

# Diaphragms Elastomers for Low Out Gassing Semiconductor Applications

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For high-vacuum environments and sensitive lithography stages, standard industrial seals are insufficient. This has necessitated the development of high-performance, low out-gassing elastomers - materials engineered to minimize the release of volatile condensible materials (VCMs) and particulate matter that can bridge circuits or cloud optical lenses.

Out gassing occurs when trapped gases, moisture, or unreacted process chemicals are released from an elastomer into a vacuum. In a semiconductor tool, these vapors can migrate to the wafer surface, causing “killer defects,” or deposit on mirrors in Extreme Ultraviolet (EUV) lithography systems, leading to costly downtime. To mitigate this, materials are often tested against standards like ASTM E595, which measures Total Mass Loss (TML) and Collected Volatile Condensable Material (CVCM).

In Semiconductor applications low out-gassing elastomers are important. These elastomers include perfluoroelastomer (FFKM), fluoroelastomers (FKM), and specialized low out-gassing silicones. These materials are critical for maintaining ultra-high vacuum environments and preventing contamination in processes like plasma etching and photo-lithography.



FFKM is the “gold standard” for semiconductor manufacturing due to its extreme chemical resistance and ultra-low out-gassing rates, even at high temperatures.

Please contact your Diacom Team to answer any questions and discuss potential diaphragm designs using this technology.

## Diaphragm Design & Manufacturing Leader

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