Parco fluorocarbon seals offer outstanding resistance to aggressive chemicals and high temperatures. Our high-quality fluorocarbon seals have a long history of reliable performance in service temperatures from -40° to +400°F. For superior resistance to chemicals and continuous service temperatures as high as 600°F, consider Parco’s perfluoroelastomer seals.

The American Society for Testing Materials (ASTM) document D1418, Standard Practice for Rubber and Rubber Latices—Nomenclature, uses the abbreviation FKM for compounds made from fluorocarbon polymer.

Parco offers fluorocarbon compounds to resist a wide range of chemicals and temperatures. The most common type of fluorocarbon polymer contains 66 percent fluorine and is a copolymer of vinylidene fluoride (VF2 or VDF) and hexafluoropropylene (HFP). Other types of fluorocarbon polymer contain tetrafluoroethylene (TFE) for improved chemical resistance. Some types of fluorocarbon polymer contain perfluoromethylvinyl ether (PMVE) for improved flexibility at low temperatures.

Standard fluorocarbon polymers are commonly divided into three types: A, B, and F, in order of increasing fluorine content. In general, higher fluorine content provides improved chemical resistance but decreased low-temperature flexibility. Specialty fluorocarbon polymers are also available for applications requiring improved performance in caustic fluids and low temperatures. Specialty fluorocarbons include GLT, GFLT, LTFE, and ETP.¹

If you are unfamiliar with the different elastomers used for seals, refer to Parco’s Elastomer Selection Guide. That guide will help you to select the correct elastomer for your application. If you determine that fluorocarbon seals are right for your application, this guide will help you select the correct compound.

¹A, B, and F are popular types of fluorocarbon polymer originally developed by DuPont Performance Elastomers. Other fluorocarbon polymer suppliers use different names for their equivalents. GLT, GFLT, and ETP are Genuine Viton® fluorocarbon polymers made by DuPont. Viton® is a registered trademark of Dupont Performance Elastomers. LTFE is a fluorocarbon polymer made by Dyneon, a 3M Company.
Characteristics of Fluorocarbon Types

Below is a brief description of the various types of fluorocarbon polymer. Figure 1 compares the resistance to common fluids among the fluorocarbon types. Low temperature resistance also varies based on the fluorocarbon type, as shown in Figure 2.

**Standard Fluorocarbons**

Standard fluorocarbon compounds typically use a bisphenol cure system, which provides fast cure cycles and improved resistance to compression set. Some standard fluorocarbons use a peroxide cure system to improve resistance to steam, acid, and aggressive automotive lubricating oils.

**A-Type** fluorocarbons or dipolymers, are used for general-purpose sealing. A-Type offers the best resistance to compression set among all fluorocarbons. A-Type is not recommended for use in amines, low molecular weight carbonyls, or flex fuels. (Fluorine content of polymer is about 66%)

**B-Type** fluorocarbons offer better chemical resistance than A-Type. B-Type has improved resistance to aromatic hydrocarbons and automotive fuels containing alcohols and ethers such as methyl tertiary butyl ether (MTBE). (Fluorine content of polymer is about 68%)

**F-Type** fluorocarbons provide excellent resistance to flex fuels. F-Type has the best fluid resistance of all the standard fluorocarbons. (Fluorine content of polymer is about 70%)

**Specialty Fluorocarbons**

Specialty fluorocarbon polymers use a peroxide cure system for improved resistance to steam and acid. Specialty fluorocarbons generally have better low-temperature flexibility than standard fluorocarbons. Specialty fluorocarbon polymers GLT, GFLT, and ETP are Genuine Viton®.

**GLT** fluorocarbons offer excellent low-temperature flexibility and fluid resistance similar to A-Type. Compounds using GLT typically have a temperature retraction value (TR-10) of -22°F. (Fluorine content of polymer is about 64%)

**GFLT** fluorocarbons combine excellent low-temperature flexibility and fluid resistance similar to F-Type. Compounds using GFLT typically have a TR-10 value of -11°F. (Fluorine content of polymer is about 67%)

**LTFE** fluorocarbons have the best low-temperature flexibility of any fluorocarbon and fluid resistance similar to GFLT. Compounds using LTFE typically have a TR-10 value of -40°F. (Fluorine content of polymer is about 67%)

**ETP** fluorocarbons were developed as a cost-effective alternative to perfluoroelastomers. ETP fluorocarbons offer similar reliable service in aggressive chemicals, but at a fraction of the cost. ETP fluorocarbons also have excellent resistance to low molecular weight carbonyls, amines, and caustic bases. (Fluorine content of polymer is about 67%)

“Flex-fuel vehicles” can use various blends of gasoline and alcohol as fuel. “Flex fuels” refer to those blends and typically have alcohol content of 15 percent or more. Parco recommends its seals made from F-type polymer for use in flex fuels.
Overview of Popular Parco Fluorocarbon Compounds

Below is an overview of Parco’s most popular fluorocarbon compounds. All compounds are black unless stated otherwise. For help choosing the appropriate Parco compound for your application, please refer to the Selection Diagram in Figure 3.

Compounds for Applications with Service Pressures up to 1,500 psi

9066-75
75-durometer fluorocarbon; excellent resistance to compression set; improved low-temperature flexibility (TR-10 value of -25°F); meets the requirements of Aerospace Material Specification (AMS) R 83485. (Polymer: GLT)

9131-75
75-durometer fluorocarbon; excellent resistance to fuels, alcohols, and solvents; blue. (Polymer: GFLT)

9166-75
75-durometer fluorocarbon; excellent resistance to fuels, alcohols, and solvents; blue. (Polymer: ETP)

9167-60
60-durometer fluorocarbon; excellent resistance to compression set; superior low-temperature flexibility (TR-10 value of -40°F); UL-listed. (Polymer: LTFE)

9266-75
75-durometer fluorocarbon; general-purpose; excellent resistance to compression set; resistant to high-temperatures; meets the requirements of AMS 7276, AMS R 83248, and MIL R 83248, on Qualified Products List (QPL). (Polymer: A-Type)

Fluid Resistance of Fluorocarbon Types

<table>
<thead>
<tr>
<th>Common Fluids</th>
<th>A</th>
<th>B</th>
<th>F</th>
<th>GLT</th>
<th>GFLT</th>
<th>LTFE</th>
<th>ETP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aliphatic hydrocarbons, process fluids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Aromatic hydrocarbons, process fluids</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Automotive &amp; aviation fuels</td>
<td></td>
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<tr>
<td>Oxygenated automotive fuels (containing MeOH, EtOH, MTBE, etc.)</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Engine lubricating oils (SM-SL grades)</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Acids</td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>Hot water, steam</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Strong bases (high pH), amines</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Low molecular weight carboxyls, ketones</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fluorine content of polymer, pct.</td>
<td>66</td>
<td>68</td>
<td>70</td>
<td>64</td>
<td>67</td>
<td>67</td>
<td>67</td>
</tr>
<tr>
<td>Low-temperature flexibility (TR-10 value °F)</td>
<td>3</td>
<td>9</td>
<td>21</td>
<td>-22</td>
<td>-11</td>
<td>-40</td>
<td>10</td>
</tr>
</tbody>
</table>

“Qualified Products Lists” (QPLs) identify companies authorized to manufacture and sell products to various specifications. Before being added to a QPL, a company must undergo a rigorous evaluation of its quality system. Parco is approved by the Air Force and Performance Review Institute to supply QPL rubber seals for aerospace and defense applications.

9166-75
75-durometer fluorocarbon; excellent resistance to fuels, alcohols, and solvents; blue. (Polymer: ETP)

9167-60
60-durometer fluorocarbon; excellent resistance to compression set; superior low-temperature flexibility (TR-10 value of -40°F); UL-listed. (Polymer: LTFE)

9266-75
75-durometer fluorocarbon; general-purpose; excellent resistance to compression set; resistant to high-temperatures; meets the requirements of AMS 7276, AMS R 83248, and MIL R 83248, on Qualified Products List (QPL). (Polymer: A-Type)

Fig. 1

Fluid Types

Source: Sales literature from polymer manufacturers.

Footnotes:
1Compounds are listed in this brochure by compound number.
2Last two digits of compound number identify hardness (durometer, Shore A).
3Military Specification MIL R 83248 has the full title Rubber, Fluorocarbon Elastomer, High Temperature, Fluid, and Compression Set Resistance.
9500-75
75-durometer fluorocarbon; general-purpose; excellent resistance to compression set; low cost. (Polymer: A-Type)

9505-75
75-durometer fluorocarbon; general-purpose; excellent resistance to compression set; low cost; brown. (Polymer: A-Type)

**Compounds for Applications with Service Pressures of 1,500 psi or More**

9009-90
90-durometer fluorocarbon; general-purpose; excellent resistance to compression set; resistant to high-temperatures; meets requirements of specifications AMS 7259, AMS R 83248, and MIL R 83248; on QPL. (Polymer: A-Type)

9021-95
95-durometer fluorocarbon; excellent resistance to compression set; better extrusion resistance than 9009-90. (Polymer: A-Type)

9115-95
95-durometer fluorocarbon; excellent resistance to steam and acid; good resistance to compression set; excellent resistance to explosive decompression and extrusion. (Polymer: B-type)

9162-95
95-durometer fluorocarbon; excellent resistance to compression set; excellent resistance to explosive decompression and extrusion. (Polymer: B-type)

9164-90
90-durometer fluorocarbon; excellent resistance to fuels, alcohols, and solvents. (Polymer: ETP)

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**Rely on Parco**

Parco is a leading manufacturer of high-performance seals. We specialize in developing proprietary elastomeric compounds and bonding techniques. Parco’s seals are available in 340 compounds, more than 25 percent developed in the last five years.

Founded in 1941, Parco was the first manufacturer to specialize in O-rings. Our modern 154,000 square-foot facility is one of the largest plants in the world making molded rubber seals. Parco also makes custom-molded elastomeric products, including rubber-to-metal bonded parts. Our quality management system is certified to ISO/TS 16949:2002, AS7115, and AS9100B. Our R & D laboratory is certified to ISO/IEC 17025.
Parco’s fluorocarbon seals provide excellent resistance to a wide range of chemicals and temperatures. This selection diagram will help you choose among Parco’s popular fluorocarbon compounds. Parco also offers more than 40 fluorocarbon compounds not shown in this diagram. If we don’t have a compound for your application, we can develop one for you.

*Compound made from Genuine Viton® polymer.

Source: Parco R & D data.
### Key Features
Parco's fluorocarbon seals are an excellent choice for harsh environments. Key features include the following:

- **Excellent resistance to chemicals:**
  Parco fluorocarbon seals resist a broad range of chemicals.

- **Wide range of service temperatures:**
  Parco fluorocarbon seals are suitable for applications from -40° to +400°F, depending on the compound.

- **UL-Listed:**
  Certain Parco fluorocarbon seals are UL-listed.

- **MIL SPEC conforming:**
  Parco offers fluorocarbon seals to meet demanding military and aerospace specifications.

- **Color:**
  Certain Parco fluorocarbon seals are brown or blue to prevent errors during assembly and to control after-market sales.

### Typical Values for Popular Parco Compounds

<table>
<thead>
<tr>
<th>Polymer Type</th>
<th>Original Properties</th>
<th>Compression Set 22 hours at 200°C (392°F)</th>
<th>Heat Aging 70 hours at 250°C (482°F)</th>
<th>Fluid Aging, Fuel C 70 hours at 23°C (73°F)</th>
<th>Low Temperature Flexibility TR-10°C (°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pct. of original deflection</td>
<td>Hardness change, pts., Shore A</td>
<td>Hardness change, pts., Shore A</td>
<td>-18(0)       -16(3)      -32(-25)   -21(-6)     -23(-10)   -18(0)      -8(18)      -7(19)      -40(-40)   -17(1)      -16(3)      -16(3)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tensile strength change, pct.</td>
<td>Tensile strength change, pct.</td>
<td>-4          -2          -3          -3          -1          -2          -2          -2          -4          -3          -3          -3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Modulus at 100 pct., elongation, psi.</td>
<td>Volume change, pct.</td>
<td>-18          -6          -3          -6          -9          -12         -4          -1          -11         -13         -13         -13</td>
</tr>
</tbody>
</table>

*Identifies a compound made from Genuine Viton® polymer.

Source: Parco R & D data.

1. Last two digits of compound number identify hardness (durometer, Shore A).
2. ASTM is the acronym for the American Society for Testing and Materials.
3. To convert psi to MPa, use the relationship 145 psi = 1 MPa.