VG-100® Fluid

Innovation for energy and the environment

VG-100® is a biodegradable dielectric fluid developed by Prolec GE, with patents granted for its application in electrical transformers. VG-100® has been satisfactorily used in more than 500 units since its introduction in 2009, and is an excellent alternative to mineral oil for use in new transformers and retrofill applications. VG-100® fluid is fully biodegradable, and has excellent fire resistance. It has the electrical, physical, and chemical properties necessary to perform as an effective cooling and insulating medium in distribution and power transformers.

For more information about our products and sales visit our website www.prolecge.com

Blvd. Carlos Salinas de Gortari km 9.25, Apodaca N.L.
Tel: +52 (81) 8030-2029
1-800-437-7653
Fax: +52 (81) 8030-2032

VG100F-1115-02
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**PRODUCT OVERVIEW**

VG-100® is a dielectric fluid derived from natural esters of edible seeds, formulated using a proprietary process for use in electrical transformers – both new and retrofill. It was developed by Prolec GE in 2009 as an environmentally-friendly alternative to existing dielectric fluids. It is 100% natural and biodegradable, and does not contain any synthetic antioxidant, petroleum, or toxic compounds.

VG-100® fluid complies with international standards and requirements for its application in electrical transformers, such as ASTM and IEEE, and is also certified by FM and UL.

**First biodegradable dielectric fluid for transformers made in Mexico**
**TYPICAL PROPERTIES**

**VG-100®** fluid fully complies with all standards and requirements established for dielectric vegetable oils used in transformers.¹,²,³

<table>
<thead>
<tr>
<th>Properties</th>
<th>Standard</th>
<th>ASTM D6871 New Fluid As-Received</th>
<th><strong>VG-100® fluid³</strong></th>
<th>Natural ester fluid-1</th>
<th>Natural ester fluid-2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breakdown Voltage (kV) at 2mm</td>
<td>ASTM D1816</td>
<td>≥ 35</td>
<td>&gt; 60</td>
<td>&gt; 60</td>
<td>&gt; 60</td>
</tr>
<tr>
<td>Dissipation Factor (%) at 25°C</td>
<td>ASTM D924</td>
<td>≤ 0.2</td>
<td>0.08</td>
<td>0.06</td>
<td>0.15</td>
</tr>
<tr>
<td>Density (g/cm³) at 25°C</td>
<td>ASTM D1298</td>
<td>≤ 0.96</td>
<td>0.916</td>
<td>0.92</td>
<td>0.91</td>
</tr>
<tr>
<td>Viscosity (cSt) at 0°C</td>
<td>ASTM D445</td>
<td>&lt; 500</td>
<td>178</td>
<td>33</td>
<td>300</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 50</td>
<td>31</td>
<td>8</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td></td>
<td>&lt; 15</td>
<td>6</td>
<td>8</td>
<td>10</td>
</tr>
<tr>
<td>Color</td>
<td>ASTM D1500</td>
<td>L1.0</td>
<td>L0.5</td>
<td>L0.5</td>
<td>L0.5</td>
</tr>
<tr>
<td>Flash point (°C)</td>
<td>ASTM D92</td>
<td>≥ 275</td>
<td>330</td>
<td>330</td>
<td>330</td>
</tr>
<tr>
<td>Fire point (°C)</td>
<td>ASTM D92</td>
<td>≥ 300</td>
<td>352</td>
<td>360</td>
<td>360</td>
</tr>
<tr>
<td>Pour point (°C)</td>
<td>ASTM D97</td>
<td>-10</td>
<td>-12 to -15</td>
<td>-21</td>
<td>-15 to -25</td>
</tr>
<tr>
<td>Biodegradability (%)</td>
<td>OECD 301F</td>
<td>N/A</td>
<td>100</td>
<td>100</td>
<td>&gt; 97</td>
</tr>
<tr>
<td>Toxicity</td>
<td>OECD 203</td>
<td>N/A</td>
<td>Zero mortality</td>
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</tr>
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</table>

3. Typical data for new fluid. These values may vary depending on the handling.
For more information, please contact Prolec GE at 1-800 43 77653
VG-100® PERFORMANCE

Fire Safety
- High fire point (>300°C)
- FM and UL certifications
- Self-extinguishing
- Reduces fire risk
- Reduces costs for fire protection

Increased Environmental Protection
- 100% natural
- Fully biodegradable
- Does not contaminate water
- Non-toxic
- Reduces or eliminates environmental risks

Enhanced Performance
- Transformer materials compatibility
- Free of corrosive sulphur and PCB compounds
- Alternative for retrofilling transformers filled with mineral oil
- Increases lifetime of cellulose insulation
- Higher capacity to absorb moisture

FIRE POINT

<table>
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<tr>
<th>Fluid</th>
<th>Temperature (°C)</th>
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<tbody>
<tr>
<td>VG-100® Fluid</td>
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</tr>
<tr>
<td>Silicon Fluid</td>
<td>340°C</td>
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<tr>
<td>Mineral Oil</td>
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BIODEGRADABILITY

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Vegetable Oil for Electrical Transformers
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VG-100® APPLICATIONS

Distribution Transformers
- Residential (1 phase Pole and 1 phase Pad mounted)
- Commercial (3 phase Pad mounted)
- Industrial (Secondary Substation, Small power)

Power Transformers
- Generation
- Transmission

Renewable Energy Transformers
- Wind
- Solar

Retrofilling
- Transformers in service filled with mineral oil

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TYPICAL PROPERTIES

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Table 1. Comparison of Typical Values of VG-100® with mineral oil and alternative fluids.

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