




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

* Please consult a Kalrez® Application Engineer to assess performance fit in your application. Please refer to the Kalrez® Application Guide (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 Properties¹

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

¹ Not to be used for specification purposes

² ASTM D2240 (pellet test specimens unless otherwise noted)

³ JIS 6253 (plied slab test specimens)

⁴ ASTM D2240 and ASTM D1414 (AS568 K214 O-ring test specimens)

⁵ ASTM D412 (dumbbell test specimens unless otherwise noted)

⁶ JIS 6251 (dumbbell test specimens)

⁷ ASTM D395B (pellet test specimens)

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

⁹ DuPont proprietary test method

¹⁰ ASTM D2240 (plied slab test specimen)

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