

**Shell Marine**



## **SHELL NATURELLE CHANGEOVER ADVICE**

Bulletin, 1 January 2018

**This bulletin is issued to all customer vessels and shore-based staff to help manage and plan the conversion to the Shell Naturelle range of lubricants.**

This changeover guide will cover the following information

- Introduction
- Flushing
- Shell Naturelle S4 Stern Tube Fluid 100
- Shell Naturelle HF-E and Shell Naturelle S4 Gear Fluid
- Shell Naturelle S2 Wire Rope Lubricant A – wire ropes and open gears
- Shell Naturelle S5 Grease V120P 2 – rudder bearings and on-deck grease applications
- Minimising water content and ensuring continuing product performance
- Health and safety
- Disposal
- Disclaimer

## INTRODUCTION

Shell Naturelle Environmentally Acceptable Lubricants (EAL) are advanced synthetic fluids specifically developed to reduce environmental impact and to help customers meet the requirements of the US EPA 2013 VGP (Vessel General Permit).

The Shell Naturelle range of lubricants and greases comprises high-performance, fully synthetic lubricants blended with selected additives to offer superior lubrication performance.

Selecting our biodegradable, low-toxicity products can help to

- extend service intervals compared with conventional mineral oils
- extend equipment life and improve its efficiency
- reduce the environmental impact of your operations
- enhance your reputation and demonstrate continuous improvement for ISO 14001 and other environmental certification programmes.

The following information is provided as a guide to help our customers change over to the Shell Naturelle product range and achieve the best performance from these products while ensuring minimal waste during the changeover process.

## FLUSHING

Although Shell Naturelle Fluids are fully miscible with mineral oils, in order to ensure that the environmental properties and lubricant performance are maintained, it is recommended that the system should be drained and flushed thoroughly when changing over to these fluids.

Other types of EALs are available on the market and may be blended with a different chemistry of base oil or designed to work differently under wet conditions. An example of this would be comparing an emulsifying EAL to an advanced non-emulsifying EAL such as those in the Shell Naturelle product range. If moving from a non-Shell EAL product to a Shell Naturelle product, you should seek advice from your local Shell technical help desk, where information will be given on a case-specific basis.

The best approach is to flush with the new oil that is going into service. Using a third type of oil is not recommended, as this would essentially be introducing a new source of contamination into the system.

New systems may be supplied already containing small amounts of fluid designed to protect the system from corrosion until the equipment is placed into service. Shell Marine recommends that new systems are also flushed to ensure the best performance of Shell Naturelle products

## SHELL NATURELLE S4 STERN TUBE FLUID 100

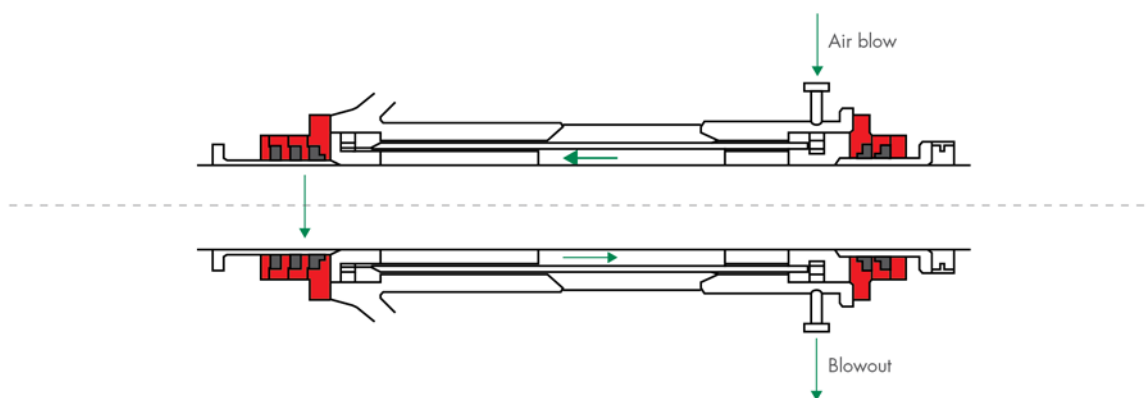
As a supplier of lubricants, Shell Marine is not directly involved in the design or installation of stern tube lubrication systems. Lubrication systems and stern tube bearing designs differ from vessel to vessel. For these reasons, the information provided below should be treated as generic guidance that may contain steps that are not relevant to all installations. Shell Marine recommends in all cases that the original equipment manufacturer (OEM) should be consulted for advice before converting to Shell Naturelle products.

In stern tube applications, Shell Marine recommends no more than 5% of the old oil being present in the new oil. This is regardless of the previous oil type. This thorough flushing will remove any water present and dilute the additives of the previous oil to a safe level, thereby ensuring the lubrication performance and biodegradability of Shell Naturelle S4 Stern Tube Fluid.

Before commencing any changeover, ensure that the materials used for seals, flexible hoses, O-rings and tank coatings are compatible with Shell Naturelle S4 Stern Tube Fluid. Check with the OEMs concerned to confirm compatibility or approvals given for use of Shell Naturelle S4 Stern Tube Fluid in the system.

The best option is to draw the shaft and to clean the stern tube manually. Of course, this is not a practical option in most cases. Consequently, general flushing recommendations are as follows:

1. If possible, operate system until normal working temperature is reached
2. Take an oil sample for Shell LubeAnalyst analysis.
3. Drain the existing stern tube oil through the drain line.
4. Drain the aft seal, including the aft seal tank, through the drain line.
5. Drain the forward seal, including the forward seal tank, through the drain hole on the forward seal housing.
6. Using Shell Naturelle S4 Stern Tube Fluid, fill the stern tube oil tank, the forward seal tank and the aft seal tank.
7. If the vessel has a circulation pump, circulate for 2–3 hours.
8. Drain oil from the whole system using pneumatic pumps if required.
9. Blow air through the aft seal chambers to remove any remaining oil.



10. Fit new filters.
11. Continue with maintenance of replacing seals (Note: Check to ensure that the seals are compatible with Shell Naturelle S4 Stern Tube Fluid).
12. Fill system again with Shell Naturelle S4 Stern Tube Fluid.
13. Take oil sample of new oil charge for Shell LubeAnalyst analysis.

Owing to the surface-wetting properties of EALs, deposits formed in the system during previous operation if the system previously contained mineral oil may be loosened and accumulate in the system filters. The filters should therefore be checked for deposits after 50 hours of operation and at regular intervals thereafter.

## **SHELL NATURELLE HF-E AND SHELL NATURELLE S4 GEAR FLUID**

As a supplier of lubricants, Shell Marine is not directly involved in design or installation of hydraulic, gear or circulating systems. System design differs depending on OEM, application and vessel type. For the above reasons, the guidance below is generic and may contain steps not to be relevant to your actual installation.

Before commencing any changeover, ensure that the materials used for seals, flexible hoses, O-rings and tank coatings are compatible with the new ester EAL. Check with your OEM if there is any uncertainty about compatibility or OEM approval for use of the fluid in the system.

In a hydraulic application, in line with ISO 15380, Shell Marine recommends no more than 2% of the old oil being present in the new oil. For systems that previously contained engine oil, this recommendation is reduced to 1%. This is to ensure the lubrication performance and biodegradability of the EAL.

There are no similar international standards available for gear oils or their application. However, Shell Marine still recommends the above figures as the maximum level of old oil to be present in the new oil when changing to Shell Naturelle S4 Gear Fluid.

Please note that the ISO 15380 standard describes minimum specifications for hydraulic fluids in new condition at the time of packing. The operator of the hydraulic system must ensure that the hydraulic fluid remains in a usable condition throughout its entire period of use. This includes meeting any cleanliness limits (ISO 4406 particle count) required by the OEM.

### **RECOMMENDED CHANGEOVER PROCESS:**

1. Operate the system until the normal working temperature is reached.
2. Take oil sample for Shell LubeAnalyst analysis.
3. Relieve all pressure in the system and disconnect any electrical supplies.
4. Drain the current oil charge, including all filters, header tanks, pumps, valves, reservoirs and oil coolers.
5. In order to remove as much of the existing oil as possible, wipe any reservoir, tank or accessible space with a clean, dry rag.
6. Fill the system with Shell Naturelle Hydraulic Fluid or Shell Naturelle Gear Fluid as appropriate, and run the system at minimum pressure or zero load for a determined length of time in line with OEM recommendations or until the normal working temperature is reached.
7. Drain the current oil charge, including all filters, header tanks, pumps, valves, reservoirs and oil coolers.
8. Replace the necessary seals. Replace filters and strainers.
9. Completely refill the system to the normal level with the Shell Naturelle product and operate the system until the normal working temperature or pressure is reached.
10. Check filters and top up to the normal level if necessary.
11. Take oil sample of new oil charge for Shell LubeAnalyst analysis.

Owing to the surface-wetting properties of EALs, deposits formed in the system during previous operation if the system previously contained mineral oil may be loosened and accumulate in the system filters. The filters should therefore be checked after 50 hours of operation and at regular intervals thereafter.

### **SYSTEMS PREVIOUSLY CONTAINING ENGINE OIL OR POLYALKYLENE GLYCOL (PAG)**

Systems previously containing engine oil or polyalkylene glycol (PAG) offer the greatest chance of incompatibility with Shell Naturelle S4 Gear Fluid or Shell Naturelle HF-E. For this reason, extra care should be taken when flushing.

Should any signs of contamination (e.g., milky coloured emulsion or gel like substance) be visible in the flushing fluid at step 7, it is recommended to repeat steps 3, 4, 5 and 6 until the contamination has been removed and is no longer visible.

## **REVERTING BACK FROM SHELL NATURELLE LUBRICANTS TO SHELL NON-NATURELLE LUBRICANTS**

Some customers do not wish to continue using Shell Naturelle lubricants and to use Shell mineral or Shell non-EAL synthetic lubricants instead. When reverting to a Shell non-EAL lubricant, Shell Marine recommends completing a full drain and flush procedure similar to those described in each application's changeover process section in this document and checking that the new lubricant is approved for use by the particular OEM. Although Shell Naturelle lubricants are miscible with Shell mineral and many Shell synthetic lubricants, the full removal of the Shell Naturelle product is recommended to maintain full performance from the new lubricant. We realise a full drain and flush may not be practical in many cases, so recommend doing this in dry dock. A sample of the new mixture must be submitted for analysis for your records. Please contact your local Shell Marine representative for further information.

## **SHELL NATURELLE S2 WIRE ROPE LUBRICANT A – WIRE ROPES AND OPEN GEARS**

The changeover to Shell Naturelle S2 Wire Rope Lubricant A can be completed very quickly by wiping off as much as possible of the current product and replacing it with the Shell Naturelle grade. Only complete the changeover when it is safe to do so.

Removing as much of the old product as possible guarantees the best adhesion of Shell Naturelle S2 Wire Rope Lubricant A to the wire rope. Shell Naturelle S2 Wire Rope Lubricant A has excellent adhesion properties, which result in reduced lubricant consumption and labour time for reapplication.

For open gear applications, Shell Naturelle S2 Wire Rope Lubricant A can be applied on top of the previous lubricant.



## **SHELL NATURELLE S5 GREASE V120P2 – RUDDER BEARINGS AND ON DECK GREASE APPLICATIONS**

Shell Naturelle S5 Grease V120P 2 is a fully saturated ester based product that uses a lithium thickener. It is compatible with most existing lithium- and calcium-based greases used in the marine environment.

To meet the biodegradability requirements of the VGP, it is recommended to remove as much of the old product as possible when it is being used in an oil-to-sea application. Please consult your OEM or rudder stock installation document for further guidance.

The changeover to Shell Naturelle S5 Grease V120P 2 can be completed quite easily for most deck applications where an extreme-pressure (EP) grease is required. In this case, Shell Naturelle S5 Grease V120P 2 should be dispensed through standard lubrication equipment or by brush.

## MINIMISING WATER CONTENT AND ENSURING CONTINUING PRODUCT PERFORMANCE

Water and/or moisture ingress to systems using biodegradable lubricants can cause severe issues such as microbial activity, which can lead to hydrolysis of the fluid. Hydrolysis may cause corrosion, seal damage and degraded performance. It is, therefore, very important to keep the system free from water by implementing the following processes:

1. Fit desiccant driers to all vents and check saturation levels regularly. Replace as necessary.
2. Ensure any oil filters fitted can be checked for water. Check or change filters after the first 50 hours' use; additional in-line driers may be required.
3. Ensure all tankage has effective bottom water drain valves.
4. Check and routinely drain water from bottom water drain valves in accordance with your standard operating procedure onboard. This is particularly important after a prolonged period of settling.
5. Regular Shell LubeAnalyst analysis should be undertaken to monitor water content. Societies such as Lloyd's Register provide recommendations regarding the testing frequency of critical pieces of equipment.

## HEALTH AND SAFETY

Shell Naturelle products are unlikely to present any significant health or safety hazard when properly used in the recommended application and good standards of industrial and personal hygiene are maintained. Avoid contact with skin. Use impervious gloves when handling used fluid. If skin contact occurs, wash immediately with soap and water. For further guidance on product health and safety, please refer to the appropriate Shell product safety data sheet.

## DISPOSAL

All EALs are subject to the same special disposal requirements as mineral oils. Please ensure that spilt or splashed fluids are absorbed with appropriate adsorbents or by a technique that will prevent contamination of seawater, water courses, or ground or sewerage systems. Comply with local and national legal requirements concerning the disposal of lubricants.

## DISCLAIMER

The information and guidance offered for use of Shell Naturelle 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.

You must check suitability of the Shell Naturelle product for your application with your OEM or your local Shell technical representative before the product is used. It is important to check compatibility of sealing materials and to ensure the fluid has the necessary OEM approval for your specific make and model of equipment.

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. Although future production will conform to Shell's specification, variations in technical specification may occur.