



MIDWEST PROTOTYPING

AS9100 D | ISO 9001:2015 | ITAR Registered



CASE STUDY

Rapid LSR Molding with Somos® PerFORM

When the COVID-19 pandemic hit, many industries quickly and painfully learned how fragile their supply chains could be and how much disruption could affect speed to market. Companies in research, biomedical, and healthcare were suddenly tasked with developing solutions to help protect doctors, nurses, and first responders, while still allowing them to operate effectively in environments that required close contact with patients and co-workers.

With most global supply lines immediately interrupted and more extensive production processes unable to pivot quickly to meet demand, domestic additive manufacturing (AM) reacted swiftly with innovative and elegant solutions.



Midwest Prototyping in Blue Mounds, Wisconsin, has long been a leader in commercializing 3D printing/AM innovations. As a “customer-first” digital manufacturing center, its focus has always been on exceeding customer expectations and collaborating with clients, material suppliers, and technology partners to build lasting solutions. In that regard, when approached by a medical device company with a list of objectives and a short time frame, the Midwest Team jumped into action.

Given the volume and timeline requirements, it was initially assumed that Midwest Prototyping’s substantial urethane casting operation, which often provides a “bridge” between prototyping and low volume projects to larger-scale injection molding, would be the solution. Urethane casting can often meet client demands without having to invest in expensive molds or high-volume processes. In this regard, the urethane team most often uses stereolithography to produce highly detailed master parts as a pattern to create an inexpensive silicone mold for casting multiple copies. In this instance, the client asked for the final parts in silicone rubber, which eliminated the possibility of using a silicone rubber mold. The compressed timeline also didn’t allow for a CNC aluminum mold to be produced. The decision was made to go directly to production by 3D printing the mold. While using 3D printed molds is not novel, using them to produce silicone rubber parts, a process that requires high-temperature curing was new for Midwest, and several key lessons were learned along the way.



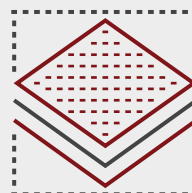
From the beginning, Somos® PerFORM from DSM ([link](#)) was chosen for the mold. Its excellent high-heat tolerance, outstanding detail resolution, and stiffness are ideal for various applications, including tooling, wind tunnel testing, high-temperature applications, and electrical. In discussions with the DSM technical reps, Midwest was able to work through some of the concerns early in the process and modify its approach when faced with roadblocks.

Despite breaking a few molds in the beginning, we learned a few things:



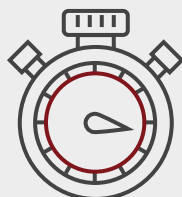
Thicker is better

Several molds were made, each progressively thicker. It needed to be strong enough to handle the heat of the oven and the pressure of the curing silicone.



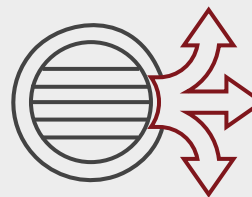
Support the mold

Steel backing plates were ultimately used to hold the mold together after the pressure of curing tore apart a mold secured with just bolts and washers.



Go easy

It was quickly learned to heat up and cool down the mold slowly and handle the mold more gently than a machined mold for best results.



Vent it

More vents were needed than typical. LSR is very thick and was injected under higher pressure than typical urethane casting materials.



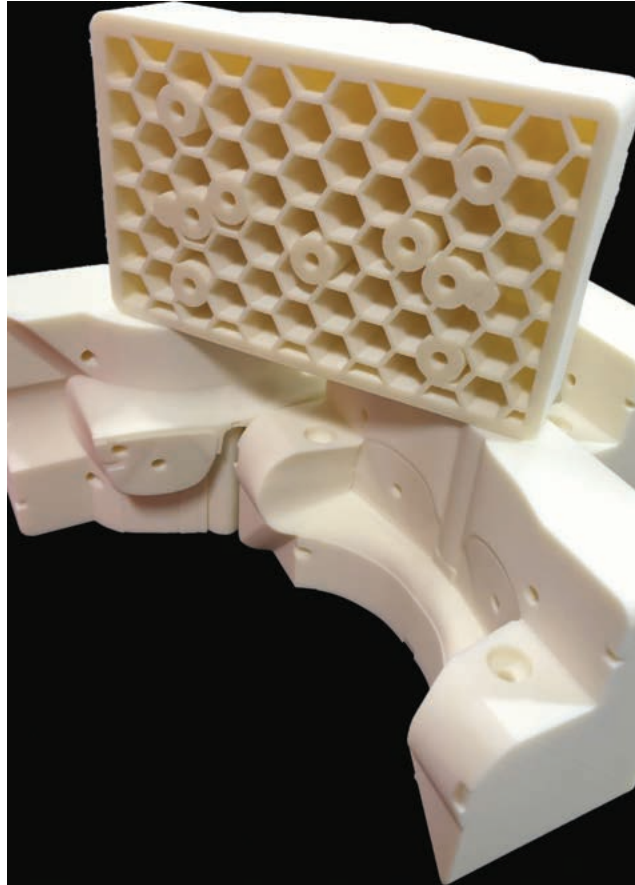
If it isn't broken, then don't fix it

Advice to switch from the standard Mann 200 mold release to Dawn Ultra Dish Detergent as a better option for LSR should be ignored. Several rounds of poorly cured parts led to the conclusion that Mann 200 was still the right choice.

Overall, the experience left Midwest confident that it could produce low-volume parts in LSR using 3D printed Somos® PerFORM molds. In fact, another customer LSR project was immediately started after finishing this one with the advantage of the knowledge gained from this project.

Midwest Prototyping's mission is to connect great ideas with innovative technologies. Continual improvement, a drive to exceed customer expectations, and being able to provide high-quality parts with quick turnarounds are all part of "The Midwest Way."

What problems are vexing you and your team? Can we help with material and technology solutions? Give us a call at (608)437-1400 or send us an email at solutions@midwestproto.com. We look forward to helping get your **ideas made**.



*Somos® PerFORM from DSM



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