

DuPont™ Kalrez® 9500

Perfluoroelastomer Parts

For Deposition, Ash/Strip & Conductor Etch Processes

Preliminary Product Data Sheet — June 2013

Product Description

DuPont™ Kalrez® 9500 perfluoroelastomer parts are a tan product for Deposition, Ash/Strip and Conductor (Poly/Metal) Etch processes. It has been specifically designed for use in applications where ozone is used for processing, e.g. SACVD, PECVD ultra-low K (BLOK™), and where the plasma environment is more “chemical”, i.e., where oxygen and fluorine radicals are more dominant.

Kalrez® 9500 exhibits excellent resistance to CVD and ash/strip process chemistry, i.e., ozone, ammonia and water vapor. It also offers outstanding thermal stability, very low outgassing and excellent mechanical strength and is well suited for both static and dynamic sealing applications. A maximum continuous service temperature of 310 °C is suggested. Kalrez® 9500 can also withstand short-term excursions up to 325 °C. Ultrapure post-cleaning and packaging is standard for all Kalrez® 9500 parts.



Kalrez® 9500 parts are based on a proprietary crosslinking system which is only available from DuPont.

Features/Benefits

- Excellent resistance to CVD and ash/strip process chemistry (ozone, ammonia, water vapor, etc.)
- Low erosion rate and ultra-low particle generation in radical dominant oxygen and fluorine-based plasmas
- Excellent thermal stability
- Very low outgassing and metals content
- Excellent mechanical strength

Suggested Applications

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

Ozone Resistance

Ozone is routinely used for processing in SACVD processes. It can attack the crosslinking structure of elastomeric seal materials causing a loss of sealing functionality (compression set resistance) to occur. The following table shows the compression set properties of Kalrez® 9500 versus Kalrez® 8085 after

Typical Physical Properties¹

| | |
|---|------|
| Color | Tan |
| Hardness, Shore A (Plied Slab) ² | 75 |
| Hardness, Shore M (O-ring) ³ | 79 |
| 100% Modulus ⁴ , MPa | 9.5 |
| Tensile Strength at Break ⁴ , MPa | 17.5 |
| Elongation at Break ⁴ , % | 205 |
| Compression Set ⁵ , % | |
| 70 hr at 204 °C | 20 |
| 70 hr at 250 °C | 36 |
| 70 hr at 310 °C | 59 |
| Maximum Continuous Service, Temperature ⁶ , °C | 310 |

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)

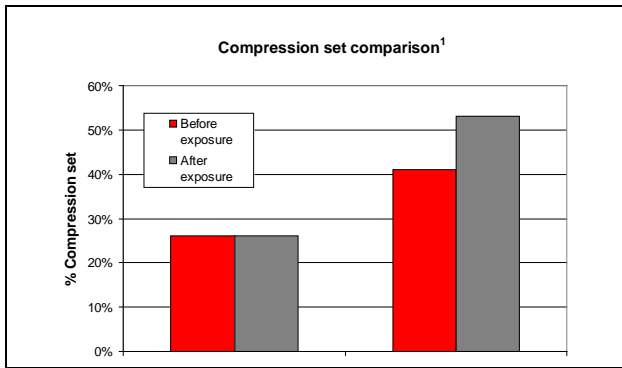
⁵ ASTM D395B & D1414 (AS568 K214 O-ring test specimens)

⁶ DuPont proprietary test method



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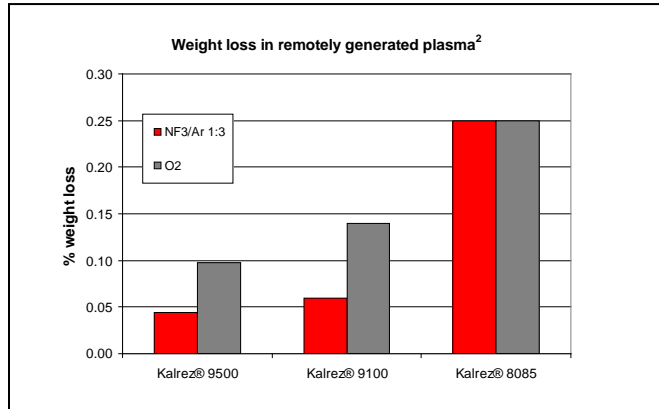
exposure to 7.4% ozone by volume for 10 hours @ 100°C. Kalrez® 9500 was largely unaffected and retained its sealing functionality better than Kalrez® 8085.



¹ASTM D395 & D1414 AS568 K214 O-ring test specimens

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, O-rings are placed on a silicon wafer and directly exposed to extremely damaging plasma environments. Kalrez® 9500 exhibited the lowest weight loss upon exposure to radical dominant oxygen and fluorine-based plasma versus the other perfluoroelastomers tested.



²DuPont proprietary test method

Note: Color variations may be observed in DuPont™ Kalrez® 9500 parts. Variations are considered to be cosmetic. See below for additional details. 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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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
+81-3-5521-8600

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(06/11) Reference No. KZE-A10956-00-D0613



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