



Shell Marine

Shell LubeMonitor

Maintain the balance between cost and reliability
Faster, simpler, better*

Shell
Lube**Monitor**



*Compared with the previous version of the Shell LubeMonitor service

HELPING YOU TO ACHIEVE THE OPTIMUM BALANCE BETWEEN COST AND RELIABILITY

In the past few years, low-speed, two-stroke engine operators have focused on reducing cylinder lubrication feed rates to minimise lubricant costs. There is a fine balance to be struck between cost reduction and reliability, a balance that depends on

- the lubricant
- the fuel
- engine severity, maintenance and operation.

These changes could be

- fuel sulphur content
- climate and humidity levels
- cylinder liner wall temperatures
- factors affecting engine load (hull fouling and propeller efficiency)
- engine settings and operating conditions.

Although modern, electronic cylinder lubrication systems have taken much of the uncertainty out of optimising cylinder oil consumption, direct monitoring of the oil and cylinder condition remains beneficial.

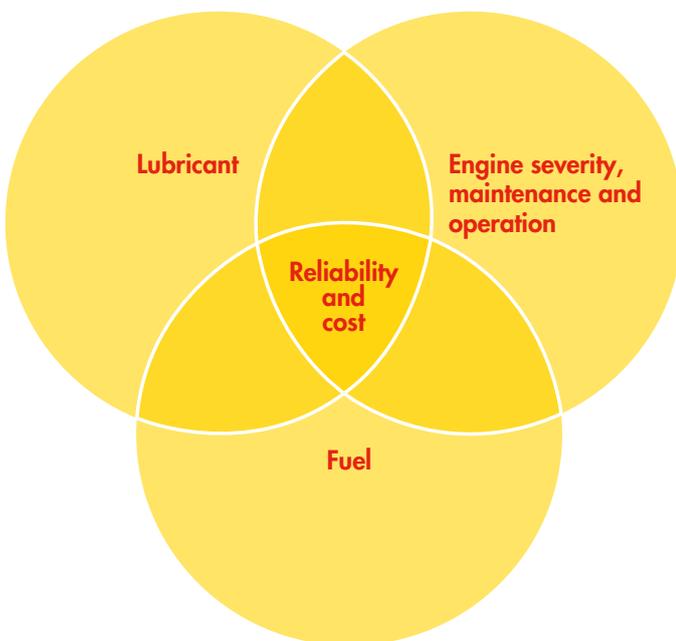
STRIKING THE RIGHT BALANCE

Shell LubeMonitor is a cylinder condition monitoring programme for two-stroke marine engines. It includes access to Shell tools and advice to help you strike and maintain an acceptable balance between cylinder oil costs and wear-related cylinder maintenance expenses.

The programme includes

- **Shell LubeMonitor sweep tests**, which equipment manufacturers require for finding the optimal feed rate when changing, for example, fuel (different sulphur level) or load. This test is especially advisable for engines suffering from cold corrosion problems.
- **Shell LubeMonitor for feed rate optimisation**, which could help to save you money on cylinder oil by finding the lowest possible feed rate and optimum wear rate combination for an engine
- **Shell LubeMonitor for cylinder condition monitoring**, which helps you to understand the condition of an engine and is particularly useful for the latest engine designs that suffer from cold corrosion problems. Equipment manufacturers are advising customers to take part in cylinder condition monitoring when they are operating a latest engine design. The programme can also help you to understand the root cause of high wear problems.

The cost and reliability of a vessel's operation can be affected by changes in three key areas:



SHELL LUBEMONITOR IS A CYLINDER CONDITION MONITORING PROGRAMME FOR TWO-STROKE MARINE ENGINES.

It also includes the use of our onboard and shore-based oil condition monitoring services.



Shell Onboard Ferrous Wear Meter: measurement and monitoring of the elemental iron content in cylinder drain oil



Shell Onboard Plus: measurement of total base number (TBN) and water content



Shell LubeAnalyst:¹ detailed analytical reports and recommendations for corrective action

¹Formerly known as Shell Rapid Lubricant Analysis



Shell Onboard Cold Corrosion Test Kit: measurement of the corrosive elements present in cylinder oil

WHAT SETS SHELL LUBEMONITOR APART?

Shell's dedication to the marine sector and engineering excellence is reflected in all aspects of its offering, from product development and formulation through to application know-how and global technical support. We possess industry and technology knowledge and experience for all types of low-speed, two-stroke engines.

Our integrated systems open up new possibilities for

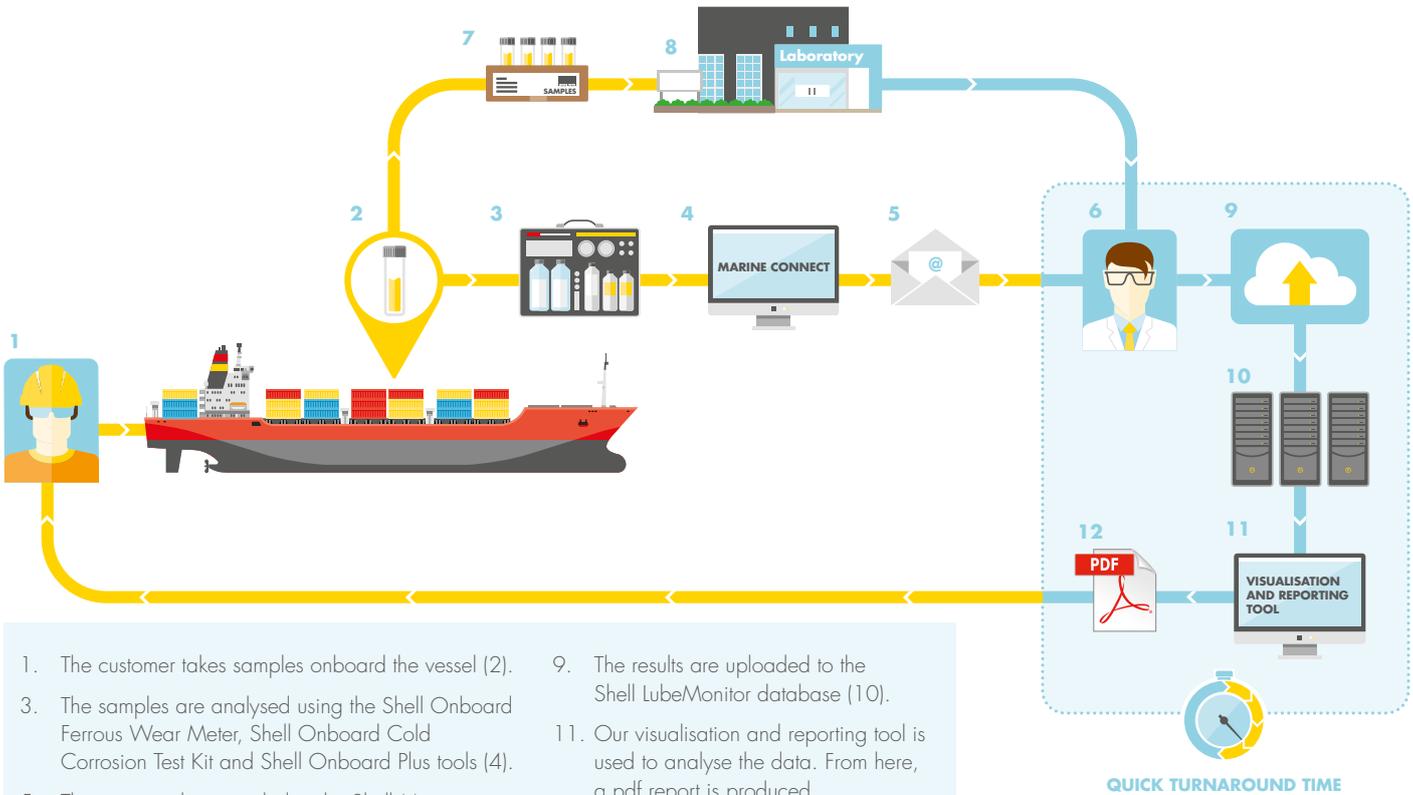
- more uptime, i.e., more operational engine time
- higher productivity
- non-intrusive corrosion and wear monitoring of the engine
- safer and more reliable engines.



HOW SHELL LUBEMONITOR WORKS

VESSEL/CUSTOMER OFFICE

SHELL BACK OFFICE



THE SHELL LUBEMONITOR SERVICE USES SOPHISTICATED SOFTWARE TO ENABLE FULL DATA INTEGRATION.



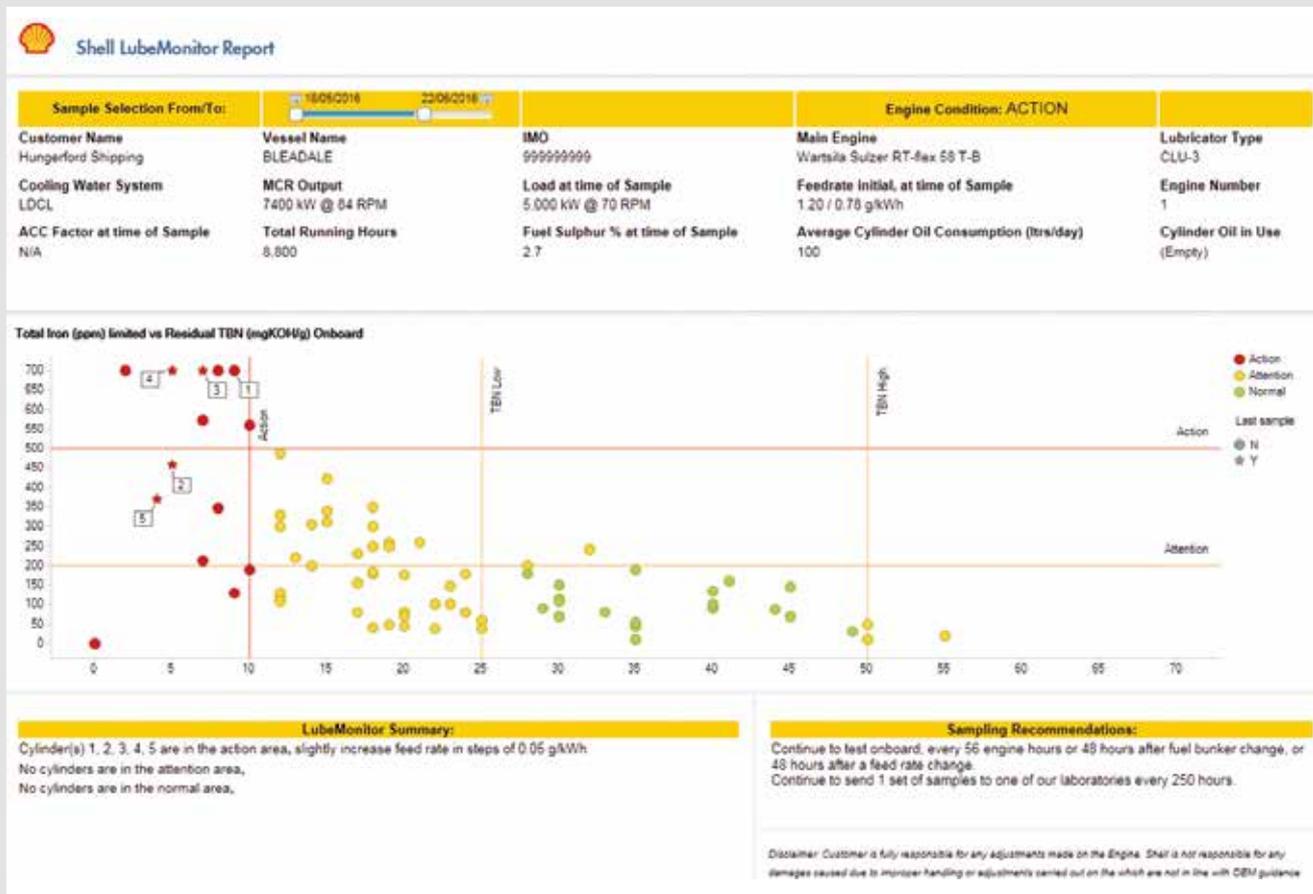
STATE-OF-THE-ART DATA MANAGEMENT SYSTEM

Marine Connect software

The Shell LubeMonitor service uses sophisticated software to enable full data integration. This ensures that all data points can be collected from engine system and oil analysis sources, and that they can be easily and securely transferred between customers' vessels and Shell. Engineering experts can then quickly build a complete overview of the data to provide you with the latest updates on your engine's running condition. Expert feedback and recommendations are also included in the reports.



Shell LubeMonitor report



Shell LubeMonitor reports show all the results from an engine in one graph and also compare onboard data from Shell LubeAnalyst¹ reports, which only show the results for each individual engine component. Shell LubeMonitor reports also compare onboard data with Shell LA data to indicate

whether the onboard tools require calibration. The comments in the Shell LubeMonitor report focus on finding the correct balance between the lowest possible feed rate and the lowest possible wear rate in line with equipment manufacturers' recommendations.

¹Formerly known as Shell Rapid Lubricant Analysis

YOU CAN RELY ON SHELL ALEXIA IN A CHANGING WORLD

The marine industry is changing rapidly as it strives to reduce fuel costs and improve environmental performance. This is increasing operational complexity and the likelihood of cold corrosion, and putting more pressure on the onboard cylinder oils.

We have designed four Shell Alexia cylinder oils to meet your changing needs and complement the wider Shell portfolio. These oils are underpinned by a rigorous scientific understanding of oil stress and their proven performance in engines.



Product	SAE engine viscosity grade	Viscosity grade	BN, mg KOH/g	Flash point, °C	Pour point, °C	Density at 15°C, kg/m ³
Shell Alexia S3	50	>95	25	235	-15	908
Shell Alexia 50	50	>95	70	>205	< -6	932
Shell Alexia S6	50	>95	100	>210	< -6	954
Shell Alexia 140	60	>95	140	>225	< -6	975

CASE STUDY



COMPANY: Oskar Wehr KG (GmbH & Co.)

COUNTRY: Germany

APPLICATION: Main engines

VESSEL: Bulk carriers and containerships

SAVING: US\$20,000 per vessel per year

KEY EDGE: Shell LubeMonitor

After comprehensive monitoring of lubricant performance through the Shell LubeMonitor programme, Oskar Wehr KG (GmbH & Co.) of Hamburg, Germany, has reduced the oil feed rate across its entire fleet by 25%, thereby saving up to \$20,000 per vessel per year² on cylinder oil costs.

Oskar Wehr, part of the Wehr Group, provides commercial and technical management services to 25 vessels, including 12 containerships ranging in size from 1,730 to 5,100 TEU, and 13 bulk carriers ranging in size from 55,000 to 176,000 dwt.

In 2015, the company aimed to cut its fleet running costs and contacted Shell for support in optimising the cylinder lubrication feed rate of the main engines. Shell worked closely with Oskar Wehr's technical department to understand the operating conditions and lubrication needs of the vessels using the Shell LubeMonitor service. Monitoring revealed that the cylinder oil feed rate could safely be reduced by a significant 25%.

Oskar Wehr has now cut its cylinder oil costs by up to \$20,000 per vessel per year while complying with the equipment manufacturer's feed rate recommendations.

²Based on the lubricant list price and main engine power per 10,000 kW

WE HAVE DESIGNED FOUR SHELL ALEXIA CYLINDER OILS TO MEET YOUR CHANGING NEEDS AND COMPLEMENT THE WIDER SHELL PORTFOLIO.

CASE STUDY



COMPANY: Berge Bulk Maritime Pte Ltd
COUNTRY: Singapore
APPLICATION: Main engine cylinder oil
VESSEL: Bulk carrier
SAVING: US\$113,000 per year
KEY EDGE: Shell LubeMonitor, Shell Alexia S6

After using the Shell LubeMonitor programme to monitor a trial switch to Shell Alexia S6, Berge Bulk Maritime Pte Ltd has been able to save an estimated \$113,000 per year³ for four of its vessels by reducing cylinder oil consumption.

Berge Bulk Maritime, one of the world's leading, independent dry bulk carrier owners, operates and manages more than 40 safe and fuel-efficient vessels ranging in size from 34,000 to 388,000 dwt.

In 2014, Berge Bulk Maritime informed Shell that black lacquer had formed on the surfaces of the cylinder liners of four of its vessels, which were using a BN 60 cylinder oil. The company was keen to work with Shell to reduce this and the consumption of cylinder oil, which would translate to lower operating costs.

Shell, in close collaboration with Berge Bulk Maritime's vessel crew and the vessel manager, used the Shell LubeMonitor service to monitor cylinder and oil condition during trial runs of different Shell Alexia cylinder oils. The results showed that by switching to Shell Alexia S6, the cylinder oil consumption had fallen significantly from an average of 520 l/d to about 370 l/d for two of the vessels. The vessels were all able to maintain a feed rate of 0.80–0.85 g/kWh. Piston underside inspections also revealed significantly less black lacquer on the surface of the cylinder liners.

The annual savings from switching to Shell Alexia S6 are estimated at 14.2%, or \$113,000, for the four vessels. In addition, the wear rates for the piston rings and cylinder liners are controlled, which translates to longer periods between overhauls and thus maintenance cost savings.



³Based on 300 sailing days a year. This was calculated from information in the logbooks the chief engineers provided weekly and the average price of cylinder oil in Singapore in 2015 (as vessels had lifted only in Singapore).

As part of its international offering, Shell Marine offers the following range of branded technical services.

SHELL SERVICE

Shell LubeMonitor

A condition monitoring programme for two-stroke marine engine cylinders that includes access to Shell tools and advice to help you strike an acceptable balance between cylinder oil costs and wear-related cylinder maintenance expenses.

Shell LubeAnalyst¹

A flexible used-oil laboratory analysis service designed to save you time and money on maintenance resulting from equipment failure. This early-warning system aims to give you peace of mind that your equipment and lubricants are in optimum working order.

Shell LubeAdvisor

This on-site support from a global team of field-based engineers includes lubrication surveys, vessel assessments, and in-depth technical and applications support when required. Back-up support is provided by telephone, fax or email.

SHELL ALEXIA

Shell Alexia

The marine industry is changing rapidly as it strives to reduce fuel costs and improve environmental performance. This is increasing operational complexity and the likelihood of cold corrosion, and putting more pressure on the cylinder oils used onboard.

We have designed four Shell Alexia cylinder oils to meet your changing needs and complement the wider Shell portfolio. These oils are underpinned by a rigorous scientific understanding of oil stress and their proven performance in engines.

To enquire about pricing for the Shell LubeMonitor service, including onboard tools, please contact your local Shell Marine representative. Shell does not undertake the supply of reagents for onboard test kits.

Please order the consumables or reagents you require from Wilhelmsen Ship Services by visiting

wssproducts.wilhelmsen.com/marine-chemicals/test-kits-and-reagents/oil-test-kit-spare-and-consumables.

TEST KIT	PART NO.	CONTENT
Shell Onboard Ferrous Wear Meter	735758	Ferrous Wear Meter test tubes, 500 pieces Sampling pipettes, 500 pieces
Shell Onboard Cold Corrosion	735744	Reagent 1, 2 x 250 ml Reagent 2, 1 x 250 ml Reagent 3, 1 x 250 ml Bottle dropper caps, 3 pieces Vials (test tubes), 100 pieces 1-ml syringe, 50 pieces
Shell Onboard Plus	632406	TBN reagent pack for 50 tests
	773156	Water in oil replacement pack for 50 tests

¹Formerly known as Shell Rapid Lubricant Analysis

CONTACT US

To find out more about our services, please contact your local Shell Marine account manager or email to shellmarine-info@shell.com.

Visit www.shell.com/marine

