Shell Naturelle **HF-M 46**

**Biodegradable hydraulic fluid**

Shell Naturelle HF-M is a biodegradable anti-wear hydraulic fluid developed for use in hydraulic systems working either in or out of doors. It is a mixture of synthetic ester and vegetable oil blended with anti-wear additives and rust and oxidation inhibitors. It contains a significant amount of renewable resource.

### Performance, Features & Benefits

- **High Degree of Biodegradability**
  Exceeds the normal requirement of 60% biodegradation in the OECD 301B test after 28 days.

- **Stable Viscosity at -20°C**
  Careful selection of base fluids and additives overcomes the ‘72-hour’ low temperature gelling problem normally associated with biodegradable fluids based on vegetable oil alone.

- **Reduced Tendency to Form Sticky Deposits when Accidentally Spilled**
  Incorporation of synthetic ester overcomes the ‘sticky deposit’ problem normally associated with vegetable oil.

### Main Applications

Shell Naturelle HF-M can be used in hydraulic systems where biodegradable fluids are preferred for environmental reasons.

### Specifications, Approvals & Recommendations

- Eaton (Vickers) M-2950 S
- Eaton (Vickers) I-286 S
- Shell Naturelle HF-M Fluids meet or exceed the requirements of the following standards:
  - Shell Naturelle HF-M fulfils the requirements of the Swedish Standard SS 15 54 34 BV and is designated environmentally acceptable

For a full listing of equipment approvals and recommendations, please consult your local Shell Technical Helpdesk.

### Compatibility & Miscibility

- **Compatibility with Other Oils**
  The biodegradability and performance of Shell Naturelle HF-M may be compromised if it is mixed with other oils. It is recommended that contamination with engine oil is restricted to less than 1% and contamination with other hydraulic oils is restricted to less than 2%.

- **Change-over Procedure**
  In order to achieve maximum benefit from the use of Shell Naturelle HF-M, it is necessary to completely drain all mineral oil from the hydraulic circuit prior to filling with fresh fluid. A detailed change-over procedure can be obtained from your Shell Representative.
Typical Physical Characteristics

<table>
<thead>
<tr>
<th>Properties</th>
<th>Method</th>
<th>Naturelle HF-M 46</th>
</tr>
</thead>
<tbody>
<tr>
<td>ISO Viscosity Grade</td>
<td>ISO 3448</td>
<td>46</td>
</tr>
<tr>
<td>Color</td>
<td></td>
<td>Red</td>
</tr>
<tr>
<td>Kinematic Viscosity - 72 hrs</td>
<td>ISO 3104 / ASTM D 445 / IP 71</td>
<td>1080</td>
</tr>
<tr>
<td>Kinematic Viscosity - 72 hrs</td>
<td>ISO 3104 / ASTM D 445 / IP 71</td>
<td>42</td>
</tr>
<tr>
<td>Kinematic Viscosity - 72 hrs</td>
<td>ISO 3104 / ASTM D 445 / IP 71</td>
<td>9.5</td>
</tr>
<tr>
<td>Viscosity Index</td>
<td>ISO 2902 / ASTM D 2270 / IP 226</td>
<td>220</td>
</tr>
<tr>
<td>Density</td>
<td>ISO 12185 / ASTM D 4052 / IP 365</td>
<td>924</td>
</tr>
<tr>
<td>Shear Stability (Taper Roller Bearing) 20 hrs</td>
<td>CEC L-45-A-99</td>
<td>8.2</td>
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<tr>
<td>Flash Point (COC)</td>
<td>ISO 2592 / ASTM D 92 / IP 36</td>
<td>256</td>
</tr>
<tr>
<td>Rust Protection</td>
<td>ISO 7120 / ASTM D 665 / IP 135</td>
<td>Pass</td>
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<tr>
<td>Copper Corrosion</td>
<td>ISO 2160 / ASTM D 130 / IP 154</td>
<td>Pass</td>
</tr>
<tr>
<td>Pour Point</td>
<td>ISO 3016 / ASTM D 97 / IP 15</td>
<td>-42</td>
</tr>
<tr>
<td>Air Release Value</td>
<td>ISO 9120</td>
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</tbody>
</table>

These characteristics are typical of current production. While future production will conform to Shell's specification, variations in these characteristics may occur.

Health, Safety & Environment

- Guidance on Health and Safety is available on the appropriate Material Safety Data Sheet, which can be obtained from http://www.epc.Shell.com/

- Protect the Environment
  Take used oil to an authorized collection point. Do not discharge into drains, soil or water.

Additional Information

- Storage
  Shell Naturelle HF-M should be stored in closed containers, preferably as delivered, at temperatures between 0°C and 30°C.

- Operating Temperature Range
  The recommended operating temperature range is -25°C to +70°C. Continuous operation at temperatures in excess of 70°C may shorten the fluid life.

- Advice
  Product recommendations on applications not listed here may be obtained from your Shell representative.