**PURITY™ VHVI Specialty Base Fluids**

The clear choice from start to finish.

**PURITY VHVI Specialty Base Fluids** are produced at Petro-Canada’s Mississauga base oil refinery, the only Group III refinery in North America. Using the **HT Purity Process**, which utilizes a combination of severe Hydrotreating, Hydrocracking and catalytic wax Hydroisomerization, deleterious sulfur, nitrogen and oxygen compounds are eliminated and undesirable aromatic compounds are converted to more stable molecules. The result is highly isoparaffinic, saturated base oils with a high viscosity index. These highly pure base oils are clear and bright, with very low toxicity and are well suited to help formulators meet ever increasing technical demands.

Formulating with **PURITY VHVI base oils** results in leading edge lubricants with high performance and long life that provide enhanced equipment protection.

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**FEATURES**

- High purity
- Very high viscosity index
- Very low volatility
- Excellent low temperature properties
- Outstanding oxidative and thermal stability

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**BENEFITS**

- Well positioned to meet needs of future ultra-low viscosity grades such as 0W-16
- Excellent response to additives
- Shear stability permits development of premium HTHS motor oils
- Alternative to more expensive PAOs/GP III+ in many high performance lubricant applications

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**NOACK, % wt Loss (ASTM D5800)**

- VHVI 4: 12.65
- Comp D: 14.37
- Comp A: 14.86
- Comp C: 15.46
- Comp B: 15.96

Low volatility is critical in finished formulations for reduced oil consumption and emissions, particularly with increasing oil drain intervals and higher engine operating temperatures.

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**Group III – Cold Crank Simulator (ASTM D5293)**

**Cold Crank Simulation @ -30°C**

- Comp D: 1407
- Comp B: 1473
- Comp A: 1505
- VHVI 4: 1608
- Comp C: 1687

**Viscosity @100°C (cSt)**

- Comp D: 4.20
- Comp B: 4.26
- Comp A: 4.26
- VHVI 4: 4.50
- Comp C: 4.34

**Note:** VHVI 4 has a higher Vis100, but a comparable CCS

Cold Crank Viscosity measures ease of starting at low temperatures (wear at low temperatures). Lower cranking resistance means faster, easier starting in engine oils.
Clear Advantage

FORMULATING

• PURITY VHVI’s excellent low temperature properties and low volatility allow for the formulation of challenging multi-grades, such as 0W-20, without the use of PAO in a wide range of market general additive packages.
• PURITY VHVI can help you reduce or eliminate the need for PAO and GROUP III+ in your formulations, optimizing cost and performance.
• Due to the higher viscosity of Petro-Canada’s 4 cSt base oil, customers may need only one ISO grade for formulating.
• Benefits of formulating with PURITY VHVI base oils include: leading edge lubricants with high performance, long life and enhanced equipment protection.

RELIABLE SUPPLY AND WORLD CLASS SUPPORT

• Over 30 years of experience producing base oils that are among the purest in the world
• Consistent and reliable quality
• Strategically located to deliver bulk shipments by rail, truck and marine globally to meet your needs
• ISO 9001, ISO/TS 16949 registered quality management systems
• ISO 14001 registered environmental management system
• World class R&D and a dedicated team that knows your business
• A full range of PURITY base oils available in a variety of grades to meet customer requests

TYPICAL PROPERTIES OF PURITY VHVI

<table>
<thead>
<tr>
<th>PROPERTY</th>
<th>ASTM TEST METHOD</th>
<th>VVH 2</th>
<th>VHVI 3</th>
<th>VHVI 4</th>
<th>VHVI 6</th>
<th>VHVI 8</th>
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<tbody>
<tr>
<td>Density @ 15°C, kg/L</td>
<td>D4052</td>
<td>0.83</td>
<td>0.83</td>
<td>0.84</td>
<td>0.85</td>
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<tr>
<td>Colour, ASTM</td>
<td>D1500</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
<td>&lt;0.5</td>
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<tr>
<td>VISCOSITY</td>
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<tr>
<td>@ 40°C, cSt</td>
<td>D445</td>
<td>9.6</td>
<td>15.9</td>
<td>20.8</td>
<td>34.1</td>
<td>51</td>
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<tr>
<td>@ 100°C, cSt</td>
<td>D445</td>
<td>2.6</td>
<td>3.7</td>
<td>4.5</td>
<td>6.0</td>
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<td>SUS @ 100°F</td>
<td>D2161</td>
<td>60</td>
<td>86</td>
<td>109</td>
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<td>261</td>
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<td>Viscosity Index</td>
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<td>100</td>
<td>120</td>
<td>127</td>
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<td>128</td>
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<tr>
<td>Pour Point, °C (°F)</td>
<td>D5950</td>
<td>-42 (-44)</td>
<td>-24 (-11)</td>
<td>-24 (-11)</td>
<td>-15 (5)</td>
<td>-15 (5)</td>
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<td>Flash Point, PM, °C (°F)</td>
<td>D93</td>
<td>184 (363)</td>
<td>195 (383)</td>
<td>210 (410)</td>
<td>225 (437)</td>
<td>242 (468)</td>
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<td>Flash Point, COC, °C (°F)</td>
<td>D92</td>
<td>185 (365)</td>
<td>204 (399)</td>
<td>215 (419)</td>
<td>230 (446)</td>
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<td>COLD CRANK SIMULATOR</td>
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<tr>
<td>@ -20°C, cP</td>
<td>D5293</td>
<td>1550</td>
<td>3291</td>
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<td>@ -25°C, cP</td>
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<td>990</td>
<td>1998</td>
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<td>@ -30°C, cP</td>
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<td>@ -35°C, cP</td>
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<td>NOACK Volatility, % wt</td>
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<td>COMPOSITION</td>
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<td>% Saturates</td>
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For more information, call 1-866-335-3369 or visit lubricants.petro-canada.com