

SHELL NATURELLE HF-E

FULLY-SYNTHETIC BIODEGRADABLE HYDRAULIC FLUIDS

DESIGNED TO MEET CHALLENGES

Shell Naturelle HF-E are advanced biodegradable hydraulic fluids for use in power transmission and hydraulic systems working in environmentally sensitive areas. Synthetic esters blended with specially tailored additive systems provide Shell Naturelle HF-E fluids with a superior balance of biodegradability, lubrication performance and compatibility with the environment.

PERFORMANCE FEATURES

READILY BIODEGRADABLE

- Biodegradable by >60% after 28 days when tested in OECD 301 B (CO₂ evolution test).

LOW ECOTOXICITY

- 'Not Harmful' to algae, invertebrates (Daphnia) and fish; EL⁵⁰/LE⁰ >100 mg/l when tested as water-accommodated fractions in OECD 201, OECD 202 and OECD 203.

EXCELLENT VISCOSITY/TEMPERATURE CHARACTERISTICS

- Minimum change of viscosity with variation in operating temperature, giving true 'multigrade' characteristics.

HIGH SHEAR STABILITY

- High shear stability ensures effective lubrication and efficient system operation.

EXCELLENT CORROSION PROTECTION

- Long-term protection for common construction materials, including most metals, non-metals and seal materials such as viton and high nitrile.

GOOD OXIDATION RESISTANCE

- Helps resist the formation of acidic products generated when working at high operating temperatures.

OPTIMUM WEAR PROTECTION

- Effective under all operating conditions, including low and severe duty situations.

APPLICATIONS

- Heavy-duty hydraulic systems for construction and earthmoving equipment
- Machine tool hydraulic systems
- Hydrostatic drive gears
- General industrial control equipment and hydraulic systems
- Moderately rated gearboxes where an anti-wear hydraulic oil is specified.

COMPATIBILITY AND MISCIBILITY

Shell Naturelle HF-E is miscible with conventional mineral oil based hydraulic oils in all proportions. However, in order to ensure that the environmental properties and performance are maintained, the system should be drained and flushed prior to change over to Shell Naturelle HF-E.

Owing to the surface wetting properties of Shell Naturelle HF-E, if systems were previously operated using a mineral oil hydraulic fluid, deposits formed in the system during operation may be loosened and deposited in system filters. The filters should therefore be checked at regular intervals after fluid changeover.

SEAL AND PAINT COMPATIBILITY

Shell Naturelle HF-E is compatible with all seal materials and paints normally specified for use with petroleum mineral oils. Certain plastics and industrial adhesives may be adversely affected and advice should be sought from the respective manufacturers.

SPECIFICATIONS, APPROVALS AND RECOMMENDATIONS

Shell Naturelle HF-E 46 and 68 are on the 'Positivliste' and qualify for funding under the German 'Marketing Introduction Programme' for biolubricants.

The improved anti-wear properties, and naturally high viscosity index (VI) of Shell Naturelle Fluids HF-E, means that they 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 and optimum fluid life will be realised if operating temperatures are maintained at approximately 55°C.

HAS THE APPROVALS OF:

- Eaton Vickers M-2950 S and I-286 S
- ISO 15380 HEES
- VDMA 24568 Synthetic esters.

MEETS OR EXCEEDS THE REQUIREMENTS OF:

- Swedish Standard SS 15 54 34, SP-Listed.

TYPICAL PHYSICAL CHARACTERISTICS

CHARACTERISTICS	46
Colour	Green
Kinematic Viscosity (ISO 3104) @ 40°C mm ² /s	47.2
@ 100°C mm ² /s	9.41
Viscosity Index (ISO 2909)	188
Density @ 15°C kg/m ³	921
Flash Point °C (COC) (ISO 2592)	321
Pour Point °C (COC) (ISO 3016)	-42