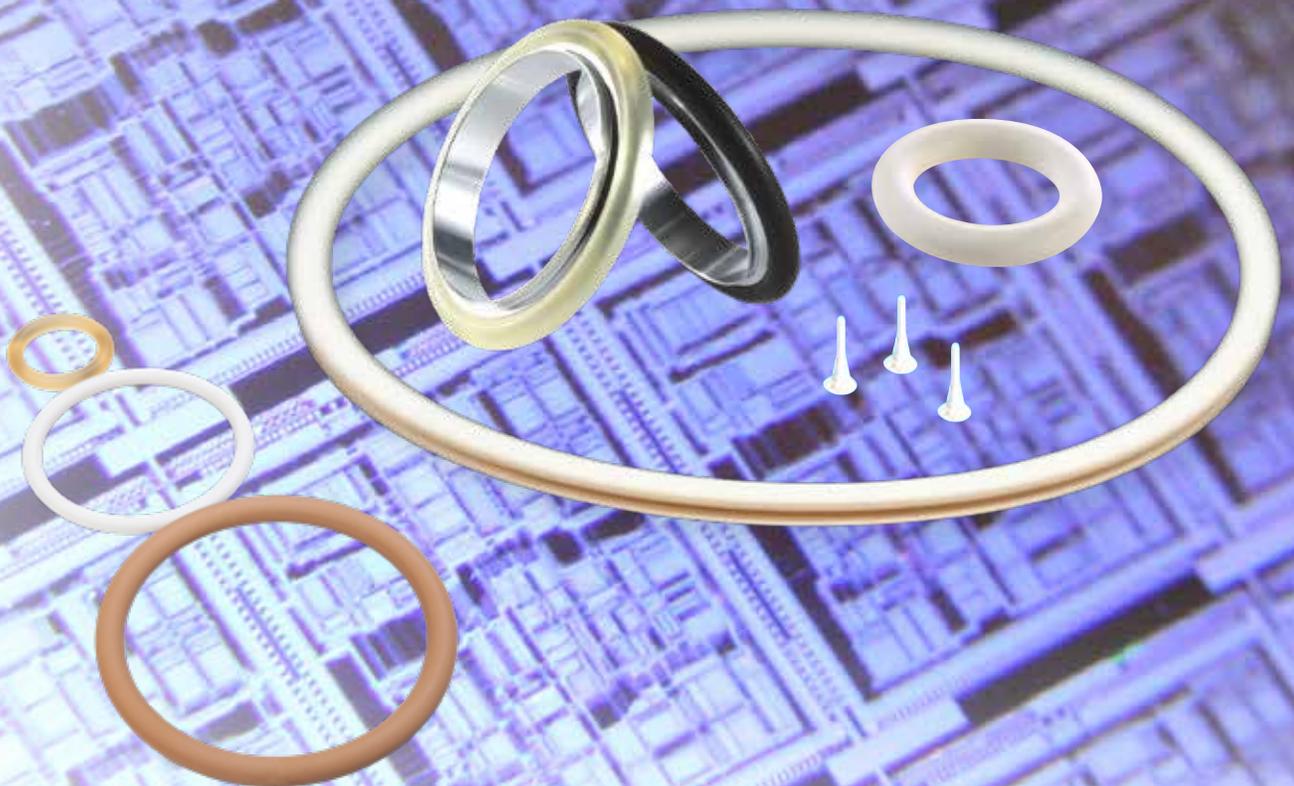




Precision Polymer Engineering  
Advanced sealing solutions for critical applications

# High performance sealing solutions for the **SEMICONDUCTOR INDUSTRY**



Exclusive manufacturers of  
**PERLAST®**

# High Performance Sealing Solutions for extreme chemical, plasma and thermal environments

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 40 years' experience, PPE's engineering and materials teams possess a thorough understanding of the processes used across chip, solar 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
- ▶ Custom design service including FEA capability
- ▶ Controlled manufacturing process
- ▶ Expert technical support, pre and post sale
- ▶ Comprehensive testing and failure analysis service



## 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.

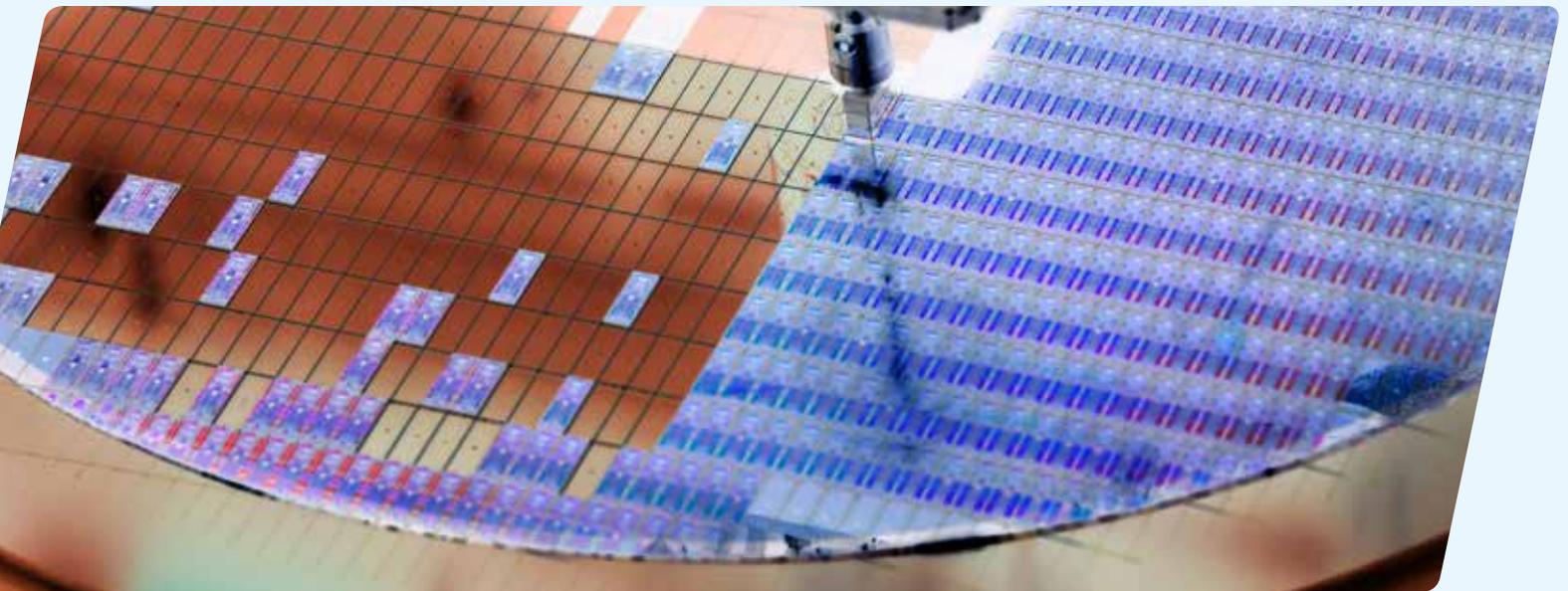
# Design and Technical Support

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.



## 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
- ▶ Flat Panel Display
- ▶ Solar Photovoltaic
- ▶ Optoelectronics and HBLED
- ▶ Power and RF (Si and CS)
- ▶ MEMS and Sensors

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.

**Perlast® Helios** perfluoroelastomers have been developed to deliver low erosion rates and ultra-low particle generation in harsh plasma environments, at temperatures up to 310°C (590°F).



### The advantages of using PPE elastomer materials:

- ▶ Extended tool Preventative Maintenance (PM/MTBC) cycles
- ▶ Lower particle generation
- ▶ Increased tool efficiency
- ▶ Reduced cost of ownership

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

## The Seal Wizard O-ring Calculator

The Seal Wizard Calculator allows you to input your application requirements and configure the optimum seal design unique to your equipment, accounting for:

- ▶ Hardware and seal tolerances
- ▶ Environmental conditions
- ▶ PPE specific material (accurate CTE values and therefore thermal expansion)

▶ Find out more at [www.prepol.com/seal-wizard](http://www.prepol.com/seal-wizard)

# 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.



PPE provides clean room manufactured seals with low particle and low trace metal contamination for minimized yield loss and low chemical erosion rates that offer the following benefits:-

- ▶ Extended system up-time
- ▶ Reduced process defects
- ▶ Increased mean time between failure (MTBF)
- ▶ Decreased wet clean or mechanical clean frequency
- ▶ Minimized cost of ownership (CoO) through reduced cost of consumables (CoC)

# 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.



## Chamber Door Seals

PPE offers a range of materials and profiles that maximize sealing integrity and life expectancy for chamber door seals. Seals are molded with square corners to reduce stress on the elastomer, with sizes available from 150mm up to 3 metres in length.



## 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.

# 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)
- ▶ Multiple plasma chemistry testing through access to systems at Stanford USA and Lancaster UK
- ▶ SEM analysis through access at Liverpool university



**Precision Polymer Engineering**

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**PERLAST®**

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

**KIMURA®**

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

**Nanofluor®**

A specialist range of fully organic ultra-low outgassing materials and an inorganic filled grade with unique nano-filler to reduce erosion rates experienced in semiconductor applications.

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Local PPE sales agent:

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