Rubber-Like Prototypes

3D PRINTING ENSURES CUSTOM RUBBER MASKING MOLDS HAVE PROPER FORM AND FIT

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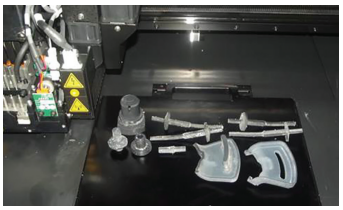
– Chad Cushman, EPSI

CASE STUDY



Prototypes printed by EPSI on its Connex 3D Printer

Many components in the automotive, off-highway equipment and defense industries such as agricultural and military vehicle chassis and underbodies, household appliances, electrical housings, and manufacturing and mining equipment are coated for protection against corrosion and other environmental hazards. Irregularly shaped features like threaded studs and weld nuts must also be covered and sealed – or "masked" – during the coating process to maintain accurate fit and function, which can prove difficult.

Wisconsin-based Engineered Products and Services, Inc. (EPSI) is a leader in designing and manufacturing masking solutions, and produces custom rubber masks molded to fit any geometry that must be covered during coating. Unlike traditional methods like taping, which can take considerable time and effort, EPSI's custom rubber masks can protect complex geometries without the risk of damaging the part or contaminating the coating solution.

Time-consuming traditional manufacturing

The rubber masks are compression molded from expensive metal production tools in a process that takes about six weeks. Before moving into production, EPSI must demonstrate to the customer's satisfaction that the rubber mask will completely cover the feature and fit tightly to avoid leakage.

In the past, the only way to make these pre-production samples was to build a production tool to mold them. When the customer approved the samples, it took about five more weeks to go into production, resulting in a total delivery lead time of 11 weeks. If the customer made changes to the samples, costly changes had to be made to the mold.

"For a long time I thought 3D printing would not work for us because conventional 3D printers can only produce rigid parts," said Chad Cushman, engineering manager for EPSI. "But when I saw the Stratasys Connex™ 3D Printer, I was very impressed with its ability to produce rubber-like parts in a wide range of durometers."

Rubber-like digital materials increase custom mask sales

EPSI now 3D prints a prototype as soon as the mask is designed. The company typically uses a digital material consisting of a mixture of VeroBlackPlus™ and TangoBlackPlus™ materials. Now customers receive a 3D printed sample to check form and fit. When the customer approves the sample, EPSI builds the mold and proceeds to production in parallel, making it possible to reach production in only six weeks, a reduction of 45%.

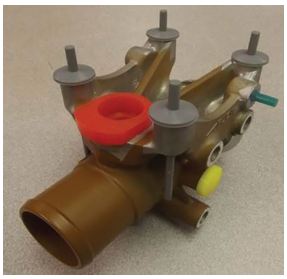
"While we originally purchased the 3D printer to reduce delivery time, we later discovered an even greater benefit," Cushman said. "Many of our customers are on the fence about whether to use a custom molded part. It turned out that our ability to provide a printed sample soon after the customer inquired showed many of these customers how much time they could save by using a rubber mask."

Cushman said that EPSI increased its closing percentage on custom masks from 40% to 60%, which in turn helped increase sales of custom masks by 12%, providing a 336% ROI in the printer in one year. The company also saved by eliminating costly tool modifications and rebuilds, and also some pre-production costs like shipping and handling of samples.

"With this technology, we can create a prototype of a custom rubber solution in days rather than the weeks that production samples can take," said Cushman. "Being able to conduct form and fit tests fast gives us the confidence to proceed directly to production, cutting lead times by weeks."

METHOD	TIME
Making samples with production tools	11 weeks
3D printing samples	6 weeks
Savings	5 weeks **(45%)**

Customers can perform fit and functional testing using 3D printed prototypes, seen here attached to a steel part.



After the 3D printed design is verified, final masks can be production molded.

3D printed prototypes attached to a steel part for verification

Production molded parts attached to a steel part

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