High performance sealing solutions for the SEMICONDUCTOR INDUSTRY
High Performance Sealing Solutions for Semiconductor, Photovoltaic and Flat Panel Display Applications

Precision Polymer Engineering (PPE) operates at the forefront of elastomer technology, with optimized materials that have been proven to provide increased tool efficiency and reduced cost of ownership in critical semiconductor applications.

With over 30 years’ experience, PPE’s engineering and materials teams possess a thorough understanding of the processes used across chip, cell and display manufacturing industries. This technical know-how combined with PPE’s unique materials, ensures that the correct solution is delivered for every application.

▶ Unique leading edge materials
▶ Broad portfolio of products and custom design service
▶ Industry leading delivery times
▶ Expert technical support, pre and post sale
▶ Comprehensive testing and failure analysis service

PPE - Your Global Sealing Partner

PPE operates globally through direct sales teams and also has a network of regional distributors.

This ensures that PPE products and materials are available in all major device manufacturing regions, with global service back-up and world class technical support readily accessible.

PPE’s extensive customer base includes the most renowned companies and corporations within the semiconductor and related industries. Many of the world’s leading OEMs, Fabs and research establishments have chosen PPE as their trusted sealing partner.
**Investment and Growth**

In 2010 PPE became part of IDEX Corporation, a multi-billion dollar Fortune 1000 company serving a wide variety of high growth specialized markets. IDEX investment ensures that PPE maintains the highest quality, state-of-the-art manufacturing and test facilities, in order to serve the needs of the semiconductor industry.

**Exceeding Your Expectations**

PPE Engineers understand the complex relationship between materials, seal design and the demanding applications which challenge equipment manufacturers and end users. PPE recognises the sealing challenges faced by both “Moore” and “more than Moore” technologies leading to a broad range of requirements across multiple applications.

**PPE serves diverse semiconductor market segments including:**

- Logic and memory
- MEMS
- HBLED
- Power devices
- Photovoltaic cells
- Flat panel displays
- Optoelectronics

Regardless of the application, you can be sure that PPE seals will continue to meet and exceed your expectations.
Innovative Materials

Since the first high purity translucent Perlast perfluoroelastomer was launched in 1999, PPE has led the field in material innovation.

With a proven track record spanning many years’, PPE continues to push the boundaries of elastomer technology and deliver the most technically advanced elastomer materials available.

Polymers with varying fluorine content and multiple filler systems including totally organic and filler free products can be provided.

Materials technology is at the core of PPE and innovation is a way of life. A continuous development program provides elastomers that not only keep pace with the current needs of the industry, but also looks to future requirements.

The Perlast® and Kimura® ranges of high performance materials offer unique properties such as high purity, excellent plasma resistance, low permeation and ultra-low out-gassing. These characteristics meet the specific requirements of thermal processing or annealing, plasma or atomic layer deposition, plasma etch, wet chemical or plasma cleaning systems.

The advantages of using PPE elastomer materials:

▶ Extended tool Preventative Maintenance (PM) cycles
▶ Reduced process defects
▶ Lower particle generation
▶ Increased tool efficiency
▶ Reduced cost of ownership

PPE combines leading-edge material and expertise to provide process-enabling technology.

Case study Perlast® G67P delivered lower cost of consumables

Providing critical chamber seals using Perlast® G67P in a HDPCVD reactor (NF3 cleaning) extended the PM cycle from 10k wafers to 20k wafers. The incumbent FFKM material was experiencing cracking, resulting in severe particulation which was affecting wafer yield.
Manufactured to Your Requirements

To ensure the highest levels of quality, PPE molds semiconductor components in a number of clean rooms located at its UK and US manufacturing facilities.

The latest advanced manufacturing techniques and equipment are utilized in order to consistently produce high performance seals within the shortest lead-times, to satisfy the most precise requirements.

The purity of PPE seals is paramount. All manufactured components undergo a multi-stage cleaning and packaging process, including the use of proprietary cleaning agents, ultrasonic cleaning tanks combined with de-ionized water and filtered drying procedures to minimize any possible particle contamination.

Case study Perlast® G67P delivered increased yield

A white FFKM material used in a MESC compliant flange in a HDPCVD system (NF₃ clean), was causing particulation and reduced yield as a result of cracks appearing in the seal after 7500 wafers. The material was replaced with Perlast® G67P eliminating the cracking/particulation issue.
PPE offers an extensive portfolio of products used within semiconductor and related manufacturing industries.

**O-rings**

Fully molded O-rings can be manufactured in any size or quantity ranging from 0.030” to 96” (0.8mm to 2.4m) internal diameter and 0.030” to 0.470” (0.8mm to 12mm) cross section, allowing PPE O-rings to be specified in all locations. Standard AS/metric sizes, international and custom non-standard sizes available.

**Centering Rings**

Aluminium or stainless steel centering rings can be combined with any PPE elastomer material and are available in various sizes from the NW, KF and ISO standard ranges.

**Slit Valve Doors**

PPE offers a range of materials and profiles that maximize sealing integrity and life expectancy for bonded and non-bonded slit valve doors and MONOVAT® gates. These are available in various sizes and designs for 150mm, 200mm, 300mm and 450mm process equipment.

**Wafer Handling Components**

PPE end effector pads provide low contact force and electrostatically dissipative solutions for wafer handling applications. PPE’s range of materials offers both low and high coefficients of friction to allow tailoring of wafer retention force. Custom designs of end effector pads can also be manufactured.

**Lip Seals**

Lip seals can be used to provide sealing of wider gaps requiring large amounts of deflection where limited contact force is available. Typical applications include sealing against quartz where large tolerances must be accommodated.

**Custom Shapes and Cross-Sections**

Seals can be designed and manufactured to customer-specific requirements, molded in almost infinite shapes, sizes and profile.

Registered trade marks: MONOVAT® - VAT Vacuumventile AG
Testing and Analysis

With state-of-the-art Material Characterization Centers located in the UK and USA, PPE provides a comprehensive range of services for the development, characterization, testing and analysis of polymeric materials.

With a team of highly qualified polymer technologists and chemical engineers at your disposal, PPE can provide a complete consultancy service including advice and assistance in material selection, material testing, sample analysis, post-use analysis and problem-solving on any sealing matter.

Testing capabilities include chemical compatibility, failure analysis and thermo-mechanical evaluation using the following analytical equipment:

- FTIR (Infrared Spectroscopy) for material identification and fingerprinting
- DSC (Differential Scanning Calorimetry) for predicting thermal characteristics
- TGA (Thermogravimetric Analysis) for compositional analysis
- TMA (Thermomechanical Analysis) for coefficient of thermal expansion measurement
- Wet chemical analysis for assessing fluid compatibility
- Mechanical property & thermal ageing capabilities from -100ºC to +300ºC (-148ºF to +572ºF)
- Plasma exposure testing in oxygen up to 250ºC (482ºF)