



**Diversified
Plastics, Inc.**

Small Company Values – Big Company Ideas

CASE STUDY

3D PRINTED MOLD COMPONENTS

Saving Development Time and Money

Development costs and time are critical considerations for today's manufacturers when developing prototype parts. Accurately evaluating the geometry, design, performance and feel of plastic injection molded parts is necessary before creating final production molds. Typically, prototype plastic parts are created using molds made of soft steel, which not only ensure the manufacturability and dimensional accuracy of the plastic parts, but are used to evaluate the product's final material. However, creating a soft steel mold takes time and is expensive.

CHALLENGE

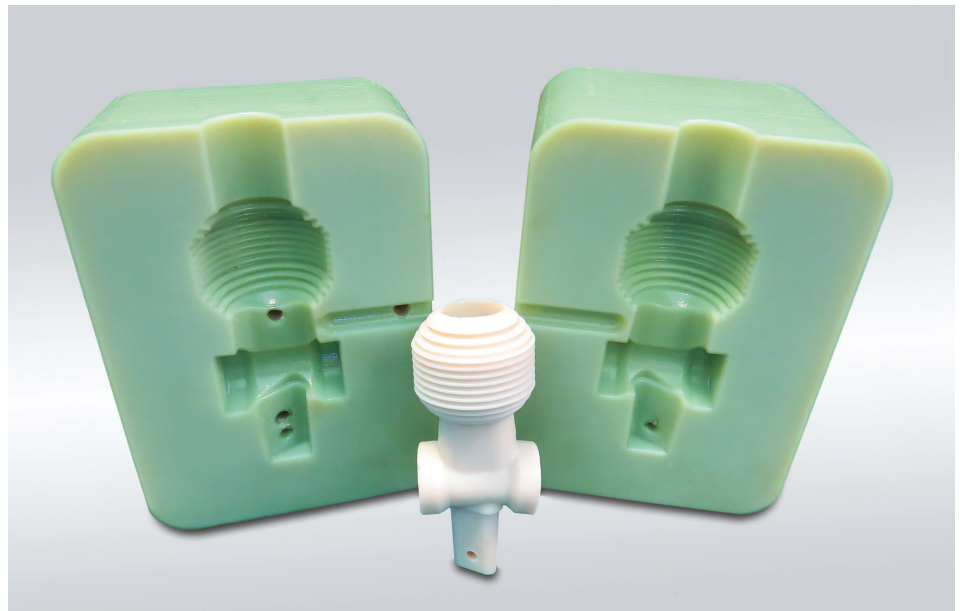
Coloplast, a global medical device company, needed sample parts produced in a thermoplastic elastomer (TPE) to test the 'feel' of their new urology device. They were also uncertain about the durometer it required because the product would be squeezed repeatedly by the end user and the material's proper compression resistance was an important factor.



Coloplast approached Diversified Plastics, Inc. to produce sample TPE parts using a prototype mold, so they would have the opportunity to analyze the durometer and wall thickness before proceeding to production.



Prototype part.



Prototype part with 3D printed mold components.

SOLUTION

The Coloplast prototype mold would have normally been built in soft steel, but Diversified Plastics recommended producing the mold using a new, cost-effective 3D additive manufacturing process. Diversified Plastics had recently acquired a Stratasys Objet Polyjet printer that was capable of producing a highly accurate injection mold for creating prototype parts. The idea of printing the mold components was of great interest to the Coloplast R&D engineer.

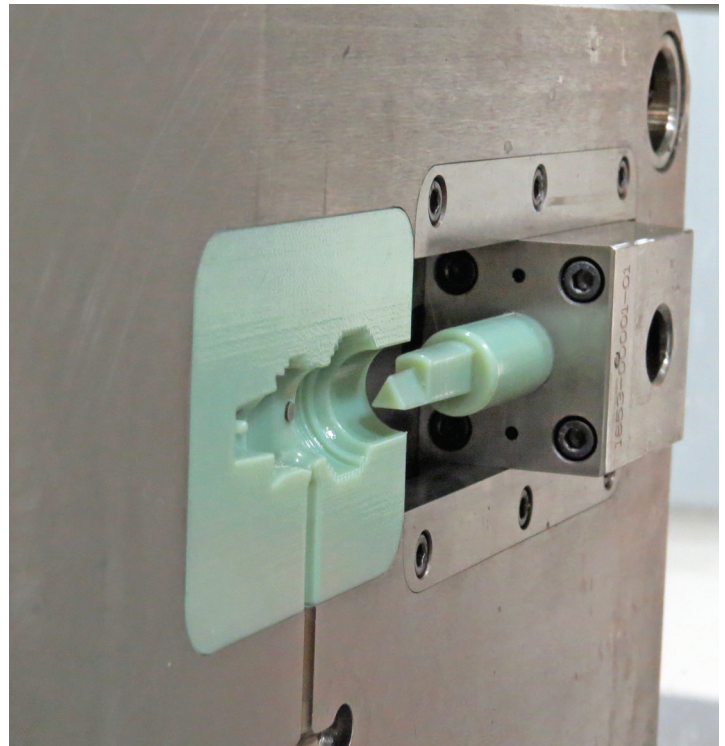
3D printed plastic molds are not designed the same as steel molds. Injection gates need to be twice as large for effective molten plastic flow and more draft is required to allow for easier part ejection from the mold. After Coloplast's tool design file was downloaded into the Polyjet 3D printer, it took approximately 11 hours to build both halves of the mold and center core. The tooling department then inserted the printed mold components into an existing mold base. The components could have just been bolted onto the injection machine's mold plates, but a base that was used for a similar part was already available. Using this existing base not only saved time, but reduced the overall cost because the ejector system was already in place.

OUTCOME

Diversified Plastics presented Coloplast with a few parts molded in the actual final thermoplastic materials. After evaluating the prototype Coloplast determined the 'feel' of the parts was too soft to meet their requirements. However, with this test data they realized what needed to be done to create acceptable parts for their new urology device trainer. Coloplast decided to revise the product design to thicken the wall sections, so the part would be slightly stiffer. It was also decided that a second prototype mold for further testing was not necessary before creating the final production mold. The whole process, from initial conversations with Coloplast, through mold production, to final product prototype, took just five business days.

SUCCESS

The project was a great success and Coloplast was thrilled with the final results they received by using 3D printing from Diversified Plastics. Since TPE is so flexible it was impossible to machine a prototype, and building a soft



3D-printed mold components in a mold base.

steel mold that may not have met their requirements, would have been expensive. Using a mold made with 3D additive manufacturing technology to determine if a design was going to meet product requirements saved thousands of dollars and weeks of time.

TOOL TYPES	COST	TIME
P20 Soft Steel Tool	\$13,000	5 Weeks
3D PolyJet Mold	\$ 1,500	1 Week
Savings	\$11,500 88%	4 Weeks 80%

Employee-owned Diversified Plastics is a custom injection molder of high-precision, close tolerance, small- to medium-sized injection molded components for medical device, filtration, aerospace and a variety of other industrial markets. A full-service contract manufacturer since 1977, the company offers a wide variety of services from design assistance and mold construction, to intricate molding and clean room assembly.



ISO 9001:2008
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