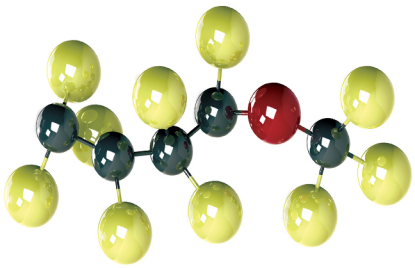
Technical Information

Kalrez® Spectrum™ perfluoroelastomer parts

A Product of DuPont Dow Elastomers



Kalrez®

Compound Description

Kalrez® *B3* is a clear, transparent compound targeted specifically for select semiconductor plasma and gas deposition applications. This unfilled compound offers ultra-low particle generation in oxygen and fluorine-based plasmas versus mineral-filled compounds. Kalrez® *B3* exhibits excellent resistance to dry process chemistry, has good mechanical strength properties and is well suited for both static and low stress/low sealing force applications. A maximum continuous service temperature of 250°C (482°F) is suggested. Ultrapure post cleaning and packaging is standard for parts made from Kalrez® *B3*

Performance Features/Benefits

- Ultra low particle generation in oxygen and fluorine-based plasmas
- Excellent (low) compression set properties
- Excellent thermal stability
- Excellent resistance to dry process chemistry

Suggested Applications

- Gas inlet seals
- Gas orifice seals
- Gas feedthrough seals
- Other plasma applications
- Other static and low stress/low sealing force applications

Typical Physical Properties[1]	
Color	Clear transparent
Hardness, Shore A (plied slabs)[2]	69
Hardness, Shore M (O-ring)[3]	76
100% Modulus[4], MPa	2.88
Tensile Strength at Break[4], MPa	15.95
Elongation at Break[4], %	246
Compression Set[5], % 70 hr at 204°C	15
Max.Continuous Service Temperature[6], °C	250

1 Not to be used for specification purposes
2 JIS 6253 test method (plied slab test specimens)
3 ASTM D395B and ASTM D1414 (AS568 K214 O-ring test specimens)
4 JIS 6251 test method (dumbbell test specimens)
5 ASTM D395B and ASTM D1414 (AS568 K214 O-ring test specimens
6 DuPont Performance Elastomers proprietary test method

Figure 1. Relative Particle Generation
1 hr at 900 W, 0.1 Torr, Direct Exposure

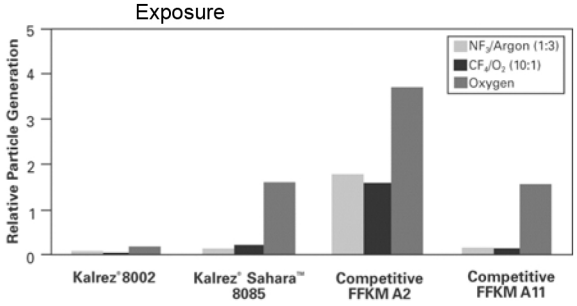
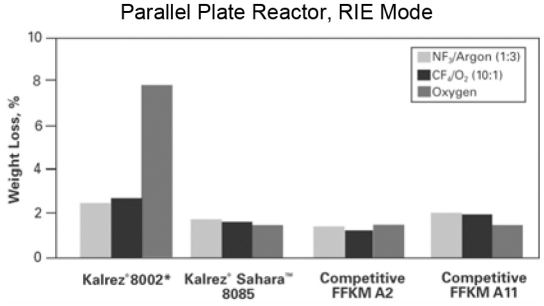


Figure 2. Weight Loss*, %
1 hr at 900 W, 0.1 Torr, Direct Exposure Parallel Plate Reactor, RIE Mode



Fabs Choose Kalrez® $B3$ For Improved Performance

Kalrez® $B3$ has been reported to significantly improve wafer production in semiconductor HDPCVD and PECVD applications where fluorinated plasmas, i.e., NF_3, C_3F_8, etc. are used during the cleaning cycle. In an evaluation at a fabline customer, Kalrez® 8002 exhibited lower particle generation and longer seal life compared to a competitive perfluoroelastomer in several different static sealing applications.

Kalrez® 8002 Case Report

Customer:	Large memory Fab line in Taiwan
Equipment:	AMAT Centura/DXZ
Process Type:	PECVD, BPSG
Application:	Gas Box (268), Shower Head (275), Foreline (220 and 121)
Process Gases:	TEOS, TMB, O_3; 1000 W
Cleaning Gases:	C_3F_8; 2000 W
Est. Seal Temperature:	85~120°C
Chamber Pressure:	~200 Torr.
Incumbent Material:	Competitive FFKM A2
Competitive FFKM Seals:	Competitive seals showed sign of cracking/leakage at 20,000 wafer PM
Kalrez® 8002 Results:	Evaluated for 22,000 wafer cycles with no sign of cracking/leakage and improved/lower particle performance. Customer has adopted Kalrez® $B3$