Technical Data Sheet

Formerly Known As: **Shell Naturelle HF-E 46**

# Shell **Naturelle S2 Hydraulic Fluid *46***

- EU Ecolabel
- Versatile Applications
- US EPA VGP Compliant

***Environmentally Acceptable, Synthetic Hydraulic Fluid***

Shell Naturelle S2 Hydraulic Fluid is an advanced hydraulic fluid for use in hydraulic and power transmission systems. Readily biodegradable with low ecotoxicity, Shell Naturelle S2 Hydraulic Fluid is particularly suited for use in environmentally sensitive areas. Fully synthetic esters, blended with ashless additives, provide Shell Naturelle S2 Hydraulic Fluid with an excellent blend of lubrication performance and environmental acceptability.

## DESIGNED TO MEET CHALLENGES

### Performance, Features & Benefits

- **Excellent wear protection**

  Advanced ashless (zinc and metal 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. Outstanding cleanliness and filterability, coupled with excellent water separation, air release and antifoam characteristics, all help contribute to maintaining or enhancing the efficiency of hydraulic systems

- **Readily biodegradable & Low Ecotoxicity**

  Shell Naturelle S2 Hydraulic Fluid is biodegradable by exhibiting over 60% biodegradation after 28 days in the OECD 301 B carbon dioxide evolution test.

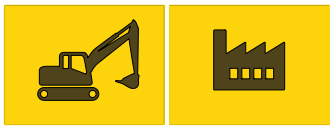
- **Low toxicity towards the environment**

  Shell Naturelle S2 Hydraulic Fluid is classified as ‘not harmful’ to bacteria, algae, freshwater invertebrates, and fish when tested as water-accommodated fractions (WAFs) according to OECD test guidelines.

- **Very high renewables content**

  Shell Naturelle S2 Hydraulic Fluid has mean biobased content of 82% (ASTM D 6866).

### Main Applications



- **Less Flammable**

  Shell Naturelle S2 is a less flammable hydraulic Fluid with high flash point.

- **Environmentally sensitive areas**

  Shell Naturelle S2 Hydraulic Fluid is an ‘environmentally acceptable’ hydraulic fluid (ISO 15380 HEES), with ‘reduced harm for water and soil during use’ (EU 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. It is particularly suited for use in environmentally sensitive areas. However, Bulk operating temperatures should not be allowed to exceed 90$^{0}$C.

### Specifications, Approvals & Recommendations

- ISO 15380 HEES
- Meets USDA Bio-preferred programme

  Meets requirements of EU Ecolabel certificate number NL/027/019

- Meets requirement of United States Environmental Protection Agency’s (EPA) 2013 vessel general permit (VGP)
- Swedish Standard SS 15 54 34 SP
- Sperry Marine
- Quantum Marine Engineering
- Rolls Royce Marine
- ISO 12922 (2012) HFDU
- FM Approved

  For a full listing of equipment approvals and recommendations please consult your local Shell Technical Helpdesk, or the OEM Approval website.

## Compatibility & Miscibility

- **Fluid Compatibility**

  Shell Naturelle S2 Hydraulic Fluid is miscible with mineral oil fluids and most other ester based biodegradable hydraulic fluids. However, in order to ensure that the environmental properties and performance of Shell Naturelle S2 Hydraulic Fluid are maintained, the hydraulic system should be drained and flushed thoroughly when changing fluids. Guidelines on fluid change-over can be found in ISO 15380 Annex A.

- **Seal & Paint Compatibility**

  Shell Naturelle S2 Hydraulic Fluid 46 is compatible with fluoroelastomers (FPM/FKM) such as Viton.
  Other seal materials and system components such as paints may be adversely affected and advice should be sought from the respective manufacturers.

## Typical Physical Characteristics

| Properties | | | Method | Shell Naturelle S2 Hydraulic Fluid 46 |
|---|---|---|---|---|
| Viscosity grade | | | | 46 |
| ISO Fluid Type | | | ISO 6743-4 | HEES |
| Kinematic Viscosity | @-20°C | cSt | ASTM D445 | 1 522 |
| Kinematic Viscosity | @40°C | cSt | ASTM D445 | 47.2 |
| Kinematic Viscosity | @100°C | cSt | ASTM D445 | 9.41 |
| Viscosity Index | | | ISO 2909 | 188 |
| Density | @15°C | kg/m$^3$ | ISO 12185 | 921 |
| Flash Point (Cleveland Open Cup) | | °C | ISO 2592 | 320 |
| Pour Point | | °C | ISO 3016 | -42 |
| Biodegradable | | % 28days | OECD 301B | 76 |
| Autoignition temperature | | °C minimum | ASTM D659 | 400 |

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

## Health, Safety & Environment

- **Health and Safety**

  Shell Naturelle S2 Hydraulic Fluid 46 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 Safety Data Sheet, which can be obtained from https://www.epc.shell.com

- **Protect the Environment**

  Take used oil to an authorised collection point. Do not discharge into drains, soil or water.

## Additional Information

- **Advice**

  Advice on applications not covered here may be obtained from your Shell representative.