GoEngineer

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

SOLUTION:
Stratasys 3D Printing and Creaform 3D Scanning

RESULTS:
Stratasys 3D printing capabilities save time and money, and enable the testing of both fit and function before committing to metal.

A PERFECT FIT: INTEGRATED ENGINEERING AND GOENGINEER'S 3D PRINTER AND SCANNER SOLUTIONS

Setting the Standard

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-orientated 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 turbo kits. "Creating some of our new products would have been impossible without the tools we get from GoEngineer," says David Blais.

Technology Matters

GoEngineer is a local reseller in Salt Lake City that provides Stratasys 3D printing and other best-in-class engineering and manufacturing solutions, including Creaform's 3D scanning tools. Integrated Engineering uses Creaform's HandySCAN 3D, which can handle even the most complicated measurement environments including production shop floors and hard-to-reach places such as engine bays.

"Scanning is a great tool for discovering negative points in an engine bay," says David Blais. "It really allows us to design in a pocket, which is huge for us, since design space is at a premium within the tight confines of an engine compartment."

Integrated Engineering's Stratasys 3D printer played a significant role in their recent development of the 2.0T FSI/TSI/TFSI intake manifold. "At the earliest stages of development, 3D printing is used to verify proper fit, which is hugely important to us," says Pete Blais. "A lot of our design headaches involve designing around the

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>
> *– PETE BLAIS, Chief of Engineering*

existing hardware in the engine bay. We can make sure everything clears the manifold with 3D printing."

Once these issues are resolved the Integrated Engineering team optimizes the part, and 3D printing comes into play again to quantify the results from the computer. Pete Blais continues: "Because the intake manifold is on the cold side of the engine, we can run the part on our dynamometer up to five minutes with the ABS material. We get real-world data from these tests that help us to improve the design."

Validation Saves Money

Each component of the intake manifold can also be easily iterated with 3D printing. "We may start out printing the manifold runner long and then cut out a half inch at a time, re-glue it back together, and recheck performance on the engine dyno," says David Blais. "That way, we can test half dozen different runner lengths." Printing a full manifold takes about a week. This is extremely fast when compared with the metal part, which can take many months to produce for small, aftermarket companies.

"By implementing and leveraging 3D printing as part of our process, we can actually validate new designs before going to metal, before paying a single dollar for tooling, and before producing castings," says Pete Blais. "We can have a high level of confidence, because we know our manifold performed before we did anything permanent in metal. If all our prototypes had to be created using traditional methods, the time needed and cost overruns would be astronomical," concludes Pete Blais.

Highly engineered parts continue to be in demand. Many of the products Integrated Engineering now makes could not be produced without the comprehensive engineering and manufacturing solutions GoEngineer provides. "Integrated Engineering's commitment is to produce the highest quality performance products available on the market today," says David Blais. "And GoEngineer's tools and support services will help us make that a reality today and into the future."

Cast Volkswagen 2.0T intake manifold with CNC machined and anodized velocity stack cover plate. 3D printing of this intake manifold during the design/build/test phase allows part fit and performance optimization.

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

Creaform's 3D scanning solutions helps Integrated Engineering quickly find negative space to maximize product designs within the tightly confined area of an engine bay.