Shell Naturelle HF-E 46

Fully Synthetic, Biodegradable, Less-flammable Hydraulic Fluid

Shell Naturelle Fluid HF-E is an advanced biodegradable and HFDU type less flammable hydraulic fluid for use in hydraulic and power transmission systems. It is readily biodegradable with a low ecotoxicity, particularly suited for use in environmentally sensitive areas and in industrial equipment operating in areas subject to fire hazards, such as in steel mills, surface mines and foundries. Fully synthetic esters, blended with ashless additives, provide Shell Naturelle Fluid HF-E with a superior blend of lubrication performance and environmental acceptability.

Performance, Features & Benefits

• Excellent wear protection
  Advanced ashless (zinc-free) anti-wear additives provide protection over a wide range of conditions – proven protection in tough industry standard tests such as the Eaton Vickers 35VQ25 vane pump and Komatsu HPV35+35 high pressure piston pump.

• Maintaining system efficiency
  Excellent viscosity / temperature characteristics can minimize the changes of viscosity with variation in operation temperature, giving true 'multigrade' characteristics. Superior cleanliness and filterability; coupled with excellent water separation, air release and anti-foam characteristics, all help to maintain or enhance hydraulic system efficiency. The filterability of Shell Naturelle Fluid HF-E is maintained, even when the fluid is contaminated with water.

• Readily biodegradable
  Shell Naturelle Fluid HF-E contains a mean biobased content of over 80% (ASTM D6866) and is biodegraded by over 60% after 28 days in the OECD 301 B carbon dioxide evolution test. The fluid is classified as ‘not harmful’ to bacteria, algae, freshwater and marine invertebrates, and fish when tested as water-accommodated fractions (WAFs) according to OECD and EPA test guidelines.

• Low toxicity towards the environment
  Shell Naturelle Fluid HF-E is less flammable hydraulic fluid with high flash point, fire point and autoignition temperature for reduced risk of fire/explosion.

Main Applications

• Mobile / exterior hydraulic applications
  Hydraulic and fluid power transmission systems in exposed environments can be subject to wide variations in temperature.

  The naturally high, shear stable viscosity index (VI) of Shell Naturelle Fluid HF-E helps deliver responsive performance from cold start to full load, heavy duty operation.

• General industrial control equipment and hydraulic systems
  The excellent anti-wear properties and high viscosity index (VI) of Shell Naturelle Fluid HF-E, mean that it can often be used where ISO 11158 (HM/HV) and DIN 51524 Part 2 or Part 3 (HLP/HVLP) mineral oil hydraulic fluids are specified. However, bulk fluid operating temperatures should not be allowed to exceed 90°C.

• Environmentally sensitive areas
  Shell Naturelle Fluid HF-E is an ‘environmentally acceptable’ hydraulic fluid (ISO 15380 HEES), with ‘reduced harm for water and soil during use’ (European Union ecolabel). When compared to conventional mineral oil hydraulic fluids, it will have a reduced environmental impact in the event of a leak or accidental spillage, and meets the United States Environmental Protection Agency’s (EPA) 2013 Vessel General Permit (VGP) requirements for use in marine applications.

• Industrial operation subject to fire hazards
  Shell Naturelle HF-E Fluids are classified as HFDU type fire-resistant hydraulic fluid for use in industrial equipment operating in areas subject to fire hazards, such as in steel mills, surface mines and foundries. It has a high ignition temperature and heat release.

Specifications, Approvals & Recommendations
Typical physical characteristics

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

<table>
<thead>
<tr>
<th>Properties</th>
<th>Method</th>
<th>Shell Naturelle HF-E 46</th>
</tr>
</thead>
<tbody>
<tr>
<td>Viscosity grade</td>
<td></td>
<td>46</td>
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<tr>
<td>ISO Fluid Type</td>
<td>ISO 6743-4</td>
<td>HEES</td>
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<tr>
<td>Kinematic Viscosity @-20°C cSt</td>
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<td>Kinematic Viscosity @40°C cSt</td>
<td>ISO 3104</td>
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<td>Kinematic Viscosity @100°C cSt</td>
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<td>Viscosity Index</td>
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<td>density @15°C kg/m3</td>
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<tr>
<td>Flash Point (Cleveland Open Cup)</td>
<td>ISO 2592</td>
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<td>Pour Point @°C</td>
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<td>Biodegradable % 28days</td>
<td>OECD 301B</td>
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<tr>
<td>Auto-Ignition temperature @°C</td>
<td>ASTM D659</td>
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</tr>
</tbody>
</table>

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Health, Safety & Environment

Health and Safety

Shell Naturelle HF-E is unlikely to present any significant health or safety hazard when properly used in the recommended
Application and good standards of personal hygiene are maintained.

Avoid contact with skin. Use impervious gloves with used oil. After skin contact, wash immediately with soap and water. 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**

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