**Kalrez® 8002**

**Compound Description**

Kalrez® 8002 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® 8002 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® 8002.

**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**

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Color</td>
<td>Clear transparent</td>
</tr>
<tr>
<td>Hardness, Shore A (plied slabs)²</td>
<td>69</td>
</tr>
<tr>
<td>Hardness, Shore M (O-ring)³</td>
<td>76</td>
</tr>
<tr>
<td>100% Modulus⁴, MPa</td>
<td>2.88</td>
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<tr>
<td>Tensile Strength at Break⁴, MPa</td>
<td>15.95</td>
</tr>
<tr>
<td>Elongation at Break⁵, %</td>
<td>246</td>
</tr>
<tr>
<td>Compression Set⁶, %</td>
<td>15</td>
</tr>
<tr>
<td>70 hr at 204°C</td>
<td></td>
</tr>
<tr>
<td>Max. Continuous Service Temperature⁶, °C</td>
<td>250</td>
</tr>
</tbody>
</table>

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

* Because Kalrez® 8002 is an unfilled product, weight loss is higher in certain plasmas
Kalrez® 8002 has been reported to significantly improve wafer production in semiconductor HDPCVD and PECVD applications where fluorinated plasmas, i.e., NF3, C3F8, 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, O3; 1000 W

Cleaning Gases: C3F8; 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® 8002.