	Poor
PERFORMANCE: Stiffness	Fair	Good	Excellent
PERFORMANCE: Toughness/Fatigue	Excellent	Fair	Fair
PERFORMANCE: Creep	Good	Excellent	Excellent
PERFORMANCE: Corrosion Resistance	Excellent	Good	Poor
PERFORMANCE: Temperature Range Performance	Good	Excellent	Excellent
PRODUCTION: Cycle Time	Excellent	Good	Poor
PRODUCTION: Design Freedom (i.e., complex geometry, part consolidation)	Excellent	Fair	Fair
PRODUCTION: Raw Material Cost	Poor	Good	Fair
PRODUCTION: Total Production Cost	Good	Fair	Fair

STRENGTH-TO-WEIGHT RATIO OF LFT VS METALS



Avient offers a range of customizable long fiber reinforced structural material solutions and design support for your metal-to-plastic conversion projects.

- Complēt™ long glass, long carbon, and hybrid fiber solutions available in a wide array of engineering polymer matrices, including PA66, PA6, ETPU, PPA, PPS, PES, PEI, PK, and PEEK
- OnForce™ long glass fiber reinforced polypropylenes
- Full suite of design and engineering services that include structural design and fiber orientation consultations and modeling, CAE analysis, prototyping, and more

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