



LSR/LIM Molding: A Unique Niche

One moldmaker's decision to venture into liquid silicone rubber/liquid injection molding makes it one of the few shops that can provide molds for liquid silicone.

In order to weather the storm of current economic difficulties, many of today's mold manufacturers are seeking out new business opportunities to diversify—and thus remain in business—whether it be focusing on a new niche, offering a value-added service, exploring a new industry, finding a new custom base or joining a collaborative effort. LSR Engineering (Lancaster, MA)—a division of Built Rite Tool & Die, Inc.—is one such mold manufacturer. Recently the company decided to foray into the world of LSR molding (liquid silicone rubber/LIM (liquid injection molding) to join the very few in this country that can create flashless, automatic running molds for liquid silicone.

Why Diversify?

According to Craig A. Bovaird, President of Built Rite and all of its divisions (LSR Engineering and Reliance Engineering), the company's plan for growth has always been aggressive, with a focus on "niche opportunities available from diverse market segments." The company began to seriously look at the LIM process two years ago. "We really did our homework," Bovaird recalls. "We felt that it was a good fit as the process is the reverse of injection molding, hot mold, 350-380°F and cold material. This fit well with our existing skill set and it required precise moldmaking capability. That is where our parent company Built Rite came in. We are very strong in mold design and we have invested heavily in the latest machining technology. In the last two years our investment in the mold shop has exceeded \$1,000,000. This investment includes two new Sodick sinker EDMs and a Sodick Wire EDM—together with a new Hurco milling center and several other pieces of support equipment."

The fact that moldmaking and custom molding of LSR takes place under one roof separates LSR Engineering from its competition, Roger Ikonen, Project Manager, notes. "We have invested in all-electric Engel, LIM injection molding machines," Ikonen says. "The machines and support equipment are all new and state-of-the-art. Our pumping units are made by Fluid Automation. We have doubled our molding



This 32-position toolchanger allows long, uninterrupted EDM operation.

Company Profile

Founded in 1984, Built Rite Tool & Die, Inc. (Lancaster, MA) has evolved to be a leader in the manufacturing of precision molds for the liquid injection molding of LSR, liquid silicone rubber, injection molding of thermoplastics and thermosets and compression and transfer molding of thermoset plastic materials. They have been fortunate enough to experience rapid growth in the past nine years. According to President Craig Bovaird, Built Rite is the corporate parent and driving force behind Reliance Engineering and the LSR Engineering Divisions. "We are really designed as a niche company with moldmaking expertise as our foundation and driving force," Bovaird notes. "Built Rite is the engine that drives our molding divisions Reliance Engineering and LSR Engineering."

Reliance Engineering was formed in 1999 as a specialized custom molder of thermoplastic and thermoset plastic materials that focuses on demanding applications that require high temperature plastic materials and very close tolerance molding.

Formed in 2008, LSR Engineering is a specialized custom molder of liquid silicone rubber (LSR). LSR works closely with Built Rite Tool & Die to produce precision molds for applications requiring high cavitation, insert molding/overmolding of plastic and metal parts and low cavitation/prototype parts.

Bovaird notes that the company has grown from eight to 55 employees in the past nine years, between the three divisions. "In that time span, we have completely retooled the company under a business plan focused on a national and international customer base, financial discipline, investment in technology and attracting top notch, skilled employees," he states.



Two brand new Sodick EDMs helped LSR Engineering add LSR molding (liquid silicone rubber/ LIM (liquid injection molding) capabilities to create flashless, automatic running molds for liquid silicone.

facilities square footage to 20,000 square feet. The LSR Division occupies 3,000 square feet of this space. This is first-class space and fully equipped to service our target customer base of medical, defense and aerospace.”

Diving In

LIM of LSR requires a very different way of thinking about the mold, Ikonen notes. “To successfully mold LSR, the most important factor is the mold,” he states. “All design elements must be accounted for at the development stage to ensure success, part design, mold design, material and machine. LSR is a thermoset elastomer and presents unique processing challenges. Due to the material’s low viscosity, it will fill a .0002 opening in steel and flash. As a result, the mold shutoffs have to be better than .0002. Rigid construction is critical together with precise temperature control to prevent flash.

“For these reasons molds require very tight tolerances,” Ikonen continues. “High processing temperatures require an understanding of the



Two Sodick Ram EDMs and one Sodick Wire EDM are amongst the more than \$1 million LSR Engineering has invested in equipment upgrades.

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interaction between the many mold components in a typical mold and their combined influence on holding tight tolerances. The tolerance requirement does not only apply to the cores and cavities but to the entire system.”

Other critical factors of LSR molds are vacuumization, ejection and venting. “All of our molds have a vacuum seal as an integral design element,” Ikonen states. “Evacuation of air and gas from the cavity is critical to successful LSR molding. Due to the flow characteristics of LSR, conventional ejection is not recommended. Mold designers must consider part removal as a key design element. This can be achieved mechanically—with EOAT—[Ed. Note see *MoldMaking Technology* February 2009 for more on EOAT] or pneumatically. Each part is different and requires analysis in the design phase to ensure a successful outcome. We use cold runner systems for high cavitation molds and we also use conventional runner systems.”

Partnering with Molders

While the company’s primary focus is with OEMs, Ikonen believes the LSR tooling capability will open up many opportunities with custom molders of LSR. “We have found through our experiences at Reliance Engineering that custom molders do not see us as competitors, but as partners that can offer them a high level of tooling expertise—based on the fact that we also are processors. We also operate under a strict code of ethics that recognizes that customers are sacred and therefore if we are building a mold for a tooling customer, *their* customer is off-limits.

“Initially our research indicated that the Austrians and Germans are the leaders in LSR tooling and that there are only a handful of companies in the U.S. that make LSR molds,” Ikonen continues. “We have recently completed a 16-cavity cold runner mold for a very close tolerance part. This mold was evaluated by several experienced processors and molding machine technicians; and they indicated that the mold and the parts it produced were world class and equal or better than anything they had worked with. We were very pleased with this feedback and plan a long and successful future in moldmaking for LSR and LIM molding.”

MMT



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