

CASTROL CAREMAX™
USED OIL ANALYSIS SOLUTIONS

PROTECT YOUR ENGINES
AND MACHINERY WITH
ADVANCED USED OIL ANALYSIS
SERVICES AND OPTIMISE YOUR
OPERATIONAL RELIABILITY

WWW.CASTROL.COM/MARINE



IT'S MORE THAN JUST OIL. IT'S LIQUID ENGINEERING.





CASTROL CAREMAX™ USED OIL ANALYSIS AND SPECIALIST USED OIL ANALYSIS SERVICES

Fleets around the world trust Castrol CAREMAX™ Used Oil Analysis Services to help them protect the operational reliability on which they depend.

And beyond the CAREMAX™ Used Oil Analysis Service, Castrol offers a suite of high performance Specialist Used Oil Analysis solutions designed to provide fleets with an even more valuable insight into their lubricant usage and machinery health.

WHY CASTROL MARINE

OUR EXPERIENCE Built on 100 years of lubricant expertise and 20+ years of world class Used Oil Analysis Service.

ANALYSIS AND INSIGHT Used Oil Analysis data supported by personalised expert report commentaries, provided by highly trained oil analysis technicians familiar with your specific vessel/fleet history, lubricant performance and formulations.

KNOW-HOW Approximately 200,000 samples per annum analysed for more than 7,000 vessels.



CAREMAX™ ONLINE: RESULTS TO YOUR DESKTOP

WITH CASTROL CAREMAX™, YOUR
ESSENTIAL USED OIL ANALYSIS REPORT
DATA CAN BE DELIVERED DIRECT TO
YOUR DESKTOP

CAREMAX™ Online is an oil analysis program that allows your technical department to manage lubricants more easily than ever before. With CAREMAX™ Online, you can compare results across your fleet and identify potential problems before they result in unnecessary breakdowns and unscheduled downtime.

CAREMAX™ Online is:

EFFICIENT

- Data can be downloaded to your PC
- Timely and easily accessible information available from either office or vessel

USER-FRIENDLY

- Easy-to-use, simple and intuitive software
- Full control on how and when vessels receive data updates
- Clearly listed vessels, engines, machinery and associated Used Oil Analysis results
- Ability to print Used Oil Analysis reports (via downloadable PDF)

POWERFUL

- Easy-to-use reporting system which tracks data for vessels within your fleet
- Easy access to historical data allows you to identify trends
- Ability to create graphs, charts and cross-compare results across fleet

MANAGEABLE

- Easy identification of submitted samples to agreed vessel schedules
- Track sampling data schedules



CASTROL CAREMAX™ USED OIL ANALYSIS

THE ADDED VALUE: POWERFUL PROBLEM PREVENTION THROUGH EXPERT OIL ANALYSIS TO ENHANCE LUBRICANT PERFORMANCE

THE CHALLENGES YOU FACE

How to maintain full operational reliability and avoid unforeseen failures and unscheduled downtime that can be costly and damaging to your reputation.

THE SERVICE

World class marine-dedicated laboratory analysis of used oil samples helps to optimise and maintain lubricant performance, maximise the reliability of engines and shipboard machinery and thus the performance and profitability of vessels and fleets.

Clear, comprehensive Used Oil Analysis reports are a key component to help prevent unscheduled downtime, unnecessary repairs and maintenance through pre-emptive remedial action.

ESSENTIAL BENEFITS FOR YOUR FLEET

- Provides valuable oil performance data supported by analysis and recommendations which you can act upon
- Helps maintain the full performance of all shipboard lubricants
- Provides essential insights into lubricant performance and machinery health
- Can significantly reduce the risk of failures, downtime and dry docking fees by identifying and preventing costly problems before they occur
- Supports reduction of maintenance (especially with regard to tail shaft inspections with Stern Tube Analysis), extension of component life, prevention of unscheduled downtime and potentially cuts your overall operating costs
- Helps you to extract maximum value from your lubricants and potentially deliver further cost savings e.g. prolonged drain intervals which will result in reduced oil consumption



CAREMAX™ SPECIAL FEATURES

- Advanced diagnostic techniques
- Reports prepared by highly experienced Castrol Technical Service Engineers and Product Managers with in-depth knowledge of lubricant formulations and shipboard machinery operation
- Clear and comprehensive reports, graphical display of most important parameters, colour-coded for easy identification of serious or potential problems
- Interpretation of analysis results and recommendations from our experienced team of engineers and lubricant specialists
- Results cross-checked against vessel Used Oil Analysis trends
- Consistently accurate results
- Development of internationally recognised analytical test methods
- Fast results turnaround; usually less than 72 hours from receipt of sample

“ANOTHER REMARKABLE SERVICE PROVIDED BY CASTROL IS ITS TECHNICAL SUPPORT AND USED OIL ANALYSIS SERVICE. IT IS EXTREMELY IMPORTANT FOR US TO CLEARLY KNOW THE LUBE OIL CONDITION ONBOARD. CASTROL’S ENGINEER IS ALWAYS THERE TO SUPPORT US IN THIS ASPECT AND PROVIDE US VALUABLE RECOMMENDATION... **WE BELIEVE OUR SIX-STAR CRUISE SHIP MUST BE SERVICED BY A SIX-STAR SUPPLIER, WHICH IS WHY WE CHOSE CASTROL.**”

Yeung Po Kei,
Technical Director
Conning Shipping Ltd

“WE WOULD LIKE TO THANK CASTROL FOR UNDERSTANDING OUR BUSINESS REQUIREMENTS AND INTRODUCING THE CAREMAX™ USED OIL ANALYSIS SERVICE AT A TIME WHEN WE WERE LOOKING FOR SYNTHETIC GRADES FOR OUR ENGINES SO AS TO PROLONG DRAIN INTERVALS. **CASTROL USED OIL ANALYSIS SERVICE HELPED US TO PROLONG THE DRAIN INTERVALS AND OPTIMISE THE OIL CONSUMPTION.**”

Prakash Tendulkar,
Manager Engineering Services
DP World Nhava Sheva





CASTROL CAREMAX™ SPECIALIST HIGH PERFORMANCE OIL ANALYSIS

THE ADDED VALUE: IN-DEPTH ANALYSIS OF THE CONDITION OF SPECIALITY LUBRICANTS ON WHICH VITAL SHIPBOARD MACHINERY DEPENDS, TO HELP ENSURE YOUR VESSELS STAY FULLY OPERATIONAL AND PROFITABLE

THE CHALLENGES YOU FACE

Avoiding costly failures in critical hydraulic systems operating under extremely fine tolerances and high pressures; deferring tail shaft inspections to avoid unplanned dry docking costs.

THE SERVICE

A suite of world class specialist oil tests that go beyond standard Used Oil Analysis to provide critical insights into the health and reliability of speciality lubricants, machinery and equipment, supported by expert advice from the Castrol Technical Specialists.

STERN TUBE - HYDRAULIC - MACHINERY HEALTH MONITOR (FERROGRAPHY) ASPHALTENES TESTING.



CAREMAX™ STERN TUBE SERVICE

Analysis: Viscosity; water content; acidity; key elemental analysis. (NB representative sampling must always be done from the correct part of the system at the correct time).

Details: The Stern Tube oil analysis report includes an assessment of wear metals and advice where results have exceeded the guidance limits set by the appropriate Classification Society.* Reports are presented in an easy-to-read format and contain an overall summary of the condition of the oil and equipment.

The potential costs of undertaking a dry docking for a tail shaft inspection are highly significant. Regular and planned Stern Tube analysis specifically tailored to meet the needs of the relevant Classification Society can be an important tool to ensure that costs associated with tail shaft inspections can be minimised.

N.B. A sample result which exceeds limits does not automatically mean that the vessel requires tail-shaft withdrawal. A Classification Society surveyor has the discretion to defer a physical survey if the condition monitoring information contains anomalous results

CAREMAX™ HYDRAULIC SERVICE

Analysis: Particle Counting; Ferrometric Wear Severity Index; Micro Filtration; Viscosity; Water Content; Acidity; Key Elemental Analysis (where appropriate reports include images of wear particles to help identify types and sources of component wear).

Details: Most hydraulic system failures are related, directly or indirectly, to particulate contamination of hydraulic oil. Critical systems benefit greatly from Castrol Marine's specialist lab analysis of oil cleanliness and component wear. Failure to remove contaminants from modern high pressure systems can lead to poor system performance, potential breakdowns and potential environmental, health and safety issues.

CAREMAX™ MACHINERY HEALTH MONITOR (FERROGRAPHY)

Analysis: Detailed ferrographic analysis and wear particle concentration (as well as the more routine physical and elemental analysis provided by Castrol CAREMAX™ Oil Monitor – Advanced Lubricating Analysis).

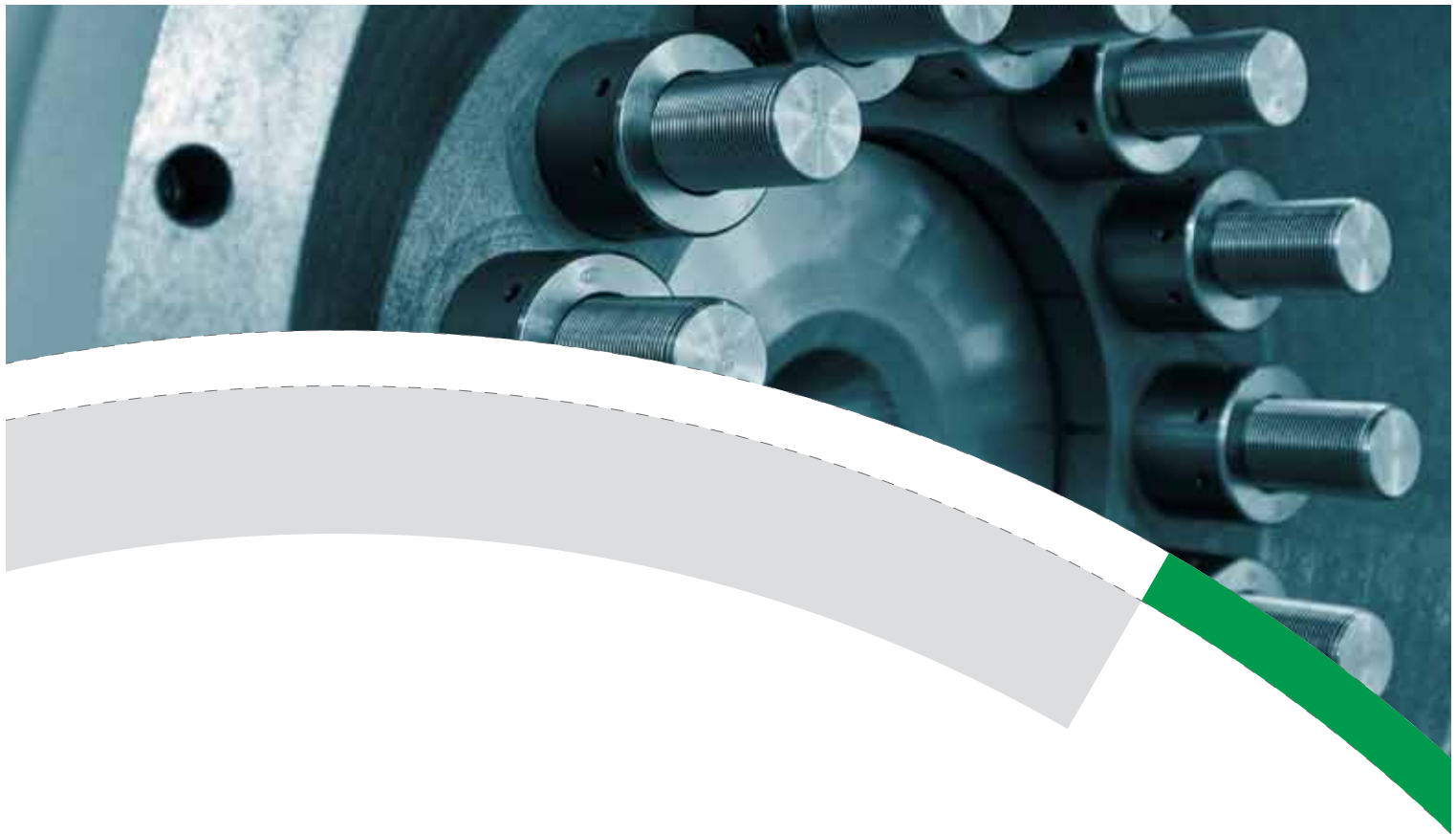
Details: The 'full service' preventative option focuses on overall machinery condition, delivering deep insight into the condition of vessel machinery through oil analysis, to help maximise operating cost reductions. Castrol CAREMAX™ Machinery Health Monitor can provide significant benefits to ship engineers, allowing them to:

- Identify items of machinery and equipment under stress and which components are particularly vulnerable
- Plan maintenance programmes to minimise disruption so that sailing schedules and voyage plans are not compromised
- Take action to avoid possible breakdowns and greatly reduce the risk of serious failure and secondary damage
- Potentially extend time-based maintenance schedules and reduce costs



ClassNK

*Castrol CAREMAX™ Stern Tube service meets the requirements of major Classification Societies including the above:



CAREMAX™ OIL MONITOR PLUS

A common source of contamination in engine oils is asphaltenes, derived from the use of heavy fuel.

Analysis: Measurement of asphaltene content.

Details: Contaminants have the potential to cause a number of problems:

- **Piston Deposits:** Asphaltenes can form deposits in the hotter parts of the engine e.g. piston undercrown, ring grooves
- **Black Sludge:** Increased likelihood of deposit formation in cooler parts of the engine (crankcase, rockers, cambox, oil passageways, filters)
- **Increased Viscosity:** Viscous oil leads to more 'drag' in lubricated components, makes the oil more difficult to pump, decreases fuel efficiency and creates potential cooling problems
- **Fuel Pump Sticking:** Asphaltenes form adverse deposits in fuel pumps which may add to fuel pump sticking problems in sensitive designs

Up until now it has been extremely difficult to identify and quantify raw (heavy) fuel contamination and

insoluble content derived from products of combustion. As a step to providing ship operators with greater diagnostic insight into the oil's condition, we have introduced CAREMAX™ Plus to measure asphaltenes in the crankcase oils of heavy fuel-burning engines.

ASPHALTENES TESTING - APPLICATION

The asphaltene test will typically be run on 4-stroke engines that burn HFO, and slow speed crosshead engine cambox systems where these are segregated from the main system oil. This primarily means samples of TLX Plus from 4-stroke engines and CDX 30 from 2-stroke camboxes.

The test method can also provide information on the potential source of asphaltene ingress - giving an indication of the dominant source of the asphaltene, whether it is from blow-by, raw fuel or a combination of the two.

Using this information, your Castrol Technical Support Engineer will then make the appropriate diagnosis in the report comments section.

This service will provide the engine operator with additional insight into the condition of the engine and enables corrective action to be taken before engine performance deteriorates leading to operational problems.

Special Features of the Offer:

- Advanced diagnostic techniques
- Reports prepared by highly experienced Technical Service Engineers and Product Managers with in-depth knowledge of lubricant formulations and shipboard machinery operation
- Clear and comprehensive reports, graphical display of most important parameters, colour-coded for easy identification of serious or potential problems
- Interpretation of analysis results and recommendations from our experienced team of engineers and lubricant specialists
- Results cross-checked against vessel Used Oil Analysis trends
- Consistently accurate results
- Development of internationally recognised analytical test methods
- Fast results turnaround; usually less than 72 hours from receipt of sample
- Physical analysis results and spectrographically determined wear and contaminating elements including asphaltenes
- Analysis results flagged that exceed limits set by machinery manufacturers and in combination with our own expertise
- Advanced computer database which stores results for trend analysis
- Analysis and reports meeting the requirements of relevant classification societies.



**“IT HAS BEEN MORE THAN
12 MONTHS SINCE WE HAVE
UTILISED THE NEW CAREMAX™
SPECIALIST USED OIL
ANALYSIS SERVICE...”**

Analysis reports have consistently provided us with a full picture on hydraulic oil condition including cleanliness of oil, metal particle counting, components wearing down index and composition of debris found etc. This greatly helped us to enhance our lubricating oil system management and to a certain extent saving the maintenance cost by reducing machinery down time when predictable breakdown could be avoided.

At the same time, we have also adopted Castrol CAREMAX™ Stern Tube Analysis. This service provides an extra token to meet requirements laid down by most of the Classification Societies... Castrol CAREMAX™ provides a comprehensive lubricating oil sample testing and we are happy with this value added service. I would recommend this service to any ship owners and managers who place priority in their fleets' lubricating oil system management, particularly in the direction of ship operation safety as well as potential saving on their ship operating cost.

**Patrick Lee,
Senior Ship Manager
The China Navigation Co. Ltd.**

**“YOUR SPECIALISED TECHNICAL
SUPPORT, EXCELLENT SERVICE
AND GUIDANCE HELP US
MAINTAIN THE SUPPLY VESSEL
TERMS IN THE KOREAN
SHIPPING MARKET...”**

We thank you for your on-time supply... Used Oil Analysis and specialised technical service from your technical engineer and detailed information on worldwide supply networks.

CAREMAX™ Oil Monitor Analysis Reports and recommendations along with consistent monitoring, enable the technical team, owner, and ship engineers to track problems on their engine when they occur. This helps the vessel to reduce lubricants cost by preventing unsuitable engine conditions. The regular training visits to ships by your technical engineer have been helping them to develop their crew competency. We encourage you to continue providing such excellent full service and technical support so that we can build our mutual business relationship even stronger.

**D.S. Chang
President
MARINETECH Co. Ltd.**





To find out more about Castrol Marine lubricants please visit: www.castrol.com/marine



Castrol Marine
Technology Centre
Whitchurch Hill
Pangbourne
Reading
RG8 7QR

Telephone: +44 (0) 118 9843311
www.castrol.com/marine

CM144
03/12

All products and services supplied are provided under Castrol Marine's standard conditions of sale. You should consult your local Castrol Marine representative if you require any further information. Castrol and the Castrol logo are the trade marks of Castrol Limited, used under licence. Produced by BP Marine Limited.

Registered office: Chertsey Road, Sunbury-on-Thames, Middlesex. TW16 7BP United Kingdom.
Registered in England & Wales, no 01214291.

© 2012 BP Marine Ltd. All rights reserved.

IT'S MORE THAN JUST OIL. IT'S LIQUID ENGINEERING.

