Cool Customer

REDDOT SOLVES CLIENTS' DESIGN PROBLEMS WITH ONSITE FUNCTIONAL PROTOTYPING

"We are nearly certain to get the design right the first time so we can keep customers happy."

– Gary Hansen, RedDOT

CASE STUDY

This FDM fan blade prototype, provided to a customer for evaluation, was built with ULTEM™ 9085 because its high temperature performance enabled functional testing.

RedDot designs and builds mobile heating, ventilation and air conditioning (HVAC) systems and components for on- and off-highway vehicles including commercial trucks and vehicles used in construction, agriculture, military and other demanding applications.

RedDOT typically creates a custom design for each vehicle in which its HVAC systems are used. These systems often include injection moldings, which are expensive to produce in low volumes, often running into the hundreds of thousands of dollars per project. This makes it critical to get the design perfect before committing to tooling.

In the past, the company ordered stereolithography apparatus (SLA) and selective laser sintering (SLS) parts from an out-ofstate service. The long leadtimes slowed the product-development process. And these prototypes were not rugged enough to use for physical testing.

Steve Kidd, president of CIMtech Inc., a Stratasys reseller, suggested that a Fortus Fused Deposition Modeling (FDM®) machine could solve both of these problems by providing the internal capability to build rapid prototypes with nearly the same properties as production parts.

“We offered to build a prototype at no cost so they could easily see the value,” Kidd said. “They were amazed that the part was robust enough for physical testing. RedDOT purchased a Fortus 400mc 3D Production System because its 14 inch by 16 inch envelope enables the company to make their largest parts in two pieces.”

To illustrate the advantages of FDM, Gary Hansen, vice president and chief technology officer for RedDOT, offers the example of a customer who provided the geometry of a housing with three components that needed to mate with a rubber bulb seal. RedDOT made a rapid prototype using the customer’s dimensions and it did not seal properly.

Building a single variation of all three components of the housing would have cost $3,000 from an SLS service bureau or taken 120 hours and $1,000 in material to produce with FDM. So the company made a much smaller prototype with four variations of depths and widths for the groove that controls the compression to mate with the seal. The FDM prototype of the four variations took only 2.5 hours and $10 of material. The Fortus system has reduced the cost of building the complete three-component housing by $2,000 and the leadtime by 3 weeks compared with using a service bureau.

“The Stratasys solution of being able to make production-grade components one-off enables us to deliver functional prototypes to customers at a much faster speed,” Hansen concluded. “FDM prototypes are more useful than the SLA and SLS prototypes because they can be used for physical testing and even given to customers as components on valuation units. This means that we are nearly certain to get the design right the first time so we can keep customers happy and start generating revenues sooner.”

This FDM part (top and side view) allows testing of four variations of a groove that mates with a rubber seal. The finished HVAC system housing (below) features three FDM parts.

How does FDM compare with traditional tooling for a complex, 3-component, HVAC system housing?

METHOD	COST	LEAD TIME	WITHSTANDING PHYSICAL TESTING?
SLA	$3,000	4 weeks	No
SLS	$3,000	4 weeks	No
Cast urethane	$7,000	6 weeks	Yes
FDM	$2,060	1 week	Yes
Savings (FDM vs. SLA)	$940 (31%)	3 weeks (75%)	

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HEADQUARTERS

7665 Commerce Way,
Eden Prairie, MN 55344
+1 800 801 6491 (US Toll Free)
+1 952 937-3000 (Intl)
+1 952 937-0070 (Fax)

1 Holtzman St., Science Park,
PO Box 2496
Rehovot 76124, Israel
+972 74 745 4000
+972 74 745 5000 (Fax)

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