GoEngineer

CHALLENGE:
Develop high quality automotive performance products that can be elegantly designed around jam-packed OEM components while maximizing quality and reliability.

SOLUTION:
The SOLIDWORKS family of products and Stratasys 3D printing.

RESULTS:
Stratasys 3D printing capabilities save time and money, enabling the testing of both fit and function. SOLIDWORKS Simulation tools optimize component design and facilitate innovation.

INTEGRATED ENGINEERING LEVERAGES GOENGINEER SOLUTIONS TO SPEED PAST THE COMPETITION

House of Cars

David and Pete Blais, co-owners of Integrated Engineering, grew up in a house full of cars. Their dad raced on the Porsche, and other, racing circuits, so working on engines was commonplace in the Blais household. "We spent a good number of our teenage days tinkering with engines and turning wrenches," says David, who is now Integrated Engineering's director of sales and marketing.

Their hobby turned into a full-time business in 2007 after the Blais brothers graduated from college and founded Integrated Engineering. The company started out specializing in turbocharged engine builds for high-performance Volkswagens and Audis.

"Our most difficult task is often designing around OEM (original equipment manufacturer) components," says Pete Blais, chief of engineering. "Part fit is critical, because it saves our customers time, it saves us time on support calls, and it makes our customers happier." And happy customers come back for more.

Integrated Engineering quickly became well-known for the strength and reliability of its performance-oriented parts that could be installed with minimal alteration to a car. In the tight-knit world of Audi and Volkswagen enthusiasts, word about Integrated Engineering's high quality products spread quickly.

Today the company sets the standard for performance products in many areas, including connecting rods, camshafts, valvetrain components, and billet accessories. "Creating some of our new products would have been impossible without the tools we get from GoEngineer," says David Blais. "We also leverage their mentoring services for learning specific capabilities such as SOLIDWORKS Surface Modeling."

A Perfect Fit

GoEngineer is a local reseller in Salt Lake City that provides SOLIDWORKS, Stratasys 3D printing, and other best-in-class engineering and manufacturing solutions, including training and support services. David continues, "SOLIDWORKS Simulation software (FEA and Flow) opened the door to building new, highly engineered products, and 3D printing gave us the ability to ensure a perfect fit every time."

One of Integrated Engineering's most ambitious projects to date is an intercooler system. The component happens to be sandwiched between two OEM components: the AC condenser and the radiator. The new product had to have a higher volume than its OEM counterpart, which typically means building the biggest core possible.

"Throughout the project, we 3D printed several revisions because it was a VERY tight fit," says Pete Blais. "Once we got the general fit, then we considered optimization." Integrated Engineering always strives to create the highest-performing products possible, and this project was no different. The next step was setting up a complete computational fluid dynamics (CFD) study using SOLIDWORKS Flow.

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– DAVID BLAIS, Director of Sales and Marketing

The flow in this study represents heat that must be dissipated from an entry temperature of 300 -400 degrees on one side to an exit temperature of approximately 100 degrees on the other side. The CFD study revealed that the bottom third of the intercooler was receiving approximately 50 -60 percent of the flow for the entire component.

Based on the results of the CFD study, the Integrated Engineering team focused on building the internal components to spread the flow more evenly across the entire intercooler core.

Real Market Value

"We ended up calling it our flow distribution system (FDS)," says David Blais. "It's actually cast right into the inlet side end tank. We were able to essentially even out the flow distribution from top to bottom of the intercooler." What began as general optimization work became an entirely new and novel product feature, one that not only optimized the component, but also added real market value.

In addition to testing product fit, Integrated Engineering used 3D-printed parts to do power testing, allowing verification of CFD results in a real-world environment.

"We actually 3D printed another set of final end tanks—the aluminum castings on the end—before we had them cast. Plus we welded sleeves, if you will, onto the end of the heat exchanger component, and epoxied the plastic end caps," says Pete Blais.

"That allowed us to instrument the intercooler from top to bottom with thermocouples and actually validate the new design before we ever touched aluminum, before we ever paid a dollar for tooling, or before we ever made a casting—it was very cool! If all of the prototypes had to be created using traditional methods, the time and cost would have been astronomical," concludes Pete Blais.

Highly engineered parts continue to be in demand. Many of the products Integrated Engineering now makes could not be produced if weren't for GoEngineer's design and manufacturing technology tools. "Integrated Engineering's commitment is to produce the highest quality performance products available on the market today," says David Blais. "And GoEngineer's tools will help us make that happen today and into the future."

Cast intake manifold with billet velocity stack cover plate. The SOLIDWORKS Flow tested velocity stacks deliver increased airflow for optimum performance.

Chassis dynamometer used for testing horse power, torque, and other variables. Stratasys 3D prototypes enable validation of performance gains before going to production.

FDS Intercooler with 3D printed end tanks for live testing with thermocouples. (The right side of the tank is strengthened for extreme temperatures.)

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GoEngineer is a provider of powerful product design and engineering tools including support and training for SOLIDWORKS, Stratasys, CAMWorks, Altium, and PLM with over 30 years of customer experience in high tech, medical, machine design, energy, and other industries.

Integrated Engineering Integrated Engineering is dedicated to providing high quality automotive performance products without compromising quality or reliability.

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