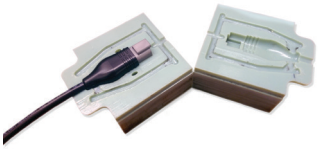
Durable Prototyping

3D PRINTING BUILDS TOUGH INJECTION MOLDS FAST

“We recently received an order for several million dollars that we would not have even been able to bid on previously because the timeline was so tight.”

– Florinel Ciubotaru / Turck

CASE STUDY



This Digital ABS injection mold is used to produce overmolded electrical cable prototypes.

Turck, internationally recognized for its process automation applications, is a leader in connectivity, sensor and industrial control solutions for factory and off-road equipment.

Many of the company’s products, such as junction boxes, cordsets and splitters, are created using injection molding. This process places components like cables and conductors in a steel injection mold, and then molten plastic is poured into the mold to create a single part. The overmolding process eliminates the need to assemble connectors, improves the integrity of the connections, and protects the connectors from elements like moisture, dust, and excessive wear and tear.

Quicker Customization

Turck offers about 900 overmolded products in its catalog and frequently designs overmolded parts for custom applications. But before the company can start producing an overmolded part, prototypes are required to evaluate the product's form and fit. The prototypes ensure all critical areas are covered by plastic, and all accessible connections are free of plastic.

To create a prototype for evaluation, an injection mold must be built. Steel molds take about 10 weeks to build. On average, two iterations are required during the design evaluation, and modifying a steel tool takes about a month at a cost of $5,000. Using this approach, it took Turck about six months to produce a custom product, which sometimes caused the company to lose orders when the client needed the product more quickly.

To save time and avoid losing potential clients with custom product requests, Turck looked to 3D printing.

"The challenge was finding a 3D printing technology strong enough to hold up to short injection molding runs," said Florinel Ciubotaru, Turck senior project manager.

PolyJet™ technology and Digital ABS™ material from Stratasys met Turck's challenge.

"Digital ABS provides high-temperature resistance, toughness and rigidity, which are just what we needed in this application," Ciubotaru said.

Digital ABS can simulate a range of durable production plastics, creating realistic, precise tools and prototypes that are tough and heat resistant. Using Digital ABS, Turck produces prototypes for overmolded products just a few days after completing the design, cutting the time to market to four months instead of six. The cost of 3D printing the mold is about $1,500, considerably less than the cost of modifying a steel tool, and the mold can produce between 20 and 100 parts.

The ability to produce prototypes quickly has helped the company get many orders that it would not have received in the past.

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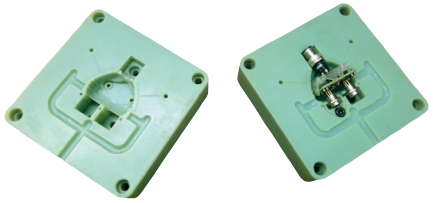
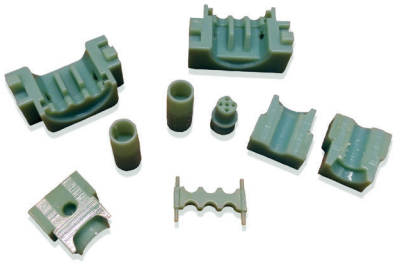
More Options Bring More Opportunities

Now Turck can try more design concepts than before thanks to the less expensive 3D printed molds. With more design freedom, Turck can respond to customer requests for variants of existing overmolded products. Often these product modifications have the same external dimensions, but different internal configurations, such as a bigger connector or cable. In the past, this required building new internal steel components such as pins and bushings for the mold, which was an expensive tooling investment.



This Digital ABS injection mold is used to produce overmolded junction box prototypes.



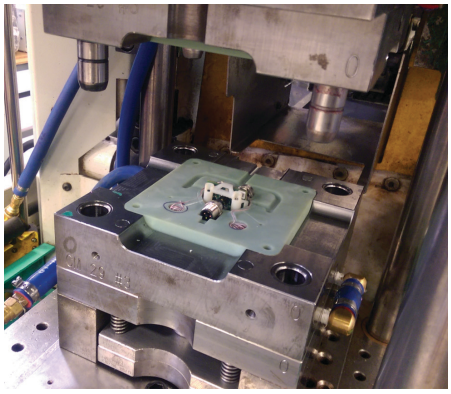
Digital ABS internal mold components can be used to produce prototypes or low-volume production parts.

Complex component molded in a 3D printed mold

But with Digital ABS, Turck can build modified internal parts for high- or low-volume orders. If the part volume is high, prototype components are 3D printed and the final components are made from steel. If the volume is low, Turck uses the plastic mold components to make production parts.

The versatility and reliability of 3D printing with Digital ABS have opened the door to many more opportunities for Turck. From building prototypes quickly to gaining more design freedom, Turck can handle every custom order with agile expertise.

	TIME TO FIRST PROTOTYPES	TIME TO MARKET	COST OF TOOLING ASSUMING 3 ITERATIONS
Build prototypes and production parts with steel mold	2.5 months	6 months	$30,000
Build prototypes with plastic mold and production parts with steel mold	2 days	4 months	$23,000
Savings	2.5 months 97%	2 months 33%	$7,000 23%



3D printed mold in the press

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