

KIMURA®

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

Product Overview

Kimura® from PPE - *A new era in elastomer technology*

Kimura® is a range of high performance elastomers containing a unique self-reinforcing polymer structure, developed specifically for aggressive semiconductor sealing applications. The high purity of the materials combined with the absence of any fillers makes the Kimura® range suitable for processes involving lower feature sizes.



What is Kimura®?

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

The Kimura® range of high performance elastomer materials utilize a controlled molecular architecture which provides a unique self-reinforcing polymer structure, eliminating the need for fillers of any kind. This high purity material breaks new ground in elastomer technology, developed specifically for aggressive semiconductor applications.

Kimura® elastomers are a new breed of elastomer, specifically developed by PPE, for the semiconductor industry, to offer a step-change in sealing performance, surpassing what has previously been achievable.

Why Kimura® from PPE?

PPE polymer chemists have, for many years, been involved in developing innovative and novel materials to meet the requirements of demanding semiconductor applications. As a result of this experience, our research and development team recognised the limitations of organic nano-filled elastomers and sought to develop the next generation of high performance elastomers to support the drive for increased productivity and lower features sizes.

In addition to pushing the boundaries of polymer technology by developing unique materials with differentiated properties, PPE offers short manufacturing lead-times and exceptional responsiveness and flexibility to customer needs, combined with outstanding technical support and customer service across the globe.

Why use Kimura®?

Exceptional purity

Reduced particulation and increased yields

Kimura® elastomers do not contain fillers of any kind. Fillers are typically used in elastomer materials to provide polymer reinforcement, however all fillers have inherent impurities which can often be the cause of contamination and particulation problems leading to reduced wafer yields. Kimura® elastomers utilize a unique self-reinforcing molecular architecture which eliminates the need for fillers and supports the continued drive towards lower feature sizes.

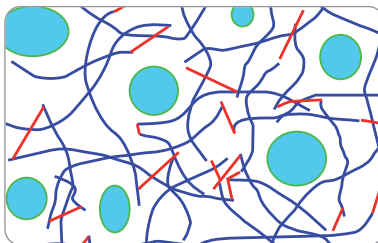


Diagram of how organic filled elastomers look at a molecular level, the polymer chains (with cross links in red) are reinforced by fillers.

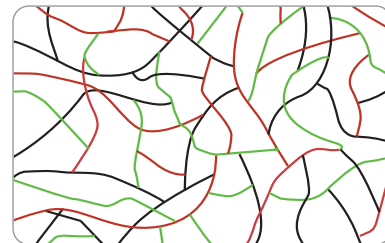
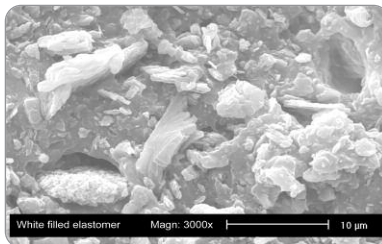


Diagram of how Kimura® elastomers look at a molecular level. The polymer chains are intimately mixed and chemically joined together with a morphology known as 'interpenetrating network'.

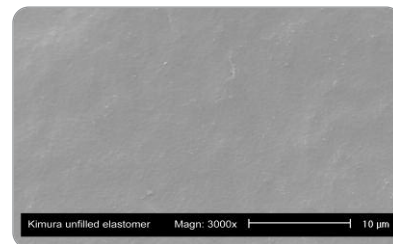
Retro-fit in existing grooves

Reduced cost of ownership

Low coefficient of thermal expansion allows Kimura® seals to be retro-fitted into existing grooves (including FKM & FFKM grooves). This allows lower specification elastomer types (i.e. FKM) to be upgraded to Kimura®, extending the seals performance and operational life-time. Longer-lasting seals maximize maintenance intervals and reduce the overall cost of ownership.



SEM micrograph of fillers in a perfluoroelastomer material.



SEM micrograph of a Kimura® elastomer the smooth nature of these materials translates to reduced surface permeation and improved sealing efficiency.

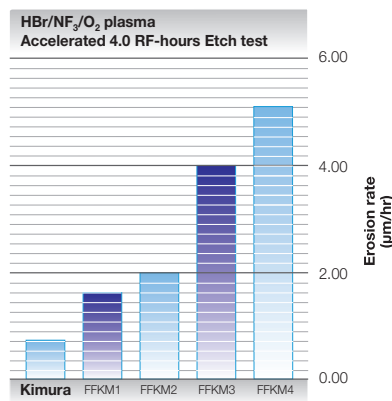
Excellent plasma resistance & low etch rates

Extended seal life

Kimura® materials have been specifically optimized to meet the needs of dry etch applications and offer exceptionally low plasma etch rates.

Differential erosion rates associated with traditionally filled or organically filled materials can result in fillers coalescing to form larger clumps, thereby causing particulation.

The homogenous nature of Kimura® materials and the lack of fillers means that any degradation that occurs will be uniform resulting in the material being volatilized as an inert gas, thereby reducing particulation.



Graph showing erosion rate comparisons during customer qualification tests

Additional benefits:-

- Low permeation and out-gassing properties make Kimura® materials ideal for vacuum applications. Low permeation rate ensures faster vacuum pump-down times are possible, as well as reduced metal oxidation due to low oxygen permeation.
- Low adhesion (reduced sticking) to mating surfaces allows easier strip-down and disassembly of hardware.
- High modulus and low abrasion properties of Kimura® elastomers make them ideal for use in dynamic applications, such as L-motion gates and door seals.
- High strength and low coefficient of friction at elevated temperatures, make Kimura® materials ideal for wafer handling components.

Typical Applications

Dynamic seals -

- Gate Valves
- Door seals
- Pendulum Valves
- ISO Valves
- Bonded Gates and lip seals

Static seals -

- O-Rings
- Body Seals
- Chamber lid seals
- Cathode assembly seals
- Electro-static-chuck seals and flange fittings

Wafer-handling products

- End effector pads and vacuum suction pads

Kimura® materials are suitable for use in dry semiconductor processes sub 65nm node including chemical vapour deposition (CVD), physical vapour deposition (PVD) and etch.

For More Information

Please refer to the data sheets which provide detailed specifications and performance information on Kimura® materials.

These data sheets are available to download from the PPE website; www.prepol.com alternatively you can request them directly from your local PPE sales specialist or distributor.

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PERLAST®

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



Local PPE sales agent: