Kalrez® Sahara™ 8085

**Compound Description**

Kalrez® Sahara™ 8085 is a new, specialty compound specifically developed for gas deposition applications, i.e., HDPCVD, PECVD, etc. It has been specifically formulated for minimal particle generation in NF3 plasma. Sahara™ 8085 exhibits very low particle generation and low weight loss in oxygen and fluorine plasma, has excellent mechanical properties and is well-suited for both static and dynamic sealing applications (e.g., bonded slit valve doors, bonded gate valves, gas inlets, gas orifice seals, gas feedthrough seals, etc.) A maximum continuous service temperature of 225°C is suggested. Ultrapure post-cleaning and packaging is standard for parts made from Sahara™ 8085.

**Performance Features/Benefits**

- Specifically formulated for minimal particle generation in NF3 plasma
- Excellent oxygen and fluorine plasma resistance, i.e., very low particle generation, low weight loss, etc.
- Excellent mechanical strength properties
- Very low outgassing properties
- Good thermal stability

**Suggested Applications**

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

**Plasma Performance**

Because there is no industry standard to characterize elastomer plasma performance, OEMs and Fab lines rely on in-use testing and actual performance. To further assist the industry in proper seal selection, DuPont Dow has developed a test method that approximates chamber conditions to quantify seal resistance to plasma. In this test, O-rings are placed on a silicon wafer in a process chamber and exposed directly to the most damaging plasma environments. Figure 1 illustrates the excellent weight loss performance of Kalrez® Sahara™ 8085 versus Kalrez® 4079.

<table>
<thead>
<tr>
<th>Property</th>
<th>Typical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardness, Shore A²</td>
<td>82</td>
</tr>
<tr>
<td>100% Modulus³, MPa</td>
<td>7.5</td>
</tr>
<tr>
<td>Tensile Strength at Break², MPa</td>
<td>16.3</td>
</tr>
<tr>
<td>Elongation at Break³, %</td>
<td>159</td>
</tr>
<tr>
<td>Compression Set², 70 hr at 150°C, %</td>
<td>28</td>
</tr>
<tr>
<td>Compression Set², 70 hr at 175°C, %</td>
<td>35</td>
</tr>
<tr>
<td>Compression Set², 70 hr at 204°C, %</td>
<td>42</td>
</tr>
<tr>
<td>Max. Continuous Service Temperature, °C</td>
<td>225</td>
</tr>
</tbody>
</table>

1 Not to be used for specification purposes  
2 Data obtained using AS568A K214 O-rings  
3 ASTM D412 (dumbbells specimens)
Kalrez® Sahara™ 8085 also exhibits very low particle generation upon exposure to reactive plasmas. Below are two photographs comparing the relative particle generation of Kalrez® Sahara™ 8085 and Kalrez® 4079 after exposure to CF<sub>4</sub>/O<sub>2</sub> (10:1) plasma. Kalrez® Sahara™ 8085 exhibited minimal particle generation.

Proven Performance in NF3 Plasma
Kalrez® Sahara™ 8085 has been proven to significantly improve wafer yield in a variety of semiconductor plasma environments where NF<sub>3</sub> plasma was used during the cleaning cycle, wafer yield more than doubled. In numerous evaluations at fabine customers, Kalrez® Sahara™ 8085 exhibited improved mechanical strength, lower particle generation and longer seal life compared to competitive perfluoroelastomers in both static and dynamic applications.

Kalrez® Sahara™ 8085 (left) and Kalrez® 4079 (right)
O-rings wiped with a lint-free cloth after 1 hr exposure to CF<sub>4</sub>/O<sub>2</sub> (10:1) plasma at 900 W, 0.1 torr.

For further information on Kalrez® or other elastomers please contact one of the addresses below, or visit us at our website at www.dupont-dow.com

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