

The Art And Science Of Thermoset Composites



Carbon Fiber Forged Wheels



ULTRIUM™
Carbon Fiber Composites



IDI Composites®
International

Ideas For Meaningful Results.

idicomposites.com

Carbon Fiber Forged Wheels

inquiry

In the world of high-performance automotive aftermarket wheels, strong and lightweight are vital to speed, acceleration, and decreased stopping time. They also contribute to greater fuel efficiency due to decreased overall vehicle weight. Additionally, consumers are drawn to sporty and complex designs, meaning wheels must maintain a high-grade appearance despite facing an extreme amount of wear and numerous road hazards.

Because of this, the wheels must be extremely durable, capable of supporting heavy loads, and have the ability to withstand corrosive elements. Due to consumer preferences, the chosen material must allow for complex geometric design options.



idea

Current trends have typically called for wheels to be made from a cast aluminum alloy. Looking to push beyond current trends however, Vision Composite Products set out to develop an all-composite wheel that would meet these demands and exceed the performance of aluminum wheels. This commitment led to an 8-year research and development project partnering with IDI Composites International to develop their Carbon Fiber Forged wheels using UltriumTM.

After defining the structural requirements, Vision collaborated with IDI Composites International and A&P Technology to develop a novel approach that would enable high volume production at costs competitive with forged and/or cast aluminum wheels. The approach combines IDI Composites International's discontinuous UltriumTM U660 Carbon Fiber Composite and A&P Technology's continuous Netshapes preforms in a composite forge molding process.

innovation

The resulting composite wheel from Vision is up to 30% lighter than forged aluminum wheels and boasts 40% weight savings compared to cast aluminum. Vision's Carbon Fiber Forged (CFF) wheels, using UltriumTM U660, passed SAE/DOT lifecycle testing by 3 to 5 times the standard requirements.

The process of combining IDI's UltriumTM Carbon Fiber Composite with A&P Technology's continuous preforms allows for better design flexibility when compared to metal wheels. The preforms can be tailored to transition between a range of thicknesses while the IDI UltriumTM carbon fiber composite yields a solid geometry that can carry bolted-joint loading without steel reinforcements.


The strength, durability, corrosion resistance, and design flexibility UltriumTM offers make this material an outstanding solution for a forward-thinking company like Vision Composite Products.

Extreme Testing Delivers High Performance Carbon Fiber Forged Wheels


- 8 years – timeline for design, engineering, development and testing
- Vision's Carbon Fiber Forged (CFF) wheels pass SAE/DOT lifecycle testing by 3 to 5 times the standard requirements.
- Track Testing and Performance:
 - Test track was 1.7 miles long with 12 turns
 - Car was aggressively driven over 100 mph in straightaways with hard cornering in the turns
 - Lug nut retention and wheel temperatures were monitored at each pit stop
 - Track test ended just shy of 48 hours due to a broken rear half shaft axle while the Vision Carbon Fiber Forged wheels performed perfectly with no damage.

Benefits

WEIGHT SAVINGS



Up to 40% lighter than cast aluminum



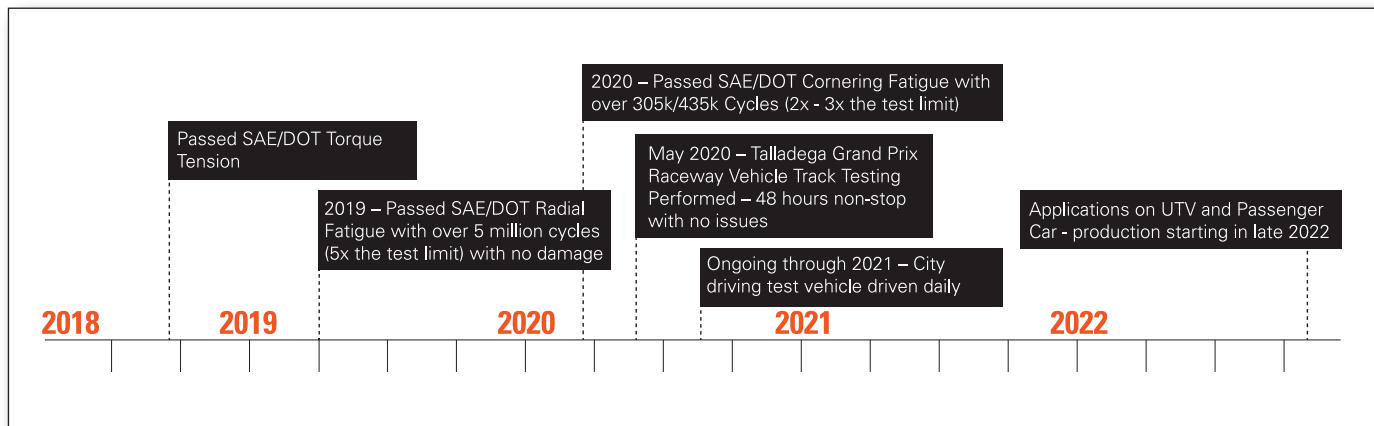
Up to 30% lighter than forged aluminum

DURABILITY

3x - 5x
Durability far exceeds industry requirements

Tested on a Ford 5.0L Coyote Mustang with Borla performance exhaust, Brembo brakes, and electronically tuned for high horsepower

Driving test covered 1,415 miles over 48 continuous hours of "Le Mans style" driving



- Ultra-high stiffness to weight ratio
- Carbon prepreg compatibility
- High strength to weight ratio
- For complex geometric applications requiring performance optimized high stiffness and low weight



Ultrium™ U660 developed for North America, other formulations available globally.

Series: ULTRIUM™
Product Description: CARBON FIBER SMC
 Ultra-performance moldable composites, offering low density, and outstanding strength and rigidity.

	Ultrium™ U550	Ultrium™ U660
Resin System	Fast Cure Epoxy	Fast Cure Epoxy
Reinforcement	Carbon Fiber	Carbon Fiber
Flexural Strength Test Method: ASTM D790	457 MPa	541 MPa
Flexural Modulus Test Method: ASTM D790	27 GPa	35 GPa
Tensile Strength Test Method: ASTM D638	229 MPa	280 MPa
Tensile Modulus Test Method: ASTM D638	43 GPa	50 GPa
Specific Gravity Test Method: ASTM D792	1.44	1.51
Reinforcement Content WT%	55%	60%
Reinforcement Length	25mm	25mm
T(g) Tan Delta	150°C	150°C

The information on this sheet is a guide. The stated values reflect an average of several tests conducted on Composites International's (CI's) goods. These values were obtained under ideal conditions and may not be replicated in any particular test, part, or application. Because the values achieved in actual parts depend considerably on part design, molding conditions, and testing methods, no guarantee is made or implied regarding values to be obtained in any specific test, part, or application. CI makes no warranty or representation as to the suitability of any of its goods for use in any application. CI relies on customer to conduct its own tests and judge for itself the suitability of CI's goods.

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GLOBAL SOLUTIONS**



idicomposites.com

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Noblesville, Indiana

Europe
Vineuil, France

United Kingdom
Oldbury, UK

Asia/Pacific
Shanghai, China

Caribbean
Aguirre, Puerto Rico

Mexico
Mexico City, Mexico