ROCBON PTFE Composites
Grade Descriptions and Properties

ROC Carbon Company
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ROCBON 1000 series is a selection of high-performance, reinforced fluorocarbon resin composites that are unique in the plastic family and that possess exceptional properties:

- Chemical resistance
- Self-lubricating
- Thermal stability
- Moisture resorbant
- Contamination resistance
- Mechanical strength
- Electrical insulation

### Grades and Applications

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1007</td>
<td>Virgin PTFE for packings, seals and bushings</td>
</tr>
<tr>
<td>1051</td>
<td>25% fiberglass-filled grade for common seals and bushings</td>
</tr>
<tr>
<td>1911</td>
<td>Carbon/graphite-filled grades for bearings, piston rings, rider rings and various seals. An excellent combination that provides good service life. 1911 has 25% fill, 1921 has 35% fill</td>
</tr>
<tr>
<td>1921</td>
<td>25% graphite-filled grade for bearings, piston rings, rider rings and various seals. An excellent combination that provides good service life. 1911 has 25% fill, 1921 has 35% fill</td>
</tr>
<tr>
<td>1521</td>
<td>50% stainless steel-filled grade for bearings and valve seat applications where high load and corrosion are primary concerns.</td>
</tr>
<tr>
<td>1821</td>
<td>Moly/bronze-filled grade for bearing and seal applications where high load strength is needed. 55% bronze, 5% moly filled</td>
</tr>
<tr>
<td>1551</td>
<td>Ceramic-filled grade for applications where high wear resistance is required. (25% mica)</td>
</tr>
<tr>
<td>1621</td>
<td>35% carbon fiber-filled grade where high strength and high wear performance is sought; a high-performance composite grade.</td>
</tr>
</tbody>
</table>

### Sizes

- **Solid cylinder:** 1.5 inch to 6 inch diameter, 12 inches long
- **Tube:** 1.5 inch to 15.875 inch diameter, 12 inches long

Larger sizes are available upon request.

### Technical Support

Technical support is available to help select the proper grade for the application, and engineering design service can be provided for the finished product. For fastest response, call our toll-free number.

- **Toll-Free:** 800.324.7743
- **Phone:** 713.468.7744
- **Fax:** 713.465.2158
- **Email** sales@roccarbon.com

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<table>
<thead>
<tr>
<th>Physical Property</th>
<th>ASTM Test Method</th>
<th>Units</th>
<th>1007 Virgin PTFE</th>
<th>1051 Glass</th>
<th>1521 Stainless Steel</th>
<th>1551 Ceramic</th>
<th>1621 Carbon Fiber</th>
<th>1821 Moly/Bronze</th>
<th>1911 Carbon/Graphite</th>
<th>1921 Carbon/Graphite</th>
</tr>
</thead>
<tbody>
<tr>
<td>Specific gravity</td>
<td>D792</td>
<td>g/cc</td>
<td>2.17</td>
<td>2.24</td>
<td>3.78</td>
<td>2.20</td>
<td>2.10</td>
<td>3.90</td>
<td>2.11</td>
<td>2.10</td>
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<tr>
<td>Tensile strength @ break (MD)</td>
<td>D638</td>
<td>psi</td>
<td>4,900</td>
<td>2,100</td>
<td>2,500</td>
<td>2,300</td>
<td>3,000</td>
<td>2,300</td>
<td>1,800</td>
<td>1,600</td>
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<tr>
<td></td>
<td></td>
<td>MPa</td>
<td>33.8</td>
<td>14.5</td>
<td>17.2</td>
<td>15.9</td>
<td>20.7</td>
<td>15.9</td>
<td>12.4</td>
<td>11.0</td>
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<tr>
<td></td>
<td>D638</td>
<td>psi</td>
<td>5,600</td>
<td>2,900</td>
<td>2,900</td>
<td>2,700</td>
<td>3,400</td>
<td>2,700</td>
<td>2,200</td>
<td>2,000</td>
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<td></td>
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<td>MPa</td>
<td>38.6</td>
<td>20.0</td>
<td>20.0</td>
<td>18.6</td>
<td>23.5</td>
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<td>15.2</td>
<td>13.8</td>
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<tr>
<td>Elongation @ break (MD)</td>
<td>D638</td>
<td>%</td>
<td>340</td>
<td>250</td>
<td>65</td>
<td>65</td>
<td>60</td>
<td>90</td>
<td>60</td>
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<td></td>
<td></td>
<td>%</td>
<td>390</td>
<td>270</td>
<td>70</td>
<td>70</td>
<td>60</td>
<td>98</td>
<td>66</td>
<td>55</td>
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<td>Deformation under load (MD)</td>
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<td>%</td>
<td>12.0</td>
<td>9.5</td>
<td>2.8</td>
<td>2.8</td>
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<td>3.6</td>
<td>6.0</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>%</td>
<td>15.0</td>
<td>13.6</td>
<td>3.0</td>
<td>3.0</td>
<td>10.0</td>
<td>4.0</td>
<td>10.2</td>
<td>5.5</td>
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<tr>
<td>Flexural strength, 3% strain</td>
<td>D790</td>
<td>psi</td>
<td>1,500</td>
<td>1,950</td>
<td>3,500</td>
<td>3,200</td>
<td>2,400</td>
<td>3,300</td>
<td>2,350</td>
<td>2,400</td>
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<td></td>
<td></td>
<td>MPa</td>
<td>10.3</td>
<td>13.5</td>
<td>24.1</td>
<td>22.0</td>
<td>16.6</td>
<td>22.8</td>
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<td>16.6</td>
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<tr>
<td>Flexural modulus</td>
<td>D790</td>
<td>psi</td>
<td>90,000</td>
<td>190,000</td>
<td>250,000</td>
<td>250,000</td>
<td>160,000</td>
<td>210,000</td>
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<td>180,000</td>
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<td>MPa</td>
<td>622</td>
<td>1,313</td>
<td>1,727</td>
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<td>1,106</td>
<td>1,451</td>
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<tr>
<td>Compressive strength, 5% strain</td>
<td>D695</td>
<td>psi</td>
<td>1,800</td>
<td>2,200</td>
<td>4,000</td>
<td>3,500</td>
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<td>3,000</td>
<td>2,500</td>
<td>2,700</td>
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<td>MPa</td>
<td>12.4</td>
<td>15.2</td>
<td>27.6</td>
<td>24.1</td>
<td>17.2</td>
<td>20.7</td>
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<td>18.6</td>
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<tr>
<td>Hardness, Durometer</td>
<td>—</td>
<td>Type D</td>
<td>54</td>
<td>62</td>
<td>70</td>
<td>70</td>
<td>68</td>
<td>70</td>
<td>64</td>
<td>66</td>
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<tr>
<td>Thermal expansion, X10¹ (MD)</td>
<td>D696</td>
<td>in/in°F</td>
<td>7.5</td>
<td>6.4</td>
<td>5.3</td>
<td>5.3</td>
<td>4.0</td>
<td>5.6</td>
<td>6.0</td>
<td>4.6</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mm/mm/°C</td>
<td>13.5</td>
<td>11.5</td>
<td>9.5</td>
<td>9.5</td>
<td>7.2</td>
<td>10.1</td>
<td>10.8</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>(CD)</td>
<td>in/in°F</td>
<td>6.2</td>
<td>4.1</td>
<td>4.0</td>
<td>4.0</td>
<td>3.6</td>
<td>4.3</td>
<td>4.7</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mm/mm/°C</td>
<td>3.4</td>
<td>2.3</td>
<td>2.2</td>
<td>2.2</td>
<td>2.0</td>
<td>2.4</td>
<td>2.6</td>
<td>2.2</td>
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<tr>
<td>Limiting PV @100 fpm, 72°F (22° C)</td>
<td>—</td>
<td>psi<em>fpm/MPa</em>m/min</td>
<td>10,500</td>
<td>10,500</td>
<td>20,000</td>
<td>18,000</td>
<td>20,000</td>
<td>12,500</td>
<td>20,000</td>
<td>20,000</td>
</tr>
<tr>
<td>Wear factor (F) X10¹</td>
<td>—</td>
<td>in/min</td>
<td>6</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td>cm/min/kg/hr</td>
<td>13.6</td>
<td>13.6</td>
<td>4.5</td>
<td>4.5</td>
<td>13.6</td>
<td>11.3</td>
<td>13.6</td>
<td>22.6</td>
</tr>
<tr>
<td>Coefficient of friction</td>
<td>static</td>
<td>—</td>
<td>0.04</td>
<td>0.07</td>
<td>0.08</td>
<td>0.08</td>
<td>0.07</td>
<td>0.08</td>
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<tr>
<td></td>
<td></td>
<td>dynamic</td>
<td>0.05</td>
<td>0.12</td>
<td>0.10</td>
<td>0.10</td>
<td>0.08</td>
<td>0.09</td>
<td>0.09</td>
<td>0.16</td>
</tr>
</tbody>
</table>

Note: The physical properties of ROC CARBON grades may vary in relation to the molded part size, configuration and the application conditions. The above values are typical and should be considered only as a guide or reference.

MD = Molded direction; CD = Cross direction