LIQUID SILICONE RUBBER: EMERGING TRENDS IN MEDICAL

As demand for home health and disposable devices grows, the demand for liquid silicone rubber (LSR) use in these products will also increase. Plastic injection molding companies migrating into the LSR arena see high profit margin potential – yet are faced with technical challenges relative to machinery, processing capabilities and skills gap.
The Changing Landscape of LSR

In the medical market, liquid silicone rubber (LSR) is a high purity platinum-cure silicone that has become a favored material due to its biocompatibility, clarity, chemical and bacteria resistance, excellent part quality and resistance to high temperatures.

Current trends in the medical industry include using LSR in the production of medical equipment parts that require high precision such as seals, sealing membranes, electric connectors, multi-pin connectors, infant products where smooth services are desired, such as bottle nipples, and multiple medical applications. The medical industry is attracted to LSR for a number of reasons including:

- It can be molded without ever being touched by human hands.
- The majority of the material used can be implanted in the body with very minimal rejection or incompatibility.

The result has been pressure for companies to hold the line on costs in an increasingly competitive market.

According to Stritzke, there are many similarities between LSR and plastic injection molding and those similarities can drive competition into the market.

"The landscape of the LSR market has changed significantly over the last 10-15 years." – Bernie Stritzke, executive general manager, Qure Medical

Companies serving the medical end market are offering similar injection molding options for LSR and plastic injection molding.

Processing LSR

Due to the thermosetting nature of the material, LSR injection molding requires special treatment, such as intensive distributive mixing, while maintaining the material at a low temperature before it is pushed into the heated cavity and vulcanized.

Stritzke explained that the valve-gated cold runner technology prevalent in LSR injection molding has its roots in plastic injection molding. “It has drastically reduced the amount of wasted material in LSR and has improved the cycle time to make parts and reach into the tool to pull out runners,” he said. “It has improved the processability of running LSR by running valve-gated cool runner technology.”

Still, there are limitations as LSR molders try to work with 32-drop or 64-drop cold runners. “There are few people who will build a valve-gated cold runner block that is more than 64 drops, so you are limited to a 64-cavity mold typically in LSRs,” Stritzke said. “It gets unwieldy to have that many valve gates. If anything does go wrong, it could take you a whole day to clean it up because you have all of those valve gates to open up and clean out.”

This is where the vulcanization takes place. The cold runner and general cooling results in no loss of material in the feed lines. The cooling allows production of LSR parts with nearly zero material waste, eliminating trimming operations and yielding significant savings in material cost.

According to Pelletier, LSR two-shot/multi-component injection molding is sometimes referred to as over-molding, in-mold, assembly injection molding, or twin-shot, a popular trend among LSR injection molders in 2014. “Overall, the process includes the over-molding of LSR directly onto a thermoplastic substrate.
Growth Opportunities for Injection Molders

For many thermoplastic injection molders, the potential presented by LSR molding proves to be an attractive business opportunity.

According to Jim Ritzema, COO of Rogan Corp., company officials saw advantages emerge in LSR about a decade ago and now the process provides a

Molders considering getting into the LSR game should do their homework to reduce risk. Ritzema said LSR users should focus on automatic and flashless molding and have a dedicated facility with dedicated resources for LSR work.

Ritzema also pointed out that LSR compounders

Economic Outlook – Medical Market

The total U.S. output of medical equipment and supplies grew by more than 5 percent in 2013 when compared with the previous year. Annual production levels almost always expand for this industry, so for planning purposes it is more useful to track the rate of growth during a 12-month period.

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This industry associated multi-cavity molds.

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That growth will continue as processors become more consistent. You can’t have variability and the silicone

The long-term demographic trends in the U.S. are cyclical pattern with peaks and troughs timed at about two years apart. If this pattern holds, then the next cyclical trough will post a bottom sometime in 2014, and the next cyclical peak should come in the middle of 2015. The growth rate certainly fluctuates, but the cyclical lows are typically not severe, even during recessions.

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Moreover, as demand for home health and disposable devices grows, the demand for LSRs use in these devices continues to grow at a solid rate for years to come. But the market

For nearly three decades, Brea, Calif.-based M.R. Mold and Engineering Co. has been making waste-free LSR molds. These molds, coupled with various types of automation devices, such as M.R. Mold’s cold runner system, provide the opportunity for lights-out molding.

According to Rick Finnie, president of M.R. Mold & Engineering, LSR injection molders want to be able to produce parts automatically with no secondary operations, which ultimately impacts mold makers.

LSR Challenges in Mold Making & Tooling

Working with LSR can be a challenge. For molders looking to jump into LSR, a barrier to entry can be the cost of equipment as well as the technical know-how to process the material, run the equipment and build the tooling.

It isn’t the easiest material to process as it flows and flashes very easily. “If you are molding a silicone O-ring, it’s not a big deal,” Ritzema points out. “If you are molding a silicone O-ring onto a plastic substrate, the tolerances on the substrate part have to be

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