



WORLD CLASS  
COMMERCIAL  
MARINE  
LABORATORY  
ANALYSIS



**SPECTRO® | JET-CARE®**

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ROUTINE ANALYSIS  
AND TRENDING  
GIVE AN ACCURATE  
INSIGHT INTO  
POTENTIAL  
PERFORMANCE AND  
RELIABILITY ISSUES.



Maintaining the optimum condition of lubricating oils, hydraulic fluids, greases and fuels is critical to ensuring the efficient and safe operation of a vessel. That is well known and yet there is much more that analysis can provide as a predictive tool to avoid accelerated wear in engines and machinery well before any other signs are evident.

Routine analysis and trending give an accurate insight into potential performance and reliability issues and allows precise programming of maintenance schedules to suit the vessel's operational cycle, negating downtime at inopportune periods and geographic locations.

Fluid analysis is also an essential tool during re-fit to ensure that optimum performance has been restored after repair and furthermore to identify wear situations which might only be able to be repaired in dry dock or refit. Classification Societies regularly defer extensive and invasive surveys, such as stern tubes and thrusters, if routine oil and fluid analysis is performed by a suitably qualified and accredited laboratory\*.

Purchasing or selling a vessel requires a precise assessment of the vessel's mechanical condition by both buyer and seller. For the seller to endorse the pedigree of the vessel and for the buyer to confirm or refute the same. Historical maintenance records are, of course, important but a real time snapshot of mechanical condition can only be truly accurate through the use of spectrographic laboratory analysis of fluids. This gives a present and historical indication of potential problems that might pre-exist and manifest themselves after sale of the vessel.

**Independent laboratory analysis is therefore the ultimate and effective security against engine and machinery malfunction, accelerated wear and failure.**

## QUALITY

Our unrivalled expertise, quality control and integrity are supported by industry recognised accreditation\* that ensures each of our laboratories maintains the same exacting high standards

UKAS (United Kingdom Accreditation Service) and SAS (Swiss Accreditation Service) verify that our laboratories comply with ISO/IEC 17025:2017, the testing and calibration laboratory standard.

In addition, our UK and USA laboratories both hold Service Supplier Status with the American Bureau of Shipping (ABS).



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The use of the UKAS/SAS marks does not imply that all activities are accredited by UKAS/SAS. Accreditation covers the laboratory activities in accordance with the schedule, which can be found on the Spectro | Jet-Core website.





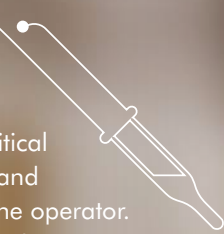
# ANALYSIS OFFERING

Analysis is performed from samples provided by the vessel, using easy to use sample kits that include the price of analysis. The kits include a sample pump to extract the fluid cleanly and directly to the bottle, labelling, and outer packaging to allow safe transit.



## OIL ANALYSIS

Unscheduled downtime of critical equipment limits availability and therefore the profitability of the operator. Quality used oil analysis provides a core tool to monitor equipment condition with rapid turn times, coupled with clear and concise reporting, expensive downtime and repairs can be minimised and catastrophic failure avoided.



## HYDRAULIC ANALYSIS

The regular sampling and testing of hydraulic fluids is key to ensuring critical control systems are kept in optimum perfect condition, as well as meeting safety standards. Regular testing of hydraulic fluid provides a clearer picture of system cleanliness and performance.



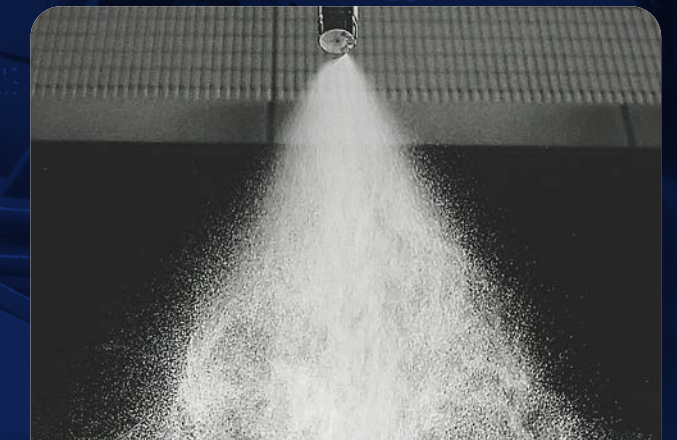
## COOLANT ANALYSIS

Specific engines rely upon sealed coolant systems and these can be vulnerable to microbial contamination and coolant degradation, with consequent and potentially damaging overheating issues. Furthermore, leakage can be identified through regular analysis.



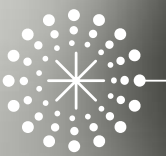
## GREASE ANALYSIS

Grease analysis is an important condition monitoring function as indications of advanced wear, overheating, grease degradation, contamination and bearing metal deposits can readily be identified. Equally where the wrong grease has been used, or indeed too much grease, this can be identified too.



## FIRE WATER MIST ANALYSIS

Fire water suppressant by mist generation is an important safety factor onboard. New regulations insist upon mandatory testing of this water to identify elements that may cause disfunction of the system when called to action during a fire.



## FUEL ANALYSIS

Periodic monitoring of fuel tanks is fundamental to ensure that fuel cleanliness is maintained at all times and to identify where treatment is needed. Water encourages the development of bacteria and fungi which could lead to blockages and consequent operational problems. The testing of samples for water content and microbiological growth of aerobic bacteria and viable fungal spores provide positive indication of fuel system contamination.



## DEBRIS & FILTER ANALYSIS

We use the analytical capabilities of Scanning Electron Microscopes (SEM), and powerful optical microscopes, for the in-depth examination of debris. Particles can be found within filters, via metallic wear debris detectors or during routine visual inspection of fluid test samples. By considering the type, form, quantity, size and condition of the particles recommendations can be made on the likely source of the debris and whether the particles are the result of fatigue or downstream collateral damage.





# ANALYSIS KITS



OIL SAMPLE CASE



OIL RESTOCK KIT



HYDRAULIC FLUID SAMPLE CASE



HYDRAULIC FLUID RESTOCK KIT



SINGLE HYDRAULIC KIT



SINGLE FUEL KIT



FIRE WATER MIST



OIL EXTRACTION PUMP



ADAPTORS



# LOGISTICS

Logistics are a vital aspect of any laboratory analysis program and the team at Spectro | Jet-Care are well aware that post Brexit this can cause challenges if customers are inexperienced in the correct procedures. Having addressed these issues and established the correct methodology and courier routes, the Spectro | Jet-Care logistics team can ensure swift passage without delay to any of our laboratories.



# webECHO™

webECHO is a versatile online resource available 24/7/365 to manage your equipment, fleet data and access your latest reports and trends through a single portal. The integrated system allows you to download reports, view graphs, read the advice dialogue and analyse data in real time. Bespoke KPI's are easily produced according to customers requirements.

webECHO can also run on a variety of mobile devices such as iPads® and Android™ tablets. webECHO is available at no extra charge as part of our support service and is a convenient and user-friendly way to manage your analysis results and trend monitoring.



# REPORTING & TECHNICAL SUPPORT

Within two working days your results are reported either by email or can be accessed through our online portal, webECHO™. The analysis reports are provided in PDF format and show the equipment history which can be discussed further with our technical team, who not only understand laboratory analysis but marine equipment and vessel operation.

OIL ANALYSIS REPORT											
Customer Name				Equipment Information							
Vessel \$				Azimuth Thruster No.3 HYD							
Description \$				Warsilla							
Manufacturer \$				LMT-FS255/MNR							
Model \$											
Serial Number \$											
Customer Reference \$											
Unique Code				Mobil DTE 10 Excel 46							
Oil Grade \$											
Unit Life \$											
Oil Life \$											
For the Attention of											
Laboratory Report Reference											
Receipt Date											
Sample Date \$											
Sampling Point \$											
Comment											
Particulate debris is excessive. Change filters to reduce or consider oil change. OIL LIFE not supplied.											
Please note that when reporting Particle Counting we will now use the ISO 4406 (2017) 3 code standard and will cease reporting to NAS1638 for all Marine applications. Find out more at <a href="http://webecho.spectro-oil.com/r.asp?R=P">http://webecho.spectro-oil.com/r.asp?R=P</a>											
Sample Number	7	8	9	10	11	12	13	14	15	16	17
Analysis Date	08-Oct-18	31-Jan-19	17-May-19	29-Aug-19	17-Oct-19	28-Nov-19	13-Mar-20	29-May-20	21-Aug-20	17-Nov-20	
Sample Date \$	28-Sep-18	20-Jan-19	30-Apr-19	21-Aug-19	06-Oct-19	24-Nov-19	25-Feb-20	15-May-20	10-Aug-20	06-Nov-20	
Ticket Number \$	146170	154228	H61814	H61802	H61801	158265	168349	H77462	H77469	H77457	
Lab Reference	SPM84411	SPM87065	SPM89322	SPM92551	SPM34443	SPM95867	SPM98150	SPM99406	SPM101585	SPM103923	
Unit Life \$	-	-	10979	12944	13707	-	14698	15162	16363	17884	
Oil Life \$	-	-	10979	12944	13707	-	-	-	-	-	
Oil/Fluid Added \$	-	-	-	-	-	-	-	-	-	-	
Sampling Point \$	-	-	-	-	-	-	-	-	-	-	
Physical Condition											
Viscosity at 40°C (M002)	(cSt @ mm/s)	44	44	44	44	45	43	44	44	44	
Viscosity at 100°C (M002)	(cSt @ mm/s)	8.0	8.1	8.0	8.1	8.6	8.0	8.0	8.1	7.9	
Viscosity Index (M002)		-	-	156	160	172	161	156	160	152	
Water (M011/1015/1016)	% wt	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	
Oxidation (M007)	Abn/cm	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Inerts 0.3 µm (M010)	% wt	0.02	0.02	0.06	0.04	0.10	0.06	0.10	0.04	0.06	
TAN (M007)	mgKOH/g	0.20	0.17	0.15	0.19	0.23	0.15	0.15	0.16	0.20	
PQ Index (M005)	PQ units	12	14	14	15	12	12	13	10	10	
Spectrographic Analysis											
Iron (M019)	mg/kg	<1	<1	<1	1	<1	<1	<1	<1	<1	
Aluminium (M019)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Chromium (M019)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Molybdenum (M019)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Copper (M019)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Lead (M019)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Tin (M019)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Nickel (M019)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Silver (M019)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Manganese (M019)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Vanadium (M019)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Silicon (M019)	mg/kg	<1	<1	<1	3	<1	<1	<1	<1	<1	
Titanium (M019)	mg/kg	<1	<1	<1	<1	<1	<1	<1	<1	<1	
Sodium (M019)	mg/kg	1	3	1	1	<1	1	1	<1	<1	
Boron (M019)	mg/kg	<1	<1	<1	<1	<1	<1	<1	1	1	
Potassium (M019)	mg/kg	<1	<1	<1	<1	<1	<1	1	<1	<1	
Phosphorus (M019)	% wt	0.0465	0.0447	0.0478	0.0475	0.0424	0.0478	0.0406	0.0446	0.0473	
Zinc (M019)	% wt	0.0025	0.0025	0.0025	0.0026	0.0024	0.0024	0.0023	0.0024	0.0025	
Calcium (M019)	% wt	0.0111	0.0114	0.0115	0.0120	0.0114	0.0114	0.0108	0.0119	0.0123	
Magnesium (M019)	% wt	0.0001	0.0002	0.0001	0.0002	0.0001	0.0001	0.0001	0.0002	0.0002	
SPECTRO   JET-CARE											
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OIL ANALYSIS REPORT PAGE 1

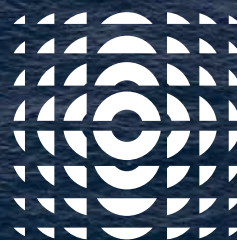
OIL ANALYSIS REPORT											
Customer Name				Equipment Information							
Vessel \$				Azimuth Thruster No.3 HYD							
Description \$				Warsilla							
Manufacturer \$				LMT-FS255/MNR							
Model \$											
Serial Number \$											
Customer Reference \$											
Unique Code				Mobil DTE 10 Excel 46							
Oil Grade \$											
Unit Life \$											
Oil Life \$											
For the Attention of											
Laboratory Report Reference											
Receipt Date											
Sample Date \$											
Sampling Point \$											
Comment											
Particulate debris is excessive. Change filters to reduce or consider oil change. OIL LIFE not supplied.											
Please note that when reporting Particle Counting we will now use the ISO 4406 (2017) 3 code standard and will cease reporting to NAS1638 for all Marine applications. Find out more at <a href="http://webecho.spectro-oil.com/r.asp?R=P">http://webecho.spectro-oil.com/r.asp?R=P</a>											
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Analysis Date	08-Oct-18	31-Jan-19	17-May-19	29-Aug-19	17-Oct-19	28-Nov-19	13-Mar-20	29-May-20	21-Aug-20	17-Nov-20	
Sample Date \$	28-Sep-18	20-Jan-19	30-Apr-19	21-Aug-19	06-Oct-19	24-Nov-19	25-Feb-20	15-May-20	10-Aug-20	06-Nov-20	
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Oil Life \$	-	-	10979	12944	13707	-	-	-	-	-	
Oil/Fluid Added \$	-	-	-	-	-	-	-	-	-	-	
Sampling Point \$	-	-	-	-	-	-	-	-	-	-	
Physical Condition											
Appearance (N/A)		-	-	Clear	Clear	Clear	-	Clear	Clear	Clear	
NAS 1638 (M033)	class	-	-	-	-	-	-	-	-	-	
ISO 4406 1991 (M033)	5-15µm	-	-	-	-	-	-	-	-	-	
PS 5 - 15 µm (M033)	per 100ml	-	-	-	-	-	-	-	-	-	
PS 15 - 25 µm (M033)	per 100ml	-	-	-	-	-	-	-	-	-	
PS 25 - 50 µm (M033)	per 100ml	-	-	-	-	-	-	-	-	-	
PS 50 - 100 µm (M033)	per 100ml	-	-	-	-	-	-	-	-	-	
PS 100+ µm (M033)	per 100ml	-	-	-	-	-	-	-	-	-	
ISO 4406 2017 (M033)	4>10µm	-	-	18/17/15	20/18/14	10/10/08	-	17/14/10	16/14/12	16/13/15	
PS 4 - 6 µm (M033)	per 100ml	-	-	239200	655400	578900	-	65000	112100	104000	
PS 6 - 14 µm (M033)	per 100ml	-	-	107800	134800	326300	-	11300	42300	68700	
PS 14 - 21 µm (M033)	per 100ml	-	-	11500	8000	34800	-	400	2700	13800	
PS 21 - 38 µm (M033)	per 100ml	-	-	4000	2200	6200	-	100	300	6600	
PS > 38 µm (M033)	per 100ml	-	-	1100	200	2100	-	100	200	1700	
SPECTRO   JET-CARE											
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OIL ANALYSIS REPORT PAGE 2

OIL ANALYSIS REPORT											
Customer Name				Equipment Information							
Vessel \$				Azimuth Thruster No.3 HYD							
Description \$				Warsilla							
Manufacturer \$				LMT-FS255/MNR							
Model \$											
Serial Number \$											
Customer Reference \$											
Unique Code				Mobil DTE 10 Excel 46							
Oil Grade \$											
Unit Life \$											
Oil Life \$											
For the Attention of											
Laboratory Report Reference											
Receipt Date											
Sample Date \$											
Sampling Point \$											
Comment											
Particulate debris is excessive. Change filters to reduce or consider oil change. OIL LIFE not supplied.											
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Physical Condition											
Appearance (N/A)		-	-	Clear	Clear	Clear	-	Clear	Clear	Clear	
NAS 1638 (M033)	class	-	-	-	-	-	-	-	-	-	
ISO 4406 1991 (M033)	5-15µm	-	-	-	-	-	-	-	-	-	
PS 5 - 15 µm (M033)	per 100ml	-	-	-	-	-	-	-	-	-	
PS 15 - 25 µm (M033)	per 100ml	-	-	-	-	-	-	-	-	-	
PS 25 - 50 µm (M033)	per 100ml	-	-	-	-	-	-	-	-	-	
PS 50 - 100 µm (M033)	per 100ml	-	-	-	-	-	-	-	-	-	
PS 100+ µm (M033)	per 100ml	-	-	-	-	-	-	-	-	-	
ISO 4406 2017 (M033)	4>10µm	-	-	18/17/15	20/18/14	10/10/08	-	17/14/10	16/14/12	16/13/15	
PS 4 - 6 µm (M033)	per 100ml	-	-	239200	655400	578900	-	65000	112100	104000	
PS 6 - 14 µm (M033)	per 100ml	-	-	107800	134800	326300	-	11300	42300	68700	
PS 14 - 21 µm (M033)	per 100ml	-	-	11500	8000	34800	-	400	2700	13800	
PS 21 - 38 µm (M033)	per 100ml	-	-	4000	2200	6200	-	100	300	6600	
PS > 38 µm (M033)	per 100ml	-	-	1100	200	2100	-	100	200	1700	
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OIL ANALYSIS REPORT PAGE 3





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JET-CARE®**

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