

# DuPont™ Kalrez® Perfluoroelastomer Parts

In Semiconductor Industry – Wet Processes

DuPont™ Kalrez® perfluoroelastomer parts have been used successfully in highly aggressive sealing environments for over 40 years. Kalrez® parts have excellent chemical and thermal stability and have been specially formulated and processed to meet the unique requirements of wafer processing environments. DuPont offers molded O-Rings and custom seals using a series of specialty products and ultrapure processing for the semiconductor industry. Ultrapure processing is standard for all semiconductor product grades.

## Product Selector for Wet Processes

The following table provides a quick and easy tool for the selection of Kalrez® parts depending on the production process type:

Process Type	Maximum Service Temperature	Typical Chemistries	Suggested Products <sup>1</sup>
Wafer Preparation	70 °C to 125 °C	UPW <sup>2</sup> , Piranha, SC-1 and SC-2 <sup>3</sup> , O <sub>3</sub> , HF (49%), EKC® fluids	Kalrez® W240UP
Etching	70 °C to 95 °C	HNO <sub>3</sub> , HF, H <sub>2</sub> O, H <sub>3</sub> PO <sub>4</sub> , UPDI, NH <sub>4</sub> OH	
Stripping	90 °C to 125 °C	NMP/Alkanolamine, hydroxylamine, acetone, IPA, DMSO, Furanone, EKC® 265™	
Copper Plating	80 °C to 100 °C	CuSO <sub>4</sub> Solution, H <sub>2</sub> SO <sub>4</sub>	

<sup>1</sup> Please consult the Kalrez® Application Guide and/or your Kalrez® Representative to assess performance fit for your specific application

<sup>2</sup> Ultra-Pure Water

<sup>3</sup> Standard Clean solutions steps 1 and 2

### Typical Applications for Wet Processes:

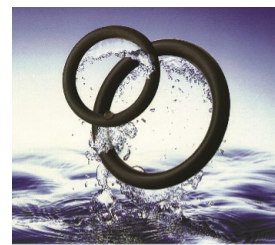
- Door/lid seals
- Drain seals
- Seals for chemical containers
- Fittings
- Seals for filters/connectors
- Flow meters
- Flow controllers
- Valves

## Current Kalrez® Product Offering for Wet Application

### Kalrez® W240UP

Kalrez® W240UP perfluoroelastomer parts are a black product for high volume O-rings and custom parts for filters, valves, pumps and other wet manufacturing processes requiring a wide range of chemical resistance. Kalrez® W240UP provides an **excellent combination of properties** (resistance to acids/bases) and is the product of choice for wet processes as an upgrade from standard elastomers, i.e. FKM, EPDM, etc.

Thanks to Ultrapure clean process, Kalrez® W240UP perfluoroelastomer parts exhibit very low particle generation.



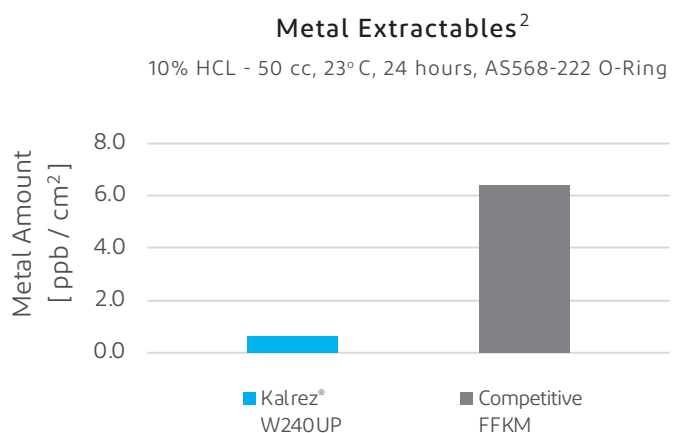
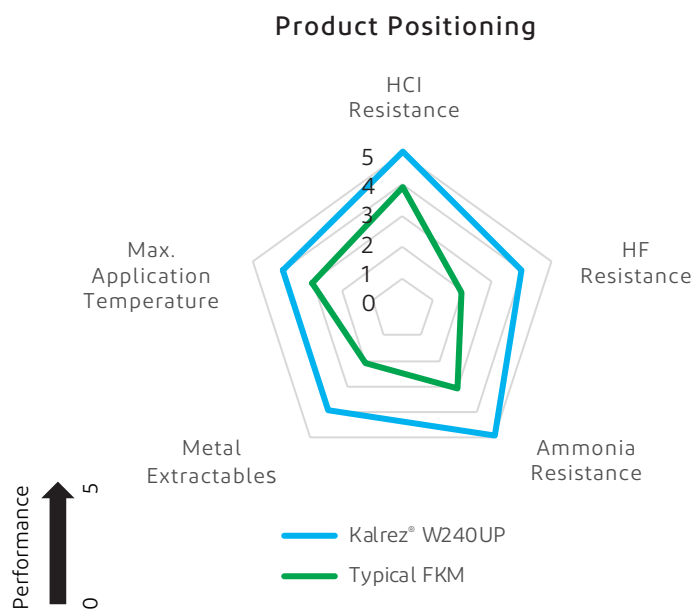
Kalrez® W240UP O-Rings

## Chemical Resistance

Immersion Chemistry (Concentration)	Temperature	Volume Change (%) after 672 hours immersion <sup>1</sup>
		Kalrez® W240UP
HCl (3.5%)	23 °C	< 0.1
HF (49%)	23 °C	2.3
HNO <sub>3</sub> (70%)	23 °C	0.6
PGMEA (> 99.5%)	23 °C	0.1
NH <sub>4</sub> OH (29%)	23 °C	< 0.1
Methoxy-Methylbutyl Acetate (> 98 %)	23 °C	< 0.1
H <sub>2</sub> SO <sub>4</sub> (98%)	90 °C	0.6
IPA (99.9 %)	80 °C	2.4
H <sub>3</sub> PO <sub>4</sub> (85%)	80 °C	< 0.1

<sup>1</sup>Test Method: ASTM D471 and D1414 (AS568 K214 O-ring test specimens)

## Kalrez® W240UP vs Typical FKM and Competitive FFKM



<sup>2</sup> Measurement performed on O-ring surface area. Amount of metal extractable was analyzed by ICP-MS

## Typical Physical Properties\*

Kalrez® grade	Color	Hardness <sup>1</sup> , Shore A	Maximum Service Temperature <sup>2</sup> , °C (°F)	Compression Set <sup>3</sup> at 70 hours, 204 °C, %
W240UP	Black	76	230 (446)	26

<sup>1</sup> ASTM D2240 (pellet test specimens unless otherwise noted)

<sup>2</sup> DuPont proprietary test method; useful temperature range may vary with seal design and application specifics

<sup>3</sup> ASTM D395B and ASTM D1414 (AS568 K214 O-ring test specimens unless otherwise noted)

\* Not to be used for specification purposes

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