Technical Data Sheet

Formerly Known As: **PANOLIN HLP SYNTH**

Shell **PANOLIN** *S4 HLP Synth 46*

- Enhanced Life
- Bosch Rexroth Approved
- ISO 15380:2016
- Biodegradability Profile: See Specifications and Approvals

Advanced Saturated Synthetic Ester (HEES) Hydraulic Fluid

Shell PANOLIN is our range of high-performance lubricants and greases tested for high biodegradability and lower environmental impact in aquatic environments. Shell PANOLIN S4 HLP Synth 32, 46 and 68 are the first HEES hydraulic fluids approved by Bosch Rexroth. They represent our highest-performance, industry-leading range of saturated ester-based hydraulic fluids, formulated with advanced zinc-free additive technology. Designed to enhance machinery efficiency, they offer extended fluid life and outstanding wear protection, helping to maximise equipment reliability and reduce maintenance requirements. Biodegradability profile: ≥87% w/w of this lubricant's components are readily biodegradable, achieving a passing result of ≥60% according to OECD 301B. The fully formulated lubricant meets the requirements of EN 17181:2019. Designed for applications requiring ISO 15380 compliance for environmentally acceptable hydraulic fluids.

DESIGNED TO MEET CHALLENGES

Performance, Features & Benefits

- **Enhanced oil life**

  Shell PANOLIN S4 HLP Synth has an enhanced oil life and is designed to help equipment operate without interruptions, with multiple field examples of lifetime filling. Longer oil-drain intervals mean less oil being produced, purchased and disposed of. Shell PANOLIN S4 HLP Synth has an outstanding dry TOST life of over 6000 hours (modified ASTM D943 test). Shell PANOLIN S4 HLP Synth has good oxidative stability which results in reduced fluid degradation, reducing filter blockage and increased viscosity. This helps prevent component failures, frequent filter and fluid changes, downtime, fluid consumption and parts and labor costs.

- **Premium wear protection**

  Shell PANOLIN S4 HLP Synth, the first Bosch approved HEES fluid, is designed to help equipment operate without interruptions. Shell PANOLIN S4 HLP Synth offers exceptional wear protection of hydraulic equipment, and strong protection from the buildup of sludge and varnish.

- **Designed to protect even in cold climates**

  Shell PANOLIN S4 HLP Synth has good cold flow behavior which enables a safe start even in cold conditions, thereby reducing the risk of metal-on-metal wear. In addition to protecting the machine over a wide temperature operating range, shear-stable, high viscosity index fluids help enable increased hydraulic efficiency in comparison to typical HM mineral oil.

- **Lower Environmental Impact**

  Offers reduced impact of leaks or accidental spillage into aquatic environments compared to conventional mineral hydraulic oils thanks to their higher biodegradability. (Publication EPA 800-R-11-002).

Biodegradability profile:

At least 87% by mass of this lubricant's components are readily biodegradable, achieving a passing result of ≥60% according to OECD 301B.

Meets the requirements of EN 17181:2019, a modified OECD 301B-based test method for determining the aerobic biodegradation of fully formulated lubricants.

Low Ecotoxicity:

Classified as 'not harmful' to algae, freshwater invertebrates, fish and bacteria when tested to Industry Standard by 3rd Party Lab as water-accommodated fractions (WAFs) according to OECD test guidelines 201, 202, 203, 210 and 209, meeting the requirements of ISO 15380 > 100mg/L for acute toxicity tests and CLP Guidance > 1mg/L for chronic toxicity studies.

Other

Shell PANOLIN Lubricants plastic packs contain at least 25% recycled plastic (Post Consumer Resin (PCR)).

Shell PANOLIN Lubricants combined with Shell lubricant services can help customers to unlock improvements in operational efficiencies.

Main Applications



- For stationary and mobile hydraulic systems including earthmoving, forestry, construction and hydroelectric applications. Compressors, bearing lubrication and oil circulation systems & marine hydraulic systems.

Specifications, Approvals & Recommendations

- Bosch Rexroth Fluid Rating RDE 90245
- Meets requirements of ISO 15380:2016 HEES
- Meets the requirements of ISO 4263-3
- ≥87% w/w of this lubricant's components are readily biodegradable, achieving a passing result of ≥60% according to OECD 301B
- Meets requirements of EN17181:2019
- Japan Eco Mark Certified 05 110 021 (ISO 14024:2018)

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

Typical Physical Characteristics

Properties			Method	Shell PANOLIN S4 HLP Synth 46
ISO Fluid Type			ISO 6743-4	HEES
Kinematic Viscosity	@-20°C	mm^2/s	ASTM D445	2 440
Kinematic Viscosity	@40°C	mm^2/s	ASTM D445	46.9
Kinematic Viscosity	@100°C	mm^2/s	ASTM D445	8.5
Viscosity Index			ASTM D2270	162
Density	@15°C	kg/m^3	ASTM D4052	916
Flash Point (COC)		°C	ASTM D92	240
Colour (ASTM)			ASTM D1500	1
Water Separability	@54°C	minutes	ASTM D1401	20
TOST life		hours	ASTM D943	6 000
Pour Point		°C	ASTM D97	-60
Iodine Value		g I2/100g maximum	Oleon OA-020	7

These characteristics are typical of current production. Whilst future production will conform to Shell's specification,

Compatibility & Miscibility

- It is strongly recommended that an oil sample is taken from the system following changeover and analysed via the Shell LubeAnalyst service to confirm the new fluid charge is fit for use.
- This lubricant should not be mixed with other HEES, HEPG, HETG and HEPR (ISO 15380: EAHF Base Fluid Classes) hydraulic fluids to ensure that the environmental properties and performance of fluid is maintained. The system should be drained and flushed thoroughly when changing fluids, guidelines on fluid change-over can be found in ISO 15380 Annex A.
- This lubricant 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.

variations in these characteristics may occur.

Health, Safety & Environment

- **Health and Safety**

  This product 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 http://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.

- **Additional Technical Advice**

  The information and guidance offered for use of Shell PANOLIN products is based on experience and understanding gained through the development and manufacturing of lubricants. The performance of the products can be influenced by a number of variables, not limited to, contamination, operating temperature, equipment application, external environment and material type. It is recommended that you discuss application and fluid recommendations with both your OEM and local Shell technical representative before the product is used. Advice given is non binding and Shell will not be held liable for any consequence as a result of or through misuse of the fluid.