

DuPont™ Kalrez® 9300

For Semiconductor Dielectric Etch Applications

Technical Information – March, 2017

Product Description

DuPont™ Kalrez® 9300 perfluoroelastomer parts are a brown product for Dielectric (Oxide) Etch applications. It has been specifically designed for use in applications where the plasma environment is a combination of ions (“physical”) and radicals (“chemical”), i.e., where a balance of “physical” and “chemical” plasma erosion resistance is typically required.

Kalrez® 9300 exhibits excellent resistance to oxygen and fluorine-based plasma and etch process chemistry. It also offers very low metals content, excellent thermal stability and mechanical strength, and is well suited for both static and dynamic sealing applications. A maximum application temperature of 300°C (572°F) is suggested. Ultrapure post-cleaning and packaging is standard for all Kalrez® 9300 parts.



Kalrez® 9300 parts are based on a proprietary crosslinking and mechanical reinforcement system which is only available from DuPont.

Features/Benefits

- Low erosion rate and ultra-low particle generation in ion/radical dominant oxygen and fluorine-based plasmas
- Excellent resistance to etch process chemistry
- Very low metals content
- Excellent thermal stability
- Excellent mechanical strength

Suggested Applications

- Gas inlet/orifice seals
- Chamber lid seals
- Isolation valve seals
- Bonded gate valves/slit valve door seals

Typical Physical Properties¹

Color	Brown
Hardness, Shore A (Plied Slab) ²	77
Hardness, Shore M (O-ring) ³	82
100% Modulus ⁴ , MPa (psi)	6.13 (889)
Tensile Strength at Break ⁴ , MPa (psi)	15.43 (2238)
Elongation at Break ⁴ , %	222
Compression Set ⁵ , %	
70 hr. at 204 °C (400°F)	25
70 hr. at 250 °C (482°F)	37
70 hr. at 300 °C (572°F)	56
Maximum Application	
Temperature ⁶ , °C (°F)	300 (572)

¹ Not to be used for specification purposes

² ASTM D2240 (plied slab test specimens)

³ ASTM D2240 & D1414 (AS568 K214 O-ring test specimens)

⁴ ASTM D412 (dumbbell test specimens)

⁵ ASTM D395B & D1414 (AS568 K214 O-ring test specimens)

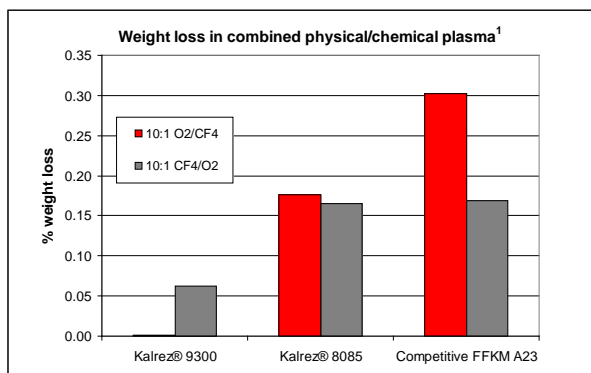
⁶ DuPont proprietary test method



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Plasma Weight Loss

Because there is no industry standard to characterize elastomer plasma resistance, OEMs and Fablines rely on in-use testing and actual performance. To further assist the industry in proper seal selection, DuPont has developed a test method that closely approximates chamber conditions to quantify seal resistance to plasma. In this test on weight loss, O-rings are placed on a silicon wafer and directly exposed to extremely damaging plasma environments. Kalrez® 9300 parts exhibited lower weight loss upon exposure to combined ion and radical oxygen and fluorine-based plasma versus Kalrez® 8085 parts and competitive FFKM A23.



¹DuPont proprietary test method

Note: Color variations may be observed in DuPont™ Kalrez® 9300 parts. Variations are considered to be cosmetic. Please contact a Kalrez® Application Engineer if you have any questions or if you need any additional information.

Marks (Dark Spots)

Small marks (dark spots) may be present in Kalrez® 9500 parts. The mark (dark spot) is a result of the curing process and is inherent in the part. It is not indicative of foreign matter and is not expected to have an adverse effect on the performance of the part in service.

Darker Sealing Element — Bonded Door Seal (BDS)

The color of the sealing element in a Kalrez® 9500 bonded door seal (BDS) is darker than a Kalrez® 9500 O-ring for two reasons:

- 1) Kalrez® 9500 BDS are manufactured at different standard operating conditions versus Kalrez® 9500 O-rings.
- 2) Since the sealing element is bonded to aluminum on at least one or more sides, less light passes through it. In both cases, this is a color issue, i.e., the darker color is not indicative of foreign material present in the sealing element nor is it expected to have an adverse effect on the performance of Kalrez® 9500 BDS in service.

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