Compound 4079
(colour: black)

General Description
Kalrez® 4079 is a carbon black filled compound having excellent chemical resistance and mechanical properties. It has a maximum operating temperature of 315 °C, although short excursions to higher temperatures are possible. It exhibits low swell in organic and inorganic acids and aldehydes and has good response to temperature cycling effects. Kalrez 4079 has outstanding hot air ageing properties and exhibits very low and stable compression set at high temperatures. Its relatively low modulus can be a great help in assembly.

This is a general purpose material suitable for around 95% of all applications in all industries. Some of its uses are O-rings, diaphragms, seals, gaskets and other custom parts.

Compound 4079 is not recommended for applications involving water/steam and aliphatic amines at higher temperature. It should never be used in applications involving ethylene oxide or propylene oxide. The physical properties and chemical resistance of compound 4079 are as follows:

Physical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hardness</td>
<td>Shore A ± 5</td>
<td>75</td>
</tr>
<tr>
<td>100% Modulus</td>
<td>MPa</td>
<td>7.2</td>
</tr>
<tr>
<td></td>
<td>psi</td>
<td>1050</td>
</tr>
<tr>
<td>TS at break</td>
<td>MPa</td>
<td>16.9</td>
</tr>
<tr>
<td></td>
<td>psi</td>
<td>2450</td>
</tr>
<tr>
<td>Elongation at break</td>
<td>%</td>
<td>150</td>
</tr>
<tr>
<td>Compression set</td>
<td>%</td>
<td>25</td>
</tr>
<tr>
<td>70 h at 204°C</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Not to be used for specifications
2 ASTM D2240
3 ASTM D412, 500 mm/min (20 in/min)
4 ASTM D395 B, pellets

Chemical Resistance

<table>
<thead>
<tr>
<th>Material</th>
<th>Compound</th>
<th>Kalrez 4079</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemical resistance to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aromatic / Aliphatic oils</td>
<td>+++*</td>
<td></td>
</tr>
<tr>
<td>Acids</td>
<td>+++*</td>
<td></td>
</tr>
<tr>
<td>Alkalis</td>
<td>+++*</td>
<td></td>
</tr>
<tr>
<td>Alcohols</td>
<td>+++*</td>
<td></td>
</tr>
<tr>
<td>Aldehydes</td>
<td>++</td>
<td></td>
</tr>
<tr>
<td>Amines</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Ethers</td>
<td>+++*</td>
<td></td>
</tr>
<tr>
<td>Esters</td>
<td>+++*</td>
<td></td>
</tr>
<tr>
<td>Ketones</td>
<td>+++*</td>
<td></td>
</tr>
<tr>
<td>Steam / Hot Water</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Strong Oxidizers</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Ethylene / Propylene Oxide</td>
<td>-- --</td>
<td></td>
</tr>
</tbody>
</table>

+++ = excellent
++ = very good
+ = good
0 = marginal
- = poor
-- = not recommended
* = recommended compound for this chemical
The major exceptions to the use of compound 4079 are listed below:

**Hot water and steam**
- Use Kalrez® 2035 up to 210°C.
- Use Kalrez 1050LF up to 280°C.
- Use Kalrez 3018 for high pressure applications.

**Propylene/Ethylene oxide**
- Use Kalrez 2035.

**Hot aliphatic amines** – above 80°C (the major aliphatic amines are ethylene diamine and hexamethylene diamine)
- Use Kalrez 3018 up to 280°C.
- Use Kalrez 1050LF up to 280°C.

### Physical Properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Range (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific gravity, g/cm³</td>
<td>1.90 – 2.00</td>
</tr>
</tbody>
</table>

### Miscellaneous

**Oxygen – Autogenous Ignition Temperature**
- Compound 1050 LF: 313°C
- Compound 1045: 370°C

### Permeation Rates of Gases

<table>
<thead>
<tr>
<th>Gas</th>
<th>Temperature, °C</th>
<th>Rate** (× 10⁻⁹ cm³/cmHg·s·cm²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nitrogen</td>
<td>RT</td>
<td>0.05</td>
</tr>
<tr>
<td>Oxygen</td>
<td>RT</td>
<td>0.09</td>
</tr>
<tr>
<td>Helium</td>
<td>RT</td>
<td>2.5</td>
</tr>
<tr>
<td>Hydrogen</td>
<td></td>
<td>113</td>
</tr>
<tr>
<td>Argon</td>
<td></td>
<td>6.1</td>
</tr>
<tr>
<td>Krypton</td>
<td></td>
<td>9.9</td>
</tr>
<tr>
<td>Xenon</td>
<td></td>
<td>19.9</td>
</tr>
</tbody>
</table>

**Thermal Properties**

- Linear coefficient of thermal expansion (25 – 250°C)
  \[ L = L_0 (1 + aΔT) \]
  \[ a = 2.3 \times 10^{-4}/°C \]

- Specific heat
  - at 50°C = 0.945 J/g (0.226 cal/g)
  - at 100°C = 0.974 J/g (0.233 cal/g)
  - at 150°C = 1.053 J/g (0.252 cal/g)

**For further information, please contact:**

**Global Headquarters**
DuPont Dow Elastomers L.L.C.
300 Bellevue Parkway, Suite 300
Wilmington, DE 19809 USA
Tel. +1 302 792 4200
Fax. +1 302 892 7380

**Kalrez Parts Marketing**
DuPont Dow Elastomers L.L.C.
P.O. Box 6098
Newark, DE 19714
Tel. 800 323 9806

**European Regional Headquarters**
DuPont Dow Elastomers S.A.
2, chemin du Pavillon
CH-1218 Le Grand-Saconnex
Geneva, Switzerland
Tel. +41 22 717 4000
Fax. +41 22 717 4001

**Kalrez Parts European Marketing**
DuPont Dow Elastomers N.V.
Battelsesteenweg 455d
B-2800 Mechelen, Belgium
Tel. +32 15 28 87 00
Fax. +32 15 28 87 50

**Asia Pacific Regional Headquarters**
DuPont Dow Elastomers Pte. Ltd.
1 Maritime Square #10-54
World Trade Centre
Singapore 099253
Tel. +65 275 9383
Fax. +65 275 9395

**Kalrez Parts Asia Pacific Marketing**
DuPont Dow Elastomers Japan
Dempa Bldg
1-11-15 Higashi Gotanda
Shinagawa-ku, Tokyo
Japan
Tel. +81 3 3444 5166
Fax. +81 3 3444 6095

**South & Central America Regional Headquarters**
DuPont Dow Elastomers Ltda.
Rua Henrique Monteiro, 90
5 andar – Pinheiros
Sao Paulo – SP 05423-020
Brasil
Tel. +55 11 816 0256
Fax. +55 11 814 6845

www.dupont-dow.com

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