



## Racing to end-use Additive Manufacturing parts with Toyota Motorsport GmbH

The rush of speeding around the track is what drives all racing enthusiasts. Toyota Motorsport GmbH (TMG) is providing this feeling to the consumer racing community with their GT86 CS-V3 race car series.

The GT86 car is TMG's first entry into the consumer racing space, where they aim to provide a cost-effective and quality based entry into the high-adrenaline world of circuit racing. What is unique about this car compared to others in the V3 series is that it truly looks like a racing car with its aerodynamic shape and curves. It provides the speed and high performance of a race car, while feeling and looking like the real thing!

TMG is committed to the consumer racing community and runs their own TMG GT86 Cup series within the VLN competition at the Nürburgring in Germany, providing that authentic racing edge for participants. The VLN competition is a long distance race that can have up to 200 cars on the track at a time on this 20 kilometer (12.4 miles) circuit. The GT86 CS-V3 car is a proven class winner having won the V3 class of the Nürburgring 24 Hours four times in four attempts and has demonstrated impressive speed in the hands of private drivers in the VLN races. Also, it regularly breaks the 10-minute barrier and surprises more expensive rivals with its lap times. Over several seasons, the TMG GT86 Cup has grown into an enthusiastic community who can testify to the reliability and cost-effectiveness of the CS-V3.

"We are excited to provide the racing community with the cost-effective racing solution of the GT86 car and to sponsor a Cup competition," said Alastair Moffitt, Marketing and Communications Manager, Toyota Motorsport GmbH (TMG). "It is so much fun to watch! Enthusiasts love racing and they are proud to compete and achieve status in the Cup competition." The competition has expanded outside of Germany and the GT86 cars can be seen on racing circuits around the world. Abu Dhabi has even created their own event for the CS-V3 series called the TRD 86 Cup.

There are multiple parts on the GT86 car made from Additive Manufacturing. The layout of the car is very sleek and there is not an abundance of space, just like a true racing series car, which creates a packaging challenge. There are also very high demands on the car to achieve its performance, especially with cooling the brakes. Additive Manufacturing was the best solution to obtain the unique shapes of the required parts. In addition, TMG has produced around 30 of these cars so far, so Additive Manufacturing is a cost effective solution, as they can directly print the parts for use in place of machining a tool for this limited series production.

TMG chose to make these parts using stereolithography (SL) for its speed, high accuracy and choice of materials. TMG uses the stereolithography process extensively to quickly test design concepts including wind-tunnel testing for their TSo4o Hybrid car for the WEC racing circuit. For this project, Somos® NeXt was the best solution for its ability to create tough, durable and complex parts that have the ability to withstand high temperatures with excellent water resistance. In addition, the parts needed to look and feel like traditional plastic materials.

The stereolithography process allows multiple design variations to be built at the same time, reducing product development cycles. TMG first prototyped multiple parts for the car design and were able to perform functional testing on the parts prior to approving the final designs. After the parts passed extensive testing, end use parts were created to be used on the car. The parts that are made by this process with Somos® NeXt include a water reservoir (which fits in the engine), an air intake, an air intake cap and brake cooling ducts. These parts produced with Somos® NeXt have been on the GT86 race cars for over 3 years and have not needed to be replaced. They are not load bearing parts, however they are exposed to quite a bit of heat and vibration. Somos® NeXt is able to stand up to this aggressive environment with no issues. “We are able to deliver consumers of the GT86 race car high quality and cost-effective parts produced by Additive Manufacturing,” said Alastair Moffitt, Marketing and Communications Manager, Toyota Motorsport GmbH (TMG). “The first models of the GT86 cars have been on the racing circuit for three years with parts built in Somos® NeXt. We are seeing Additive Manufacturing move from prototyping and functional testing to being used to create end use parts, which is very exciting and opening more doors for design in motorsports!”

The GT86 combines that love of racing with the best in quality, while being cost effective in the V3 production-based racing class. TMG is using Additive Manufacturing to produce parts with high durability and accuracy to create unique shapes to fit their aerodynamic shaped car. By combining stereolithography and the durable Somos® NeXt, TMG was able to provide a winning solution to the consumer motorsports community.



SL printed water reservoir made from Somos® NeXt



SL printed brake cooling inlet made from Somos® NeXt

