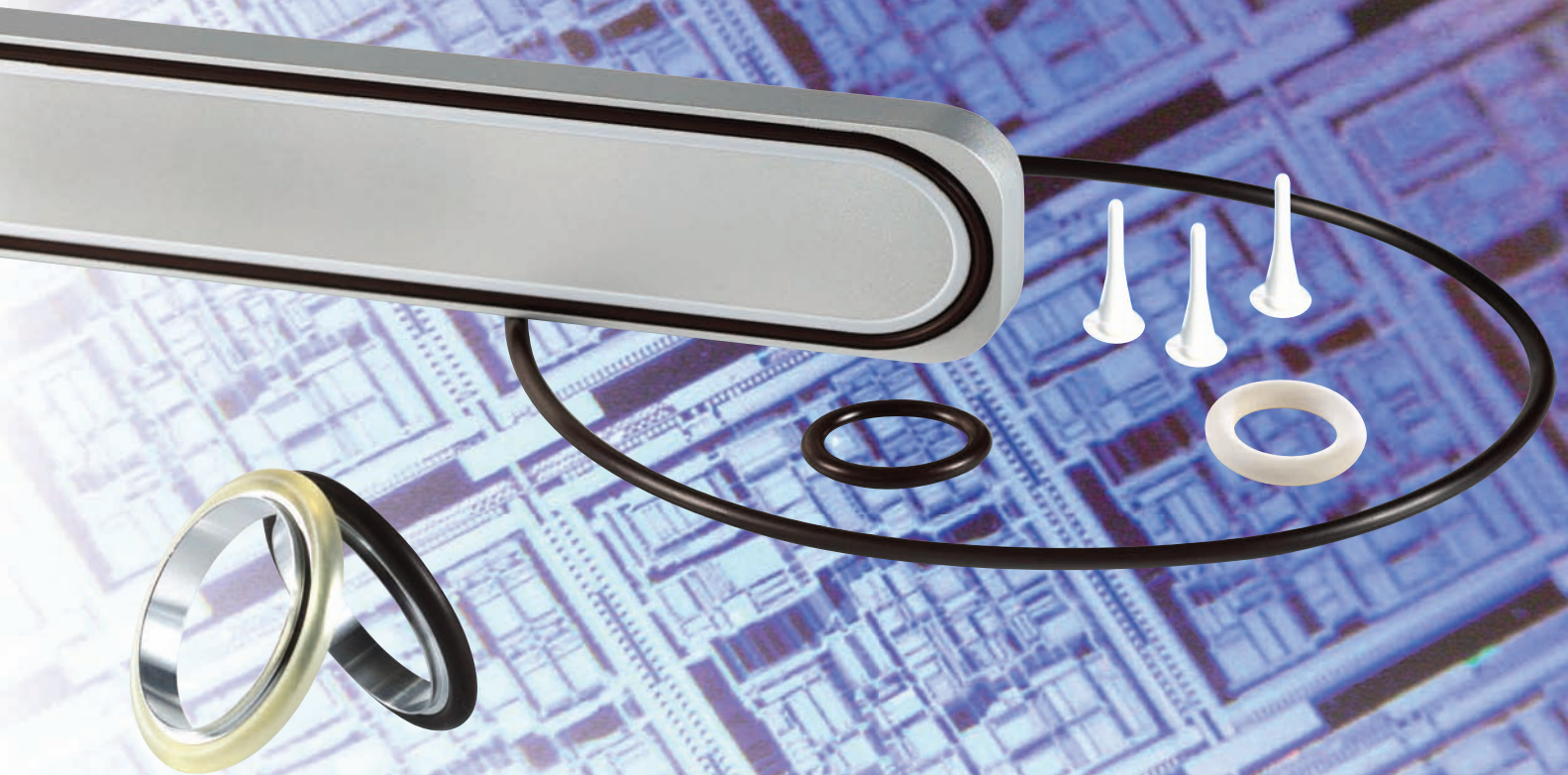




**Precision Polymer Engineering**

Advanced sealing solutions for critical applications

# 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

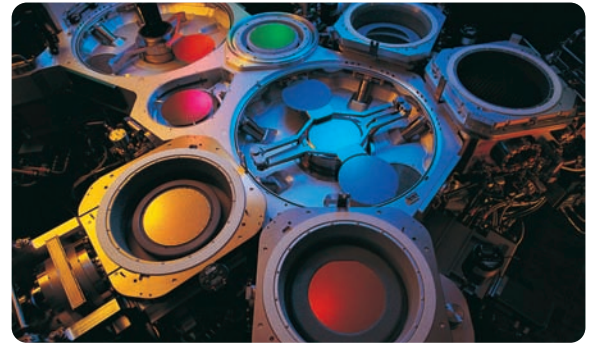
**PPE operates globally through direct sales teams and also has a network of regional distributors.**

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:

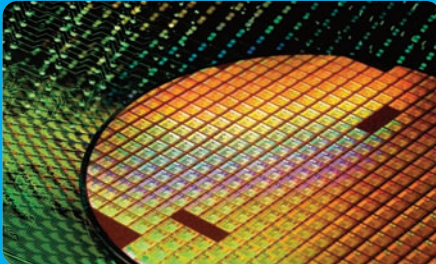
- ▶ Logic and memory
- ▶ HBLED
- ▶ Photovoltaic cells
- ▶ Optoelectronics
- ▶ MEMS
- ▶ Power devices
- ▶ Flat panel displays

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 (NF<sub>3</sub> 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.



## Design and Technical Support

PPE offers a comprehensive design service to ensure maximum performance from your sealing products and materials.

An experienced Applications Engineering team is on hand to provide advice on hardware design and customization of seal shape or type, based on mathematical and finite element analysis (FEA). A complete 3D CAD to CAM to tool production process, provides rapid prototype delivery and right-first-time designs, resulting in fast response to critical sealing needs.

---

### Case study Perlast® G67P delivered increased yield

A white FFKM material used in a MES-C compliant flange in a HDPCVD system (NF<sub>3</sub> 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.

# Products

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.



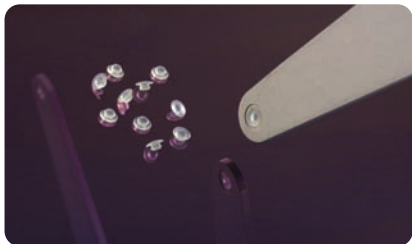
## Centering Rings

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.



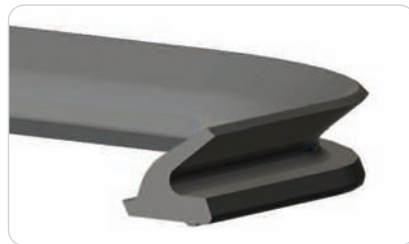
## Slit Valve Doors

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 -100°C to +300°C (-148°F to +572°F)
- ▶ Plasma exposure testing in oxygen up to 250°C (482°F)



**Precision Polymer Engineering**

Advanced sealing solutions for critical applications

**Europe, Middle East & Africa**

Precision Polymer Engineering Ltd  
Head Office  
Greenbank Road  
Blackburn BB1 3EA  
England

**T:** +44 1254 295400

**F:** +44 1254 680182

**E:** [prepol.sales@idexcorp.com](mailto:prepol.sales@idexcorp.com)

**Americas**

Precision Polymer Engineering LLC  
1754 Technology Drive  
Suite 244  
San Jose CA 95110  
USA

**T:** +1 408 441 2043

**F:** +1 408 441 1042

**E:** [prepol.sales-usa@idexcorp.com](mailto:prepol.sales-usa@idexcorp.com)

PPE LLC  
4702 North Sam Houston Parkway West  
Suite 100  
Houston TX 77086  
USA

**T:** +1 713 482 0123

**F:** +1 713 623 2332

**E:** [prepol.sales-usa@idexcorp.com](mailto:prepol.sales-usa@idexcorp.com)

**Asia Pacific**

Precision Polymer Engineering LLC Rm  
3502-3504, Zhao Feng Plaza  
No. 1027 Chang Ning Road  
Shanghai 200050  
China

**T:** +86 21 5241 5599 - 113

**F:** +86 21 5241 8339

**E:** [prepol.sales-asia@idexcorp.com](mailto:prepol.sales-asia@idexcorp.com)

**PERLAST®**

The ultimate perfluoroelastomers for sealing applications where chemical resistance and high temperature performance are critical.

Perlast® and Kimura® are trademarks of Precision Polymer Engineering.

**KIMURA®**

A unique range of fully organic elastomers for semiconductor sealing applications which demand extreme plasma and abrasion resistance.

Local PPE sales agent:

[www.prepol.com](http://www.prepol.com)