

UHP Slit Valve Door

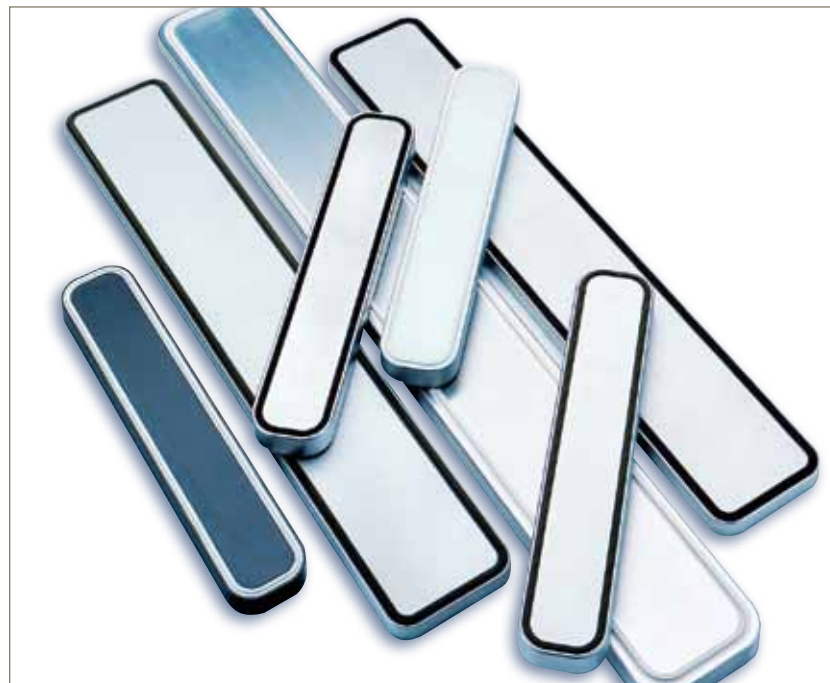
For Process Chambers or Load Locks
in Semiconductor, Flat Panel Display
and Photovoltaic Processing Equipment



Ultra-High Purity (UHP) Bonded Door for Reduced Particulation, Increased Throughput

Dramatically enhancing performance from current slit valve door seals, the Parker UHP slit valve door unites the strengths of Parker exclusive UHP elastomers, advanced bonding technology, and a uniquely engineered sealing element to decrease particle generation and increase resistance from dynamic mechanical wear and chemical attack.

First pioneered with a leading semiconductor equipment manufacturer, the Parker UHP slit valve door extends seal life up to 10 times greater than conventional O-rings, delivering unsurpassed assurance of performance and reliability to critical plasma and vacuum systems.



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Extended Life:

- Custom engineered seal design optimizes internal sealing stresses in elastomeric material, reducing chemical attack
- Molded-in sealing element eliminates parting lines present on O-rings subject to degradation and chemical attack
- Advanced bonding technology eliminates mechanical abrasion of O-ring within dovetail groove, reducing particle generation up to 95%

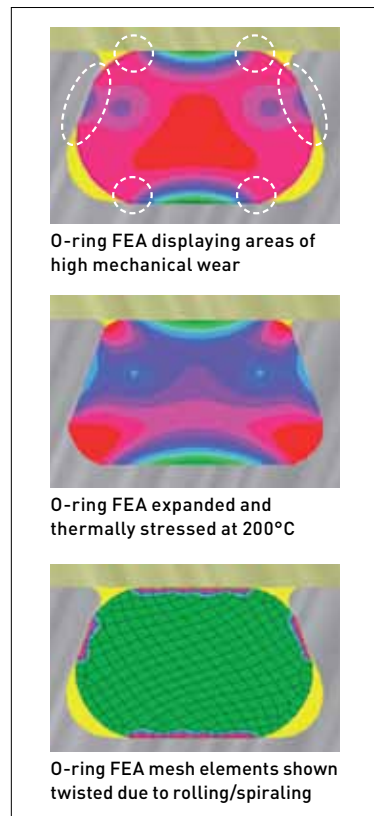
Reliable Performance:

- Bonded slit valve door design simplifies installation and lengthy equipment downtime, eliminating complicated O-ring installation
- Custom engineered seal design maintains optimal sealing force for robust pneumatic valve operation and consistent vacuum sealability
- Bonded seal eliminates “virtual” leaks and contamination trapped inside dovetail groove experienced by O-rings

ENGINEERING YOUR SUCCESS.

Extending the Life of Traditional Slit Valve Door Seals

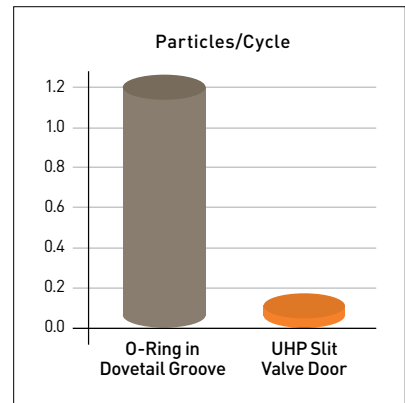
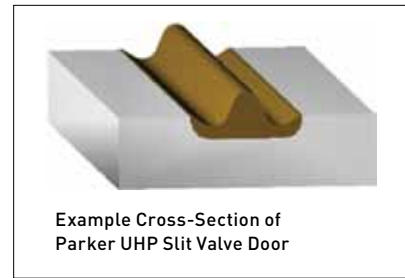
When an O-ring is stretched and installed around the corners of a slit valve door configuration, stress cracking exposes the surface of the O-ring to severe chemical attack and breakdown. Dynamic cycling of the slit valve door O-ring abrasively scrubs the O-ring surface mechanically against the side walls of the dovetail groove.



Over time, this mechanical wearing coupled with chemical attack of the abraded seal aggressively degrades the O-ring, producing an increase in particulation and wafer contamination. In process recipes with a combination of high temperatures and harsh

chemistries, an O-ring becomes thermally stressed without adequate expansion volume, and can become “pinched” in a dovetail groove. These effects can result in ultimate seal failure, vacuum leaks, high particle generation, and unplanned tool productivity loss.

Unlike an O-ring in a slit valve door, the UHP slit valve door sealing element is molded-in-place, integrally vulcanized to the metal slit valve door. This process eliminates mechanical wearing between the sealing element and groove, creating a robustly bound seal providing reduced particulation up to 95%. The UHP slit valve door’s custom-engineered sealing element reduces mechanical and thermal stresses, additionally eliminating exposed parting lines in its molded construction to dramatically increase seal life and promote increased equipment productivity.



Delivering Reliable Performance

The bonded UHP slit valve door delivers an assurance of performance from installation to disassembly by eliminating several errors experienced by mis-installed O-rings: rolling of seal within the groove, inappropriate stretching to fit seal into groove, misalignment of parting line within groove, contamination trapped inside dovetail groove, and vacuum leaks due to damaged dovetail groove surfaces. All of these issues are eliminated and controlled by the efficiency of the seal bonded securely in the UHP slit valve door. Carefully planned engineering of the custom sealing element also maintains a consistent loading force throughout the lifecycle of the slit valve, ensuring trouble-free vacuum sealability and robust pneumatic valve operation.

Systems Engineering

Parker provides a full suite of design tools, prediction modeling, and correlation testing. To complement this suite, extensive material offerings are at our engineers’ disposal: from Parker exclusive UHP elastomers, to precision metals, thermoplastics and ceramics, and high-purity polymer coatings and metal platings. Extended expertise in design and fabrication of vacuum chambers and valves, complementing our engineered seals, make Parker a total systems solution provider for critical microelectronics processing equipment.

