



## On the fast track

**To win in the racing industry, you must cross the finish line first. When developing the engines needed to get there, timing is a critical element.**

Roush Yates, a well-known builder of racing engines, is no newcomer to this battle. These high performance engines require an extensive amount of development time and stringent testing to create the most powerful machines available. So how do they reduce their development time and costs while increasing their testing results? They use Additive Manufacturing technology to prototype engine components that they can then test for all aspects of form, fit and function.

Recently, Roush Yates decided to use this process to redesign an intake manifold. To cast this part in metal would take weeks to create the tooling alone and would cost about \$25,000.

In just days, they produced a prototype of a casting using stereolithography, a distinct technology within Additive Manufacturing, and Somos® stereolithography materials by DSM. They chose to use Somos® WaterShed XC 11122, since it provided the required performance properties: accuracy for form, strength of machinability for fit and superior clarity while testing the functionality.

To complete the job, the part was built with casting dimensions after the CAD (Computer-Aided Design) file was completed. This allowed Roush Yates to qualify the casting design and then machine the prototyped casting by milling surfaces, drilling, tapping, installing inserts, etc. Machining the prototype not only ensures the proper fit to the engine block, but

also provides the user with information about which tools and fixtures will be necessary for the CNC operation when machining the more expensive metal casting in the future.

The machined manifold was assembled to the engine and prepared for testing on a Dynamometer. The 'dyno-run' accelerated from 4,500 rpm to 9,000 rpm with over 700 Horsepower. While each 'dyno-run' lasts only a short time, the test may be repeated up to 100 times. The part, made from Somos® WaterShed XC 11122, proved to be durable through this rigorous testing while providing clarity for visual inspections. The clarity of the manifold gives the opportunity to see fuel build-up during testing, which can be corrected before final production.

Dan Keenan, Director of Product Development at Roush Yates Engines says, "We extensively use Somos® Materials in our SLA machine as an integral part of our design and development cycle. It allows us to verify fit and function faster than machining or casting prototypes. We can cut the design and development time of some products as much as 45%."

With their outstanding engineering staff and utilization of additive manufacturing using Somos® stereolithography materials by DSM, Roush Yates continues to be a recognized as an innovative leader in the racing community while "staying ahead of the curve."

