

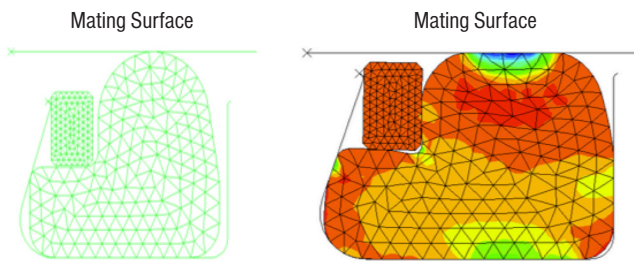
Chemraz® Shielded Seal Design Extends Seal Life

The Challenge

A fab running high-density, plasma-enhanced deposition was experiencing problems with their process chamber lid seal. Exposure to plasma and process gases, including NF3 and O2, was causing seal erosion, which resulted in a shortened seal life and increased preventive maintenance (PM) cycles and downtime.


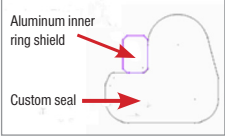
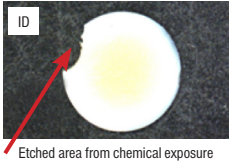
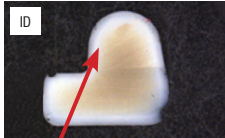
The Greene Tweed Solution

Greene Tweed's solution was a shielded seal design made from Chemraz® E38. The design was optimized to reduce the gap between the top of the gland and the mating surface by which process gases could reach the seal material. The Chemraz® E38 shielded seal design lasts longer than a typical o-ring in some applications.



FEA shows optimized seal design with shield

The following graphic provides a comparison of Greene Tweed's Chemraz® E38 standard o-ring versus Chemraz® E38 custom shielded seal using Silane, H2, and N2 process gas, and NF3 cleaning gas.

	Chemraz® E38 O-ring	Chemraz® E38 Custom, Shielded Seal
Parts Used		
Problem	Silane leakage into chamber, causing wafer thickness uniformity issue	No
Seal CX Area	CX @ 8,000 Wafers  Etched area from chemical exposure	CX @ 22,000 Wafers  No etch apparent
% Area Etched	~10%	~0%
Solution		Custom Seal + Shield Design Change

The Results

- As demonstrated in the graphic above, the Chemraz® shielded seal design provides a repeatable PM service life that is three times longer than a typical o-ring used in the same application.
- Chemraz® E38 remains stable at service temperatures as high as 260°C (500°F).
- The optimized seal design reduced the erosion rate and extended seal life.