




# DuPont™ Kalrez®

## Perfluoroelastomer Parts

### Semiconductor Product Selector Guide

Technical Information – March, 2017

	Process Type	Typical Seal Temperature	Typical Process Environment	Suggested Products*	Comments	Typical Applications
 <p><b>Plasma Processes</b></p>	PECVD/ALD/HDPCVD	250°C	TMS, DEMS, TEOS, SiH <sub>4</sub> , C <sub>3</sub> H <sub>6</sub> , NH <sub>3</sub> , SiF <sub>4</sub> , O <sub>2</sub> , N <sub>2</sub> O, NF <sub>3</sub>	9100	9100 – Low erosion rate and ultra-low particle generation	Dynamic: <ul style="list-style-type: none"> <li>• Door seals</li> <li>• Gate valves</li> <li>• Pendulum valves</li> </ul> Static: <ul style="list-style-type: none"> <li>• Chamber lid seals</li> <li>• Exhaust valves</li> <li>• Gas inlet/outlet/mixing block seals</li> <li>• Window seals</li> <li>• Center ring seals</li> </ul> Other: <ul style="list-style-type: none"> <li>• Seals for heat-traced lines in sub-fab foreline and exhaust systems*</li> </ul>
	PECVD Curing Process	200°C	O <sub>3</sub> , UV light	8705* Quartz Window Seal 9500* All other seal locations		
	SACVD / FCVD	280°C	TEP, TEBO, TEOS, O <sub>3</sub> , NF <sub>3</sub> , NH <sub>3</sub>	9500	8705 – Excellent resistance to UV light	
	Ash/Strip	200°C	O <sub>2</sub> , CF <sub>4</sub> , CHF <sub>3</sub> , NH <sub>3</sub> , Water Vapor, Forming Gas	8002	9300 – Excellent resistance to plasma ions and radicals	
	Dielectric (Oxide) Etch	200°C	CF <sub>4</sub> , C <sub>3</sub> F <sub>8</sub> , CHF <sub>3</sub> , SF <sub>6</sub> , O <sub>2</sub> , H <sub>2</sub>	9300	8002 – Excellent resistance to oxygen plasma	
	Conductor (Poly/Metal) Etch	200°C	CF <sub>4</sub> , CHF <sub>3</sub> , HBr, BCl <sub>3</sub> , CCl <sub>4</sub> , Cl <sub>2</sub>	9100		
 <p><b>Thermal Processes</b></p>	ALD LPCVD	280°C	SiH <sub>4</sub> , HF, F <sub>2</sub> , Cl <sub>2</sub> , NF <sub>3</sub> , H <sub>2</sub> O Vapor, O <sub>2</sub>	8900	8900 – Excellent thermal stability and very low outgassing properties.	<ul style="list-style-type: none"> <li>• Quartz chamber seal</li> <li>• Fittings</li> <li>• Center ring</li> <li>• Plenum seals</li> </ul>
	Metal CVD	280°C	Organic precursors, WF <sub>6</sub> , TiCl <sub>4</sub> , ClF <sub>3</sub> , NF <sub>3</sub>	7075UP		
	Oxidation Diffusion	300°C	N <sub>2</sub> , O <sub>2</sub> , H <sub>2</sub> O, HCl, Cl <sub>2</sub> , O <sub>3</sub>	8900 8575/8475	8575 – Low IR absorption due to white color.	
	Lamp Anneal RTP	300°C	Infrared light	8575		
 <p><b>Wet Processes</b></p>	Wafer Prep	125°C	UPDI, Piranha, SC-1, SC-2, O <sub>3</sub> , HF (49%)	6375UP	6375UP – General purpose product for all wet process applications.	<ul style="list-style-type: none"> <li>• Door/lid seals</li> <li>• Drain seals</li> <li>• Seals for chemical containers</li> <li>• Fittings</li> <li>• Seals for filters/connectors</li> <li>• Flow meters</li> </ul>
	Etching	180°C	HNO <sub>3</sub> , HF, H <sub>2</sub> O, H <sub>3</sub> PO <sub>4</sub> , HNO <sub>3</sub>			
	Photolithography	125°C	H <sub>2</sub> SO <sub>4</sub> + Oxidant, Organic Acids, nMP			
	Stripping	125°C	nMP/Alkanolamine Hydroxylamine			
	Copper Plating	100°C	CuSO <sub>4</sub> Solution H <sub>2</sub> SO <sub>4</sub> , H <sub>2</sub> O <sub>2</sub>			

\* Please consult a Kalrez® Application Engineer to assess performance fit in your application. Please refer to the Kalrez® Application Guide ([www.kalrez.com](http://www.kalrez.com)) for specific chemical compatibility ratings for Kalrez® products.



The miracles of science™

## DuPont™ Kalrez® Parts for the Semiconductor Industry

DuPont™ Kalrez® perfluoroelastomer parts have been used successfully in highly aggressive sealing environments for over 30 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 and must be specified for Kalrez® 6375UP and 7075UP.

### Typical Physical Properties<sup>1</sup>

Product	Color	Hardness Shore A (pellet) <sup>2</sup>	Hardness Shore M (O-ring) <sup>4</sup>	Maximum Application Temperature <sup>9</sup> °C	100% Modulus <sup>5</sup> MPa	Compression Set <sup>8</sup> at 70 hr. 204 °C, %
9100	Amber translucent	70 <sup>10</sup>	78	300	5.17	18
9300	Brown	77 <sup>10</sup>	82	300	6.13	25
9500	Tan	76 <sup>10</sup>	82	310	9.60	20
8002	Clear	69 <sup>3</sup>	76	275	2.88 <sup>6</sup>	15
8475	White	62	74	300	2.49	20
8575	White	63	74	300	2.99	23
8900	Black	76 <sup>10</sup>	85	325	13.31	8
7075UP	Black	75	85	327	10.54	15
6375UP	Black	77	86	275	9.00	24 <sup>7</sup>
8705	Black	77 <sup>10</sup>	85	310	6.55 <sup>4</sup>	17

<sup>1</sup> Not to be used for specification purposes

<sup>2</sup> ASTM D2240 (pellet test specimens unless otherwise noted)

<sup>3</sup> JIS 6253 (plied slab test specimens)

<sup>4</sup> ASTM D2240 and ASTM D1414 (AS568 K214 O-ring test specimens)

<sup>5</sup> ASTM D412 (dumbbell test specimens unless otherwise noted)

<sup>6</sup> JIS 6251 (dumbbell test specimens)

<sup>7</sup> ASTM D395B (pellet test specimens)

<sup>8</sup> ASTM D395B and ASTM D1414 (AS568 K214 O-ring test specimens unless otherwise noted)

<sup>9</sup> DuPont proprietary test method

<sup>10</sup> ASTM D2240 (plied slab test specimen)

Visit us at [kalrez.dupont.com](http://kalrez.dupont.com)

Contact DuPont at the following regional locations:

**North America**  
800-222-8377

**Latin America**  
+0800 17 17 15

**Europe, Middle East, Africa**  
+41 22 717 51 11

**Greater China**  
+86-400-8851-888

**ASEAN**  
+65-6586-3688

**Japan**  
+81-2-5521-8600

The information provided in this data sheet corresponds to our knowledge on the subject at the date of its publication. This information may be subject to revision as new knowledge and experience becomes available. The data provided fall within the normal range of product properties and relate only to the specific material designated; these data may not be valid for such material used in combination with any other materials, additives or pigments or in any process, unless expressly indicated otherwise.

The data provided should not be used to establish specification limits or used alone as the basis of design; they are not intended to substitute for any testing you may need to conduct to determine for yourself the suitability of a specific material for your particular purposes. Since DuPont cannot anticipate all variations in actual end-use and disposal conditions, DuPont does not guarantee favorable results, makes no warranties and assumes no liability in connection with any use of this information. All such information is given and accepted at the buyer's risk. It is intended for use by persons having technical skill, at their own discretion and risk. Nothing in this publication is to be considered as a license to operate under or a recommendation to infringe any patent. DuPont advises you to seek independent counsel for a freedom to practice opinion on the intended application or end-use of our products.

**CAUTION:** Do not use DuPont materials in medical applications involving implantation in the human body or contact with internal body fluids or tissues unless the material has been provided from DuPont under a written contract that is consistent with DuPont policy regarding medical applications and expressly acknowledges the contemplated use. For further information, please contact your DuPont representative. You may also request a copy of DuPont POLICY Regarding Medical Applications H-50103-5 and DuPont CAUTION Regarding Medical Applications H-50102-5.

Copyright © DuPont. The DuPont Oval Logo, DuPont™, The miracles of science™ and Kalrez® are trademarks or registered trademarks of E.I. du Pont de Nemours and Company or its affiliates. All rights reserved.

(03/17) Reference No. KZE-H88232-00-Y0317



*The miracles of science™*