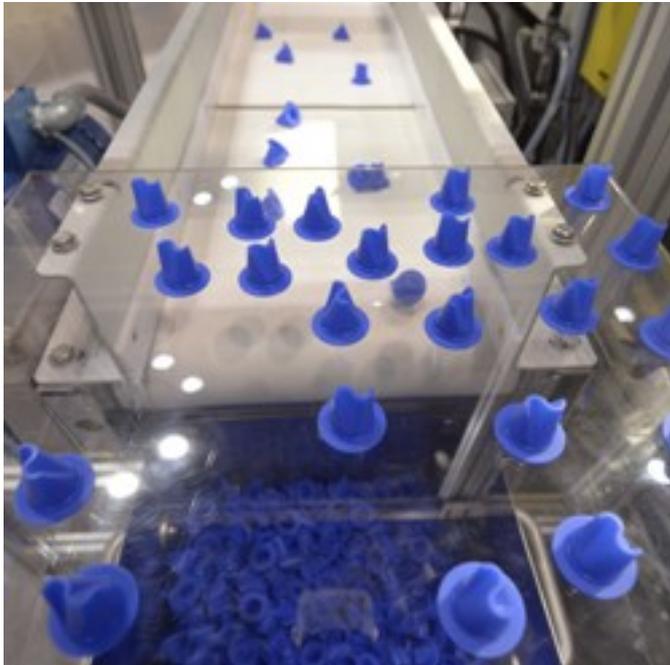


## Fast Cure and Flashless LIMS



Shin-Etsu Silicones of America recently premiered advanced technical demonstrations with industry leading equipment partners at NPE 2012. The demos featured Shin-Etsu's KEG-2000 LIMS (Liquid Injection Molding System) products' advanced handling and molding properties being run with a variety of integrated LIMS machinery and equipment. Shin-Etsu's KEG-2000 series is supplied in two components which are mixed in a 1:1 ratio to ensure easy and accurate blending with optimized physical and processing properties. Offering "Dynamic Viscosity", KEG-2000 products exhibit higher viscosity under low shear stress (pumping and shut-off) and lower viscosity under high shear stress (injection). Customers benefit from faster mold filling and minimal flash. The KEG-2000 Series is engineered for outstanding performance in cold-runner systems with both open and closed-nozzle configurations.

KEG-2000 LIMS Products have consistent properties from batch to batch. They have high clarity and range in Shore A hardness from 10 - 80. Physical properties, such as tensile and tear strength, modulus, and elongation have been maximized for physically demanding applications. Additionally, the products have been tested for compliance with FDA, USP Class VI, and ISO 10993 regulations.

The versatility of Shin-Etsu's KEG-2000 LIMS was demonstrated daily at NPE in conjunction with the latest technology advancements of the following SESA partners.

World-wide leading injection molding machine manufacturer Engel Machinery North America conducted a LIMS molding demonstration using Shin-Etsu's KEG-2000 (Shore A-50 hardness) silicone and Engel's hybrid tiebarless injection molding machine—the ENGEL e-victory 310/130 LSR US. The machine's molding cell ran a 64 cavity, valve-gated, cold-runner mold supplied by ACH Solutions to produce a

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flashless liquid silicone diaphragm, with automatic part removal.

The e-victory press featured ENGEL's energy-saving ecodrive hydraulic system which is controlled by an electric servomotor. The unique combination of hydraulic functions with an electric injection unit makes the system comparable to all electric models, while delivering the flexibility of the tiebarless clamp unit and on-board hydraulics for core-pull functions. According to Engel's LSR/ELAST Project Engineer, Steve Broadbent, "The servohydraulic ecodrive has been a standard Engel option for the past two years as the system offers the flexibility of hydraulics with energy efficiencies equaling that of an all-electric."

The LSR diaphragm was produced running at a 7 second cycle time; which is excellent for a 64-cavity mold. The ACH mold featured close spacing to the valve gate design; thus providing more cavities in a smaller area which otherwise might have required a 200 ton machine. According to Broadbent, "Shin-Etsu's KEG-2000 LIMS ran great as it released from the mold exceptionally well (de-molding under 1 second). Additionally, it has a nice pot life that won't cure up over time."

A complex shaped silicone duckbill valve was molded with Shin-Etsu's KEG-2000-50 using the Roboshot S-2000i-B Series 55 ton press from Milacron, and featuring a 2-cavity, valve-gated, cold-runner mold built by Roembke Manufacturing.

A global leader in the plastics processing industry and a leading provider of premium fluids to the metalworking industry, Milacron's Roboshot 55 ton press was introduced in 2006 and now features next-generation precision molding features including: new clamp, injection, software and control designs with servo technology.

The all electric injection molding Roboshot reduces energy consumption by 50 to 80% with repeatable and precise cycles that are 5 to 50% faster compared to hydraulic machines. The 'green' series offers zero cost for oil supply, filtration or disposal and there is no deviation due to oil viscosity, oil compressibility, or drifting valve action time.

The duckbill that the Roboshot produced is a one-direction valve for fluids often used in automotive and medical applications. Fluid travels in one direction and seals off in the other direction at the back of the valve. The duckbill features an s-shape design to accommodate this flow and would normally slip open. The modulus of Shin-Etsu's KEG-2000 material provided flexibility to the part to let fluid move through it with no pressure as it closed back up. According to Milacron's Electric Platform Product Manager, Eric Thompson, "Shin-Etsu's KEG-2000-50 material ran flawlessly; with easy startup and shut-off which could be difficult with an intricate duckbill design like this."

Industry leading experts in the design and build of inserted flashless rubber molds, Roembke Mfg. & Design's 2-drop, valve-gated cold-runner LSR mold allowed the mold to run with direct injection with zero waste. The flashless LSR tool is fully automatic?adapting the automation for the duckbill part to be de-molded automatically.

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Additionally, Roembke incorporated internal mold pressure sensors from RJG (Traverse City, MI) which allowed for complete control of the valve gates including: balance of the cold runner, and monitoring the internal cavity material and its' temperature and/or pressure.

According to President, Greg Roembke, "In the past, manual choke systems were used to balance a cold-runner system from cavity-to-cavity. Over the last several years we've been incorporating internal mold pressure sensors from RJG in the cavity to detect fill pressure in each cavity and individually monitor and track shot-to-shot consistency."

Roembke also noted that the whole cell works in synergy with Shin-Etsu's KEG-2000-50 material which ran clean in the system as they were able to run fully automatic within three shots! Additionally, a 3-axis robot from Milacron removed the parts from the mold.

Zeiger Industries demonstrated its' new LIMS Plug-N-Play Conversion Kit on a Sumitomo injection molding machine to manufacture LIMS quiche pans made from Shin-Etsu's KEG-2000-70. The LIMS molding conversion kit enables processors to take existing thermoplastic injection molding machines and quickly convert them for liquid silicone molding. The conversion can be done on any brand or model of injection molding machine and minimal steps are required.

Key features of the innovative LIMS Plug-n-Play Conversion Kit design include; a Z Wear™ zero compression ratio ZP screw, a water-cooled Wexco 777™ tungsten carbide-lined barrel, water-cooled LIMS pin type shut-off nozzle, a LIMS barrel and screw seal kit, and a Mallard Zpringlok™ self-closing LIMS valve assembly.

According to Zeiger Director of Sales, Stan Glover, "The beauty of the design is that processors can utilize any of the components independently to meet their specific conversion needs. The cost-efficient LIMS conversion kit can also be utilized as a complete package for new presses."

Shin-Etsu's KEG-2000-70 was used to produce the bakeware quiche pans in a single cavity mold supplied by PTG Silicones, (New Albany, IN) and was de-molded automatically. The KEG-2000-70 has the necessary stiffness to retain its shape and not collapse when the pan is fully loaded with batter.

According to SESA's North America Marketing Manager, Eric Bishop, "Our workhorse KEG-2000 Series products offer a wide processing window; as reflected in the variety of processing technologies and applications demonstrated with our manufacturing partners at NPE. The series is designed to take full advantage of and complement these latest developments in molding equipment and tooling technology."

Bishop also stressed that world-wide customers depend on Shin-Etsu's consistency to ensure that their process remains in control and does not require constant adjustments to compensate for batch-to-batch variations in the liquid silicone; thus improving the quality of the parts and efficiency of the process. Molded articles

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from Shin-Etsu's KEG-2000 series are commonly used in the Healthcare, Infant Feeding, Automotive, and Consumer Products industries.

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