Technical Information

**Introduction**

Viton™ GF-200S fluoroelastomer is a 70% fluorine, peroxide-cured fluoroelastomer similar to Viton™ GF-600S, but with a significantly lower gum polymer viscosity of ~25 (ML at 121 °C [250 °F]). Viton™ GF-200S utilizes advanced polymer architecture (APA), which includes a novel peroxide cure site along with an optimized molecular weight distribution.

**Features**

- Excellent fluid resistance to aromatic hydrocarbons and alcohols, including methanol, oils, steam, and acids
- Is ideal for blending with Viton™ GF-600S to reach intermediate viscosity ranges for injection molding
- Improved mold release/mold fouling properties
- Improved mold flow and less shear sensitivity than 65 Mooney Viton™ GF-600S
- Excellent physical properties with high elongation, both original and aged
- Heat, fluids, and low temperature properties comparable to Viton™ GF and GF-600S
- Improved water resistance/lower volume swell in water
- Excellent compression set resistance with either low or no post-cure

**Processing**

A load factor of >72% for internal mixing of Viton™ GF-200S is suggested. The suggested process aids for Viton™ GF-200S are 0.75 phr of Struktol® HT-290, either alone or in combination with 0.5 phr of PAT-777, or combinations of 0.5 phr Armeen® 18D with carnauba wax or Struktol® WS-280. The use of DIAK™ 8 is NOT suggested, as it causes poor mold release and high compression set. DIAK™ 7 (TAIC) is the suggested coagent for all Viton™ GF-200S compounds and is usually used at a 2.5 phr level or lower, unless high modulus is needed. High levels of TAIC can bleed out and cause molding flaws.

**Safety and Handling**

Before handling or processing Viton™ GF-200S, be sure to read and be guided by the suggestions in the Chemours technical bulletin, "Handling Precautions for Viton™ and Related Chemicals."

**Product Description**

<table>
<thead>
<tr>
<th>Chemical Composition</th>
<th>Copolymer of hexafluoropropylene, vinylidene fluoride, and tetrafluoroethylene with a cure site monomer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical Form</td>
<td>Sheet</td>
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<tr>
<td>Appearance</td>
<td>White to tan</td>
</tr>
<tr>
<td>Odor</td>
<td>None</td>
</tr>
<tr>
<td>Mooney Viscosity, ML 1 + 10 at 121 °C (250 °F)</td>
<td>25</td>
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<tr>
<td>Specific Gravity</td>
<td>1.90</td>
</tr>
<tr>
<td>Storage Stability</td>
<td>Excellent</td>
</tr>
<tr>
<td>Fluorine, %</td>
<td>~70</td>
</tr>
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</table>
## Table 1. General Properties of Viton™ GF-200S

<table>
<thead>
<tr>
<th></th>
<th>Viton™ GF-200S</th>
<th>50/50 Blend</th>
<th>Viton™ GF-600S</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mooney Viscosity (ML 1 + 10 at 121 °C [250 °F]) on Gum Polymers</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>1 + 10 Reading</td>
<td>23</td>
<td>38</td>
<td>58</td>
</tr>
<tr>
<td>Viton™ GF-200S</td>
<td>100</td>
<td>50</td>
<td>—</td>
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<tr>
<td>Viton™ GF-600S</td>
<td>—</td>
<td>50</td>
<td>100</td>
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<tr>
<td>Zinc Oxide</td>
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<tr>
<td>N990 (MT Black)</td>
<td>30</td>
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<tr>
<td>DIAK™ 7 (TAIC)</td>
<td>3</td>
<td>3</td>
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<tr>
<td>Varox® DBPH-50</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Total phr Lab</td>
<td>138</td>
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<td>138</td>
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<tr>
<td><strong>Mooney Scorch at 121 °C (250 °F)</strong></td>
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<tr>
<td>Minimum, MU</td>
<td>13</td>
<td>22</td>
<td>31</td>
</tr>
<tr>
<td>2 Pt. Rise, min</td>
<td>24.8</td>
<td>23.0</td>
<td>18.4</td>
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<tr>
<td>5 Pt. Rise, min</td>
<td>26.2</td>
<td>24.2</td>
<td>19.8</td>
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<tr>
<td>10 Pt. Rise, min</td>
<td>27.7</td>
<td>25.7</td>
<td>20.9</td>
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<tr>
<td><strong>ODR at 162 °C (324 °F), 3 Degree Arc, 100 Range, 30 Min Clock</strong></td>
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<tr>
<td>M-L, dNm</td>
<td>6</td>
<td>10</td>
<td>16</td>
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<tr>
<td>ts-2, min</td>
<td>1.4</td>
<td>1.3</td>
<td>1.4</td>
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<tr>
<td>t'50, min</td>
<td>3.1</td>
<td>3.0</td>
<td>3.1</td>
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<tr>
<td>t'90, min</td>
<td>5.8</td>
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<td>6.2</td>
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<tr>
<td>M-H, dNm</td>
<td>173</td>
<td>168</td>
<td>166</td>
</tr>
<tr>
<td><strong>MDR 2000 at 177 °C (351 °F), 0.5 Degree Arc, 100 Range, 12 Min Clock</strong></td>
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<tr>
<td>M-L, dNm</td>
<td>0.6</td>
<td>1.1</td>
<td>1.7</td>
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<tr>
<td>ts-2, min</td>
<td>0.4</td>
<td>0.4</td>
<td>0.4</td>
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<tr>
<td>t'50, min</td>
<td>0.7</td>
<td>0.7</td>
<td>0.6</td>
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<tr>
<td>t'90, min</td>
<td>1.1</td>
<td>1.1</td>
<td>1.0</td>
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<tr>
<td>t'95, min</td>
<td>1.4</td>
<td>1.3</td>
<td>1.3</td>
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<tr>
<td>M-H, dNm</td>
<td>33.6</td>
<td>33.2</td>
<td>32.7</td>
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<tr>
<td><strong>Physical Properties at RT—Original (Cured 7 min at 177 °C [351 °F]—No Post-Cure)</strong></td>
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<tr>
<td>M-100, MPa</td>
<td>4.5</td>
<td>4.8</td>
<td>4.7</td>
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<tr>
<td>Tensile, MPa</td>
<td>13.3</td>
<td>13.3</td>
<td>14.3</td>
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<tr>
<td>T-B , psi</td>
<td>1,930</td>
<td>1,931</td>
<td>2,069</td>
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<tr>
<td>Elongation, %</td>
<td>278</td>
<td>264</td>
<td>291</td>
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<tr>
<td>Hardness A, pts</td>
<td>71</td>
<td>70</td>
<td>71</td>
</tr>
<tr>
<td><strong>&quot;Hot&quot; Tear Strength at 150 °C (302 °F)—Original (Cured 7 min at 177 °C [351 °F]—No Post-Cure)</strong></td>
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<tr>
<td>Tear Die B, N/mm</td>
<td>11.4</td>
<td>10.5</td>
<td>10.9</td>
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<tr>
<td><strong>Physical Properties at RT—Original (Cured 7 min at 177 °C [351 °F]—Post-Cured 2 hr at 232 °C [450 °F])</strong></td>
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<tr>
<td>M-100, MPa</td>
<td>6.3</td>
<td>6.6</td>
<td>6.2</td>
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<tr>
<td>Tensile, MPa</td>
<td>18.0</td>
<td>18.7</td>
<td>20.0</td>
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<tr>
<td>T-B , psi</td>
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<td>2,714</td>
<td>2,904</td>
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<tr>
<td>Elongation, %</td>
<td>246</td>
<td>237</td>
<td>285</td>
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<td>Hardness A, pts</td>
<td>76</td>
<td>74</td>
<td>74</td>
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*continued*
### Table 1. General Properties of Viton™ GF-200S (continued)

<table>
<thead>
<tr>
<th></th>
<th>Viton™ GF-200S</th>
<th>50/50 Blend</th>
<th>Viton™ GF-600S</th>
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<tr>
<td><strong>Compression Set , Method B, O-Rings</strong></td>
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<tr>
<td>22 hr at 200 °C (392 °F)</td>
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<tr>
<td>– No Post-Cure</td>
<td>20</td>
<td>20</td>
<td>19</td>
</tr>
<tr>
<td>– Post-Cure at 232 °C (450 °F)</td>
<td>16</td>
<td>14</td>
<td>16</td>
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<tr>
<td>70 hr at 200 °C (392 °F)</td>
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<tr>
<td>– No Post-Cure</td>
<td>26</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>– Post-Cure at 232 °C (450 °F)</td>
<td>20</td>
<td>19</td>
<td>20</td>
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<tr>
<td><strong>Physical Properties at RT—Heat-Aged 70 hr at 250 °C (482 °F) in Oven</strong></td>
<td></td>
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<tr>
<td>M-100, MPa</td>
<td>5.2</td>
<td>5.6</td>
<td>5.4</td>
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<tr>
<td>% Change, M-100</td>
<td>–17</td>
<td>–15</td>
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<td>Tensile, MPa</td>
<td>18.6</td>
<td>18.2</td>
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<tr>
<td>% Change, T-B</td>
<td>3</td>
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<td>–9</td>
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<tr>
<td>Elongation, %</td>
<td>296</td>
<td>275</td>
<td>293</td>
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<tr>
<td>% Change, E-B</td>
<td>20</td>
<td>16</td>
<td>3</td>
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<td>Hardness, A, pts</td>
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<td>77</td>
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<tr>
<td>Pts Change</td>
<td>2</td>
<td>3</td>
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<tr>
<td><strong>Physical Properties at RT—Heat-Aged 70 hr at 275 °C (527 °F) in Oven</strong></td>
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<td>M-100, MPa</td>
<td>3.8</td>
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<td>4.2</td>
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<tr>
<td>% Change, M100</td>
<td>–40</td>
<td>–39</td>
<td>–33</td>
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<tr>
<td>Tensile, MPa</td>
<td>11.8</td>
<td>12.9</td>
<td>13.2</td>
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<tr>
<td>% Change, T-B</td>
<td>–34</td>
<td>–31</td>
<td>–34</td>
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<tr>
<td>Elongation, %</td>
<td>355</td>
<td>347</td>
<td>340</td>
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<tr>
<td>% Change, E-B</td>
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<td>19</td>
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<tr>
<td>Hardness, A, pts</td>
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<td>77</td>
<td>77</td>
</tr>
<tr>
<td>Pts Change</td>
<td>2</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td><strong>Physical Properties at RT—Aged 168 hr at 100 °C (212 °F) in ASTM # 105 Oil (5W/30 Motor Oil)</strong></td>
<td></td>
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<tr>
<td>M-100, MPa</td>
<td>7.0</td>
<td>6.4</td>
<td>6.7</td>
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<tr>
<td>% Change, M100</td>
<td>12</td>
<td>–3</td>
<td>8</td>
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<tr>
<td>Tensile, MPa</td>
<td>10.8</td>
<td>10.4</td>
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<tr>
<td>% Change, T-B</td>
<td>–40</td>
<td>–45</td>
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<tr>
<td>Elongation, %</td>
<td>141</td>
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<td>% Change, E-B</td>
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<td>–51</td>
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<td>Hardness, A, pts</td>
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<tr>
<td>Pts Change</td>
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<tr>
<td>Volume Swell, %</td>
<td>1.6</td>
<td>1.6</td>
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<tr>
<td><strong>Low Temperature Testing (Post-Cured)</strong></td>
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<tr>
<td>Tg by DSC, °C (Inflection)</td>
<td>–5.0</td>
<td>–5.4</td>
<td>–6.0</td>
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<tr>
<td><strong>Fluid Immersions — Volume Swell—168 hr at 23 °C (73 °F), Unless Noted</strong></td>
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<tr>
<td>Fuel C, %VS</td>
<td>2.9</td>
<td>3.4</td>
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<td>M15 Fuel, %VS</td>
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<tr>
<td>Methanol, %VS</td>
<td>3.4</td>
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<tr>
<td>Distilled Water at 100 °C (212 °F)</td>
<td>3.7</td>
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### Test Procedures

<table>
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<tr>
<th>Property Measured</th>
<th>Test Procedure</th>
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<tr>
<td>Compression Set</td>
<td>ASTM D395, Method B (25% deflection)</td>
</tr>
<tr>
<td>Hardness</td>
<td>ASTM D1414, durometer A</td>
</tr>
<tr>
<td>Mooney Scorch</td>
<td>ASTM D1646, small rotor at 121 °C (250 °F)</td>
</tr>
<tr>
<td>Mooney Viscosity</td>
<td>ASTM D1646, ten pass at 121 °C (250 °F)</td>
</tr>
<tr>
<td>ODR (oscillating disk rheometer)</td>
<td>ASTM D2084</td>
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<tr>
<td>Property Change After Heat Aging</td>
<td>ASTM D573</td>
</tr>
<tr>
<td>Stress/Strain Properties</td>
<td></td>
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<tr>
<td>100% Modulus</td>
<td>ASTM D412, pulled at 8.5 mm/sec (20 in/min)</td>
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<tr>
<td>Tensile Strength (T-B)</td>
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<tr>
<td>Elongation (E-B)</td>
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<tr>
<td>Tear Die B</td>
<td>ASTM D624</td>
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<tr>
<td>Tg by DSC</td>
<td>DDE Custom (Akron MDSC – Tg)</td>
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<tr>
<td>Volume Change in Fluids</td>
<td>ASTM D471</td>
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Test temperature is 23 °C (73 °F), except where specified otherwise.