Gallagher Fluid Seals recently added a new white paper to its Resources Page, *Perfluoroelastomers for the Semiconductor Industry*, written by Russ Schnell. Below is an excerpt from the new white paper. You can download it in its entirety by clicking on the thumbnail to the right.

The following is a simplified process chart for chip manufacture in the semiconductor industry:

Following the process shown above:
1. A silicon wafer has been prepared from an ingot by cutting and polishing. The wafer then has layers of material applied. These include a silicon oxide layer, a silicon nitride layer and a layer of photoresist.
2. A light is then projected through a reticle and a lens unto the wafer surface. This pattern is projected numerous times onto the wafer for each chip.
3. The photoresist that was exposed to the light can now be chemically removed.
4. The areas where the photoresist has been removed can now be etched, which in the case above, is done by gases.
5. An ionic gaseous stream showers the chip and “dopes” those regions that were exposed due to etching. New photoresist can be applied to the wafer and steps 2-4 are repeated.
6. In a similar repeated cycle, metal links can be laid down between transistors. Every step of the process requires elastomer seals to isolate the process from the outside atmosphere. The processing environment is very aggressive and often requires high performance perfluoroelastomer (FFKM) seals for longer service life.

There are three standard processes that are used to accomplish the above tasks: plasma process, thermal process and wet process. Each has unique requirements for seal use and performance. The Perfluoroelastomers for the Semiconductor Industry white paper focuses on elastomer, and more specifically, perfluoroelastomer seals in these applications.

About the Author

Russell Schnell spent more than 37 years as an engineer with DuPont, the last 26 years as a Senior Application Engineer with the Kalrez® perfluoroelastomer parts business. Recognized for his expertise in elastomer applications, seal design and failure analysis, he provided technical support for a wide range of industries including: chemical processing, aerospace, oil and gas, pharmaceutical and semi-con. He created and conducted hundreds of training seminars and workshops in this field and was solely responsible for the development of the Kalrez® Application Guide software tool.

Russ received a Bachelor of Science in Chemical Engineering from Columbia University in
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