

What you need to know

PANOLIN HLP SYNTH

The high performing hydraulic lubricant



Swiss Oil Technology



PANOLIN



PANOLIN® +
Swiss Oil Technology

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Important facts in brief

Safe technology for demanding machine applications

- Saturated synthetic ester basis
- High-quality additive systems
- Pour point down to -60°C
- Prevents deposits and residues within the system
- Excellent corrosion and wear protection
- Outstanding oxidation and aging stability
- Suitable for lifetime fillings

Environmental compatibility – when ecology meets economy

- Readily biodegradable, ecotoxically harmless
- Conservation of ground soil and water bodies
- Reputable environmental labels and awards
- Extended oil change intervals preserve resources
- Using environmentally considerate lubricants creates a positive image

Nothing can replace experience

- More than 35 years of practical experience
- PANOLIN is the leader in the field of **E**nvironmentally **C**onsiderate/**A**cceptable **L**ubricants (ECL/EAL)
- Consistent core technology since market launch
- PANOLIN HLP SYNTH has never been replaced on account of «exhausted» additives

Part of the PANOLIN concepts

GREENMACHINE®

GREENMARINE®

GREENDREDGE®



A hydraulic oil that pays off

In «rock-hard» everyday use



PANOLIN HLP SYNTH has proven its value in this CAT 235 for years between rock and dust.

**> 22 000 operating hours
without an oil change**

It turns and turns and turns ...



The millennium landmark «London Eye» has completed countless revolutions with PANOLIN HLP SYNTH since its commissioning. (Main pumps run 24 hours non-stop)

**> 90 000 operating hours
without an oil change**

Running for a small eternity



PANOLIN HLP SYNTH is held in high esteem by the industry.

**> 100 000 operating hours
without an oil change**

Every saved oil change is of interest
not only ecologically, but also economically

Additional facts

GREENMACHINE®

What is PANOLIN HLP SYNTH?

The benefits of PANOLIN high-performance hydraulic oils

- Fully synthetic, based on saturated synthetic esters
- Longer oil change intervals/shorter down times
- Top performance even under demanding conditions
- Outstanding oxidation and aging stability, optimum protection against corrosion and wear
- Readily biodegradable in accordance with OECD 301 B
- Advantageous Eco-Tox profile confirmed by numerous Eco labels
- Internationally acknowledged Eco labels and awards



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Customer benefits in daily use

1. PANOLIN HLP SYNTH is suitable for all kinds of hydraulic applications due to the combination of fully synthetic base oils and special additives. Its unique technology protects systems from the formation of deposits. This prevents filters from blocking and damage to hydraulic components.

2. PANOLIN HLP SYNTH enables longer oil change intervals due to its high performance capacity. We recommend sending an oil sample to the PANOLIN Tec Center prior to changing the oil. Oil laboratory will check the condition of the hydraulic oil and provide a detailed report for review.

Less down time = lower operational cost

3. No matter where the machine is in operation – PANOLIN HLP SYNTH performs reliably even in tough conditions.

4. PANOLIN HLP SYNTH extends machine availability and lowers operating costs throughout the entire service life.

5. PANOLIN HLP SYNTH has proven itself to be the ideal hydraulic oil for applications on, in and next to water and other sensitive environments for more than 35 years. It is readily biodegradable, enabling the user to complete projects in sensitive areas and without leaving any trace of rainbow colors on the water's surface.

6. By choosing to use environmentally considerate lubricants such as PANOLIN HLP SYNTH your company has made a conscious decision to protect the environment and reduce your CO₂ footprint which results in a positive corporate image.

The **Lubrication Concept** consisting of high performance **Environmentally Considerate Lubricants** for your heavy duty equipment.



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The **Lubrication Concept** consisting of high performance **E**nvironmentally **A**cceptable **L**ubricants for your vessel.



The **Lubrication Concept** consisting of high performance **E**nvironmentally **A**cceptable **L**ubricants for your dredge.





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PANOLIN Conversion and Operating Guidelines

Considering that there are many different systems and applications for our lubricants, we are providing basic guidelines to assist you while converting from mineral oil or another environmentally friendly lubricant to PANOLIN Environmentally Considerate Lubricants – ECLs/Environmentally Acceptable Lubricants – EALs. The Conversion Guidelines are applicable for all PANOLIN ECLs/EALs (hydraulic fluids, gear oils, lowSAPS diesel engine oils, cable/chain lubricants, stern tube lubricants, UTTO lubricants and hydro-power turbine lubricants).

1. Draining



- **Run the system up to operating temperature**
- **Drain oil from the entire system**
- **Check oil tank for cleanliness and clean if necessary**

Warm fluid will be easier to drain, therefore run the system until operating temperature is reached. Drain oil from the entire system (e.g. tank, cylinder, gear box housing, oil pan, coolers, tubes, hoses, etc.). Check oil tank for cleanliness specifically at this stage, and clean if necessary. Cleaning the tank and draining the components will help eliminate contaminants during flushing.

2. Filter



- **Replace filter cartridges**
- **Check filters regularly**

Replace filter cartridges (if applicable). PANOLIN ECLs/EALs may have a cleaning effect on your system and remove deposits produced by former lubricants. This cleaning effect will start during the flushing process, therefore please check your filters regularly. PANOLIN does not specify or require any particular filter material.

3. Flushing



- **Prevent air in the system during flushing process**
- **Fill the tank with 30 to 50% of system capacity or according to OEM specification**
- **Run the system up to operating temperature**
- **Drain the flushing fluid**

During the flushing process, no air should enter the system or suction inlet of the pumps. Air in the system will prevent thorough flushing and could create cavitation or cause further damage to your system. From our experience, filling the tank with 30 to 50% of the system capacity is adequate for flushing. Do not operate the system with less than the OEM-specified minimum fluid requirements. Please be aware that some systems might require complete filling for the flushing procedure. Run the system up to temperature by operating all functions. Then drain the flushing fluid. This will help to release contaminants and eliminate residual fluid. To avoid any negative impact on the PANOLIN ECL/EAL, please use the replacement fluid in the correct viscosity when flushing. Using alternative fluids for flushing can jeopardize the correct viscosity grade, performance and environmental benefits of the new fluid.

4. Filling



- **After flushing the system completely, fill with PANOLIN ECL/EAL**
- **Top up fluid if you need to remove air or perform a system bleed**

After flushing the system completely, fill with the replacement PANOLIN ECL/EAL. Make sure the system is adequately filled to OEM specifications and always use the viscosity class prescribed by the equipment manufacturer. If you need to remove air from the system or perform a system bleed, make sure to top up fluid levels afterwards if necessary.

5. Operating and control



- **Start with a zero sample after an initial warm-up procedure**
- **Check oil samples regularly**
- **Water content must not exceed max limit of 0.1% (1000 ppm)**
- **In case of problems, inform PANOLIN and carry out an oil sample**
- **For further information – see PANOLIN Sampling Guideline**

5.1. We recommend establishing a regular sampling schedule by starting with a zero sample after an initial warm-up procedure. If you already have a fluid testing program in place, our general recommendation is to check oil samples regularly.
5.2. Water content must not exceed the maximum limit of 0.1% (1000 ppm). This corresponds to the general recommendation for conventional mineral oils.
5.3. Measures recommended by PANOLIN after the oil examination, such as dehydration, filtration or the like, must be implemented/adhered to. After implementation of the measures, a further control sample must be taken after an initial warm-up procedure.
5.4. In case of problems, the machine operator/owner is in any case obliged to inform PANOLIN immediately. In addition, the machine operator/owner must immediately carry out an oil sample and send it to PANOLIN or its affiliates. PANOLIN reserves the right to take an oil sample itself or to ensure that the sampling is carried out properly.

6. Mixing



- **Do not mix any mineral oils or synthetic fluids with PANOLIN ECLs/EALs**
- **Mineral oil residue must not exceed 5% of total filling quantity**
- **Some manufacturers and eco-labels set the limit for foreign oils below 5% (e.g. ISO 15380 max 2% of mineral oil-based fluids)**

Do not mix any mineral oils or synthetic fluids with PANOLIN ECLs/EALs. Mixing any incompatible fluids with PANOLIN ECLs/EALs can lead to malfunctioning and damage to the system due to incompatibility. For technical reasons, the mineral oil residue must not exceed 5% of total filling quantity. Furthermore, mixing can negatively affect performance and/or environmental requirements with eco-labels, and seriously impair the high quality of PANOLIN ECLs/EALs. Some manufacturers and eco-labels set the limit for foreign oil content below 5%. These regulations take precedence over PANOLIN recommendations. According to the ISO 15380 guideline, ECLs/EALs may only be mixed with up to 2% mineral oil-based fluids.

7. Microfiltration 	• Microfiltration helps to filter out any residues, debris and water	Microfiltration can help to filter out any residues, debris and water that have accumulated over a longer period of time. It can also help to maintain the cleanliness level if oil drain intervals are prolonged.
8. Disposal 	• PANOLIN ECLs/EALs can be disposed of by thermal use or recycling	PANOLIN ECLs/EALs can be disposed by companies authorized for disposal by thermal use or recycling. Disposal is subject to national and local laws and regulations.

9. Product-specific recommendations

Consider in addition to the recommendations above.

9.1. Hydraulic fluids



ATLANTIS, HLP SYNTH, HLP SYNTH E, HLP SYNTH ECO, SPRINT, ORCON SYNTH E

To ensure the operational safety, reliability and durability of machines, plants and components throughout their service life, particle contamination (abrasion, dust, etc.) must be minimized to comply with cleanliness class 17/13 or 21/17/13 (according to ISO 4406). Manufacturer's instructions must be followed at all times. According to the ISO 15380 guideline, ECLs/EALs may only be mixed with up to 2% mineral oil-based fluids. PANOLIN environmentally friendly hydraulic fluids may remove deposits produced by former hydraulic fluids (see section 2).

Test interval after oil conversion/during operation	Standard application Normal conditions	Heavy-duty applications Special conditions (e.g. breaker/dusty environment)
1. Control after	50 working hours	50 working hours
2. Control after	500 working hours	250 working hours
3. Control after	1000 working hours	500 working hours
Subsequent controls each	1000 working hours or at least once a year	500 working hours or at least once a year

For oil sampling, please consult the PANOLIN – Sampling Guideline. When converting the system, attachments (e.g. hydraulic breakers and quick couplings on excavators, etc.) have to be included in the conversion procedure.

HLP SYNTH, HLP SYNTH E, HLP SYNTH ECO

Depending on use and application, PANOLIN HLP SYNTH* can greatly prolong oil change intervals up to lifetime filling compared to mineral oil-based hydraulic oils. Do not mix PANOLIN HLP SYNTH* with other readily biodegradable hydraulic fluids (such as HEES, HEPR, HETG or HEPG as per ISO 15380). PANOLIN HLP SYNTH* and PANOLIN SPRINT are fully mixable and compatible with each other. The full performance (lifetime fill potential) of PANOLIN HLP SYNTH* will be achieved only if not mixed with any other fluid.

* also applies to HLP SYNTH E and HLP SYNTH ECO

9.1. Hydraulic fluids

(Continued)



SPRINT

PANOLIN SPRINT and PANOLIN HLP SYNTH are fully mixable and compatible with each other. The full performance (lifetime fill potential) of PANOLIN HLP SYNTH will be achieved only if not mixed with any other fluid. Mixing with other fluids from third party suppliers can lead to system malfunctions and failure due to incompatibility.

ORCON SYNTH E

Due to the fact that this lubricant is used in food processing machinery, special care must be taken with regard to cleaning and flushing the system. Mineral oil is unacceptable in food-grade applications.

9.2. Gear oils



EP GEAR SYNTH, MARGEAR, BIOGEAR RS

Due to its outstanding anti-wear properties, PANOLIN gear oils reduce micro-wear of surface roughness on friction surfaces in aggregates. For optimal benefit from the outstanding characteristics, a prolonged and smooth running-in procedure is recommended. PANOLIN gear oils may remove deposits produced by former gear oils (see section 2).

9.3. UTTO lubricants



BIOFLUID ZFH, BIOFLUID SBH-N, BIOFLUID PRS

Do not mix any mineral oils or synthetic fluids with PANOLIN UTTO lubricants as they might be incompatible and modify the friction characteristics. This can lead to malfunctioning of gear shifting or noisy wet brakes. When converting the system, attachments fed from tractor hydraulic systems (e.g. tractor trailers, hay balers, etc.) have to be included in the conversion procedure.

9.4. Engine oils



BIOMOT, ECOMOT

As an oil sampling schedule for diesel and petrol engine oils, we recommend taking an oil sample prior to the recommended oil drain interval (OEM maintenance specifications).

9.5. Cable/chain lubricants and greases



BIOTRACK E, BIOGREASE EP, MARGREASE EP

Clean surfaces before applying new lubricant/grease. Pump out former grease from central greasing systems and pivot points to avoid contamination. Do not mix different greases due to incompatibility.

General note Before changing over to PANOLIN ECLs/EALs, we recommend checking that the intended machines, vehicles, systems or applications are suitable for use with environmentally friendly lubricants. You should pay particular attention to any integrated seals, tubing materials and coatings (paints, varnishes, coatings inside tanks, etc.).

Please contact your local PANOLIN Partner if you require further information.

PANOLIN also encourages you to contact the Original Equipment Manufacturer (OEM) regarding lubricant conversions.

Disclaimer PANOLIN provides these general instructions and recommendations according to their level of knowledge and experience. No warranty or warranted characteristics with regard to the products mentioned, and no liability of PANOLIN can be derived therefrom.

The manufacturer's instructions and regulations take precedence over PANOLIN's recommendations.



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PANOLIN – Sampling Guideline

To obtain an accurate oil analysis, it is recommended that you follow this guideline.

Modern analytics rely substantially on counting particles, moisture and elements in ppm dimension therefore cleanliness of the sampling apparatus is critical. PANOLIN attaches great importance to oil condition monitoring, and makes the following recommendations. PANOLIN can only accept responsibility for oil condition if the correct procedures are respected by the person taking the sample. It is important both to take the sample correctly, and to record the details accurately if the results are to be of use.

1.1 Sample bottle

Correct sample bottles (content 500 ml) are available from PANOLIN. Before starting the sampling ensure that sample bottles are clean, dry and free of possible contaminants. Bottles such as beverage bottles, jam jars, etc. are not acceptable and will be rejected.

1.2 Detailed statement for the oil sample

All analysis reports will be recorded on our data base. Future reports on subsequent samples will be linked to the original by machine or by serial number or by the vessel's IMO number. It is essential to fill in the detailed statement for the oil sample completely and accurately. Without correct information it is impossible to carry out a correct oil analysis and allocate the data to previous samples. The detailed statement for the oil sample must be sent together with the oil sample.

2.1 Sampling engine oil



The sample must be taken under operating conditions, if at all possible, when the engine is warm and the fluid has been circulated. Only then it is possible to get a representative oil sample. We recommend taking the sample from the oil dip stick tube using an oil sampling kit (available from PANOLIN) or at the sump plug.

When sampling through the oil dip stick tube or at the sump plug the first 200 ml must be disposed of in accordance with oil disposal regulations in operation. Close the sample bottle immediately after sampling to avoid any contamination. A sample amount of of min. 200 ml is recommended.

2.2 Sampling gear oil



The sample must be taken under operating conditions, if at all possible, when the gear box is warm and the fluid has been circulated. Only then it is possible to get a representative oil sample. When sampling through a fitted sampling device or from the sump or in the return line before the filter unit the first 200 ml must be disposed of in accordance with oil disposal regulations in operation. Close the sample bottle immediately after sampling to avoid any contamination. A sample amount of 200 ml is recommended in order to provide a complete testing.

2.3 Sampling hydraulic oil



The sample must be taken immediately after steady operating conditions, when the hydraulic system is warm and the fluid has been circulated. Only then it is possible to get a representative oil sample. The sampling point is important and has to be recorded on the detailed statement for the oil sample. Samples from quick release couplings or at the end of long hoses (e.g. excavator hammer hoses) are not representative of the entire oil contents, and should not be used. We recommend sampling at the «minimess» connection. Machine manufacturers warn about the high pressures at the «minimess» connection, therefore the sample has to be taken by trained staff. When sampling at the «minimess» connection or at the tank bottom plug the first 500 ml must be disposed of in accordance with oil disposal regulations in operation. If water is present in the hydraulic oil, the sample should be collected at the drain valve, but only after the machine has cooled down and the oil has separated from the water. Drain off the water before taking the oil sample. A sample amount of of min. 200 ml is recommended.

2.4 Sampling stern



Depending on the stern tube configuration there are multiple points in which you can pull the tube oil sample. We suggest not to sample from the reservoir/tank, because the fluid can be stagnant and moisture and contaminants can settle.

The sample should be collected from a drain or pump connection/valve at the bottom of the stern tube system, in a zone where the oil is circulating. If you are collecting a sample from an inline or exterior filtration system it should be collected prior to any filters and pumps. The first 500 ml of the oil being pulled should be disposed of in accordance with oil disposal regulations in operation.

We understand that it is not always feasible to collect a warm or circulating sample but if possible this is the most representative sample.

We suggest sampling the oil in intervals recommended by the Classification Society of the vessel or what the vessel stern tube or stern tube seal manufacturer recommends. A sample amount of min. 200 ml is required.

3.0 General aspects

Please ensure that sample bottles are clean, dry and free of possible contaminants. Open them just before sampling. Close them immediately after sampling. It is highly recommended taking samples always from the same sampling point at a regular period.

Sampling frequency

We recommend to collect samples from machinery equipment frequently according to the table below:

	Operational hours	Time period (latest)
Hydraulic systems	~ 1000	12 months
Gear boxes	~ 1000	12 months
Engines	~ 250 – 500	6 months
Thrusters	~ 1000	6 months
Stern tubes	~ 1000 – 1500	6 months

However, manufacturer's regulations take precedence over these recommendations. Before sending the samples please take care of correct and complete information on the consignment form. Ensure that the correct label is attached to each bottle.

Labels are available from your local PANOLIN Distributor or from PANOLIN direct.

The concepts

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Economy



Save money

- Preventative maintenance
- Extended oil change intervals
- Less equipment downtime
- Reduction of life-cycle cost

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Technology

Increase performance

- Advanced technology
- More reliability
- Higher efficiency
- Improved availability



Environment

Protect the environment

- Environmentally friendly
- Biodegradable
- Meets global regulations
- CO₂ reduction

Only economically viable, technically mature and environmentally friendly concepts are truly sustainable.

Your benefits

High Performance

Environmentally Considerate/Acceptable Lubricants

- Save money ...
- Increase performance ...
- Protect the environment ...

... with PANOLIN
Bio-Lubricants

Readily biodegradable Lubricants
are our core competence since 1983.



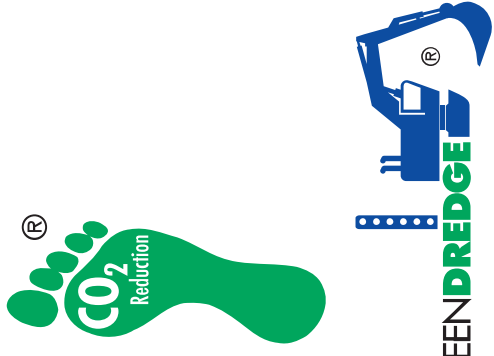
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PANOLIN is a statement for

- Advanced Technology
- Environmental Responsibility
- Security

The sustainable PANOLIN concepts

GREENMACHINE®  **GREENMARINE**® 



PANOLIN offers a wide range of high performance biodegradable lubricants for diverse applications.
For further information please contact PANOLIN International Inc.

PANOLIN® **+**
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