

Evaluation Service

Make the most out of your existing measuring tools or get our help to get started. CMT experts will help you to make sense of data gathered by Diesel Performance Analysers, Vibration Monitoring Equipment or your Fuel oil and Lube Oil Condition Monitoring devices. CMT will accompany you from the purchase of the device, implementation up to the interpretation of the data gathered.



However most technical personnel agree that if monitoring tools are being used correctly and the evaluation of the results is being done properly it will help to bring down maintenance costs, prevent down times and improve the bottom line.

CMT has recognized this and is offering an evaluation service for results obtained for Diesel Performance, Vibration and Oil condition. It does not end with the interpretation of the results but we will offer help for the implementation of the devices, the individual set up of the instruments and training. Either let us help to get you started or let us provide our service the whole way. We are prepared to offer individual services as per your need- just get in touch and we will find a solution.

SDA LAB REPORT		CMT	
IMO number	IMO XXXXX	Customer number	203100
Vessel name	MS OELCHECK	Engine make	MAN
Component	2 stroke marine diesel engine	Engine speed	750 rpm
OELCHECK GmbH Postfach 1116 83004 Brannenburg		Total operating hrs	24007 h
Typical Laboratory Report		Oil temperature	45 °C
OELCHECK		Oil level	OK
Postfach 1116		Oil viscosity	220 cSt
83004 Brannenburg		Oil level	OK
Diagnosis for the current laboratory values		Oil level	OK
Residual BV is adequate to avoid corrosion for low on cylinders 3 and 7. A fuel rate increase on cylinders 3 and 7 is recommended to ensure that corrosion is contained. Residual BV is not high enough on some cylinders to safely recommend a fuel rate reduction. Iron, Chrome and Copper are in the normal range. PO index is higher than expected for cylinders 1, 3, 6 and 7 but not critical. Viscosity and soot content are high but not a cause for concern. Soot content are all low and well within the expected range. Sulfur oil content in cylinders 2 and 4 is high as are the copper contents. This could indicate wear of the cylinder walls. Viscosity at 40°C is slightly high but does not require attention. Recommendations are given on the test sample by trend. Recommendations in line with the recommendations of your engine supplier or your insurance company. Recommendation: Please complete all sample information in blue. We attach a more detailed assessment to be made. Dig. Wieg. grey buffer Bots		Average rating	!
ANALYSIS RESULTS			
LAB NUMBER	1702021	1702022	1702023
CYLINDER NUMBER	1	2	3
SAMPLE RATING	3	2	2
PREVIOUS SAMPLE RATING	1	1	1
DATE	08.07.2014	24.08.2014	24.08.2014
Fe mg/kg	92	79	124
Cr mg/kg	5	7	4
Cu mg/kg	3	2	4
PO index	30	27	25
CONDENSATION			
Silicon Si mg/kg	100	108	136
Aluminium Al mg/kg	23	24	28
Sodium Na mg/kg	120	105	142
Nickel Ni mg/kg	178	156	229
Vanadium V mg/kg	881	827	841
Sulfur S mg/kg	28370	29720	34149
Water W mg/kg	2.11	2.62	2.14
Soot content %	0.1	0.2	0.1
Excess sulfur at >20%	18.7	11.9	32.5
VELOCITY @ 40°C	486.44	431.89	548.15
VELOCITY @ 100°C	37.85	34.90	31.70
ADDITIONS			
Cobalt Co mg/kg	23370	23282	22858
Magnesium Mg mg/kg	314	127	159
Zinc Zn mg/kg	187	180	242
Phosphorus P mg/kg	29	19	52

In today's busy and hectic work environment it is more and more difficult to get the most out of the tools which are available due to time constraints or limited available personnel. Also measuring tools which have been identified as useful and valuable are not being purchased because of the already full work schedule of the personnel responsible for the implementation.

In other cases the knowledge of the intended user is being considered as inadequate to use the tool effectively or there are even fears a misinterpretation of achieved results will interfere with normal operations and cause a disruption rather than be a help.

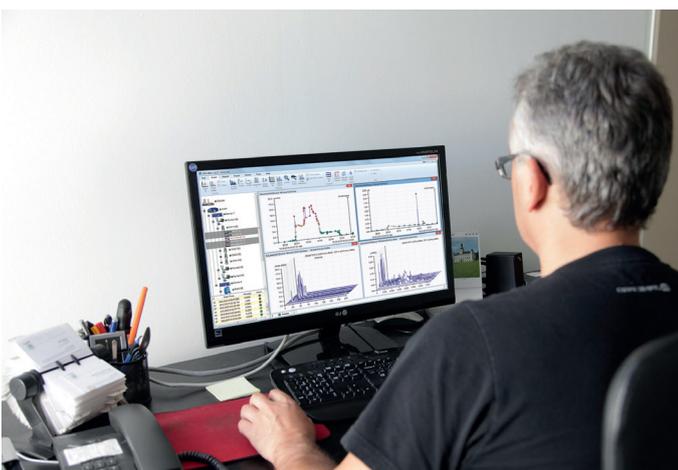


Deliverables:

- Help & guidance to set up your monitoring regime
- CMT Experts interpret and evaluate measuring data
- Reports which indicate problems and help to find the reason

Benefits:

- No need for an in house specialist
- Free your personnel so that they can focus on their duties
- Get an expert opinion
- Make sure purchased tools are being used efficiently
- Prevent Damages and keep your equipment running



Calibration Service

CMT offers a calibration for a huge number of devices. Calibration is very important to guarantee precise results even a long time after manufacturing.

We recommend calibration for all of our devices every two years.

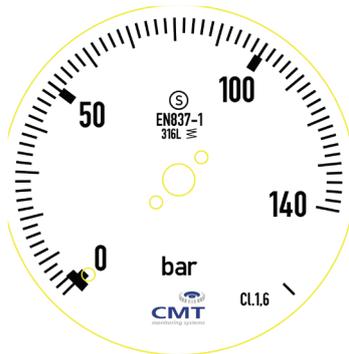
The next calibration date from our devices will be noted on a label on the device as well as on the calibration certificate.

We also calibrate devices similar to our own.

Calibration of test equipment is essential to maintaining confidence and reliance on the readings obtained from them to get reliable condition monitoring results. Whether motivated by regulatory requirements or by the need for assurance of measurements critical to a manufacturing process, regular calibration of your instrument is critical to having a reference based on known standards. Besides the reference measuring instruments and the calibration services that CMT offers, we also offer a line of calibration standards that you can use to validate your devices in use.

Beside a calibration service for all devices from our own portfolio we cover many other calibration services for any third party product.

Calibrations are performed in an expeditious fashion, with turnaround times of less than one week in most cases. Calibration price is at a Flat Rate cost and covers all labour and equipment to perform one calibration required to meet our specifications. The calibration is provided by CMT as an ISO



9001:2015 certified company to ensure highest quality and traceability. If your instrument requires repairing, the repair service will include standard calibration. Custom calibration or accredited calibration can also be included for an additional fee.

Traceable Calibration

Calibration means that the test results from a measuring device of unknown accuracy, are compared with a device whose accuracy is known. This device is universally accepted as a “reference”.

Calibrations are traceable to the International System of Units (SI) through National Metrological Institutes, and natural physical constants.

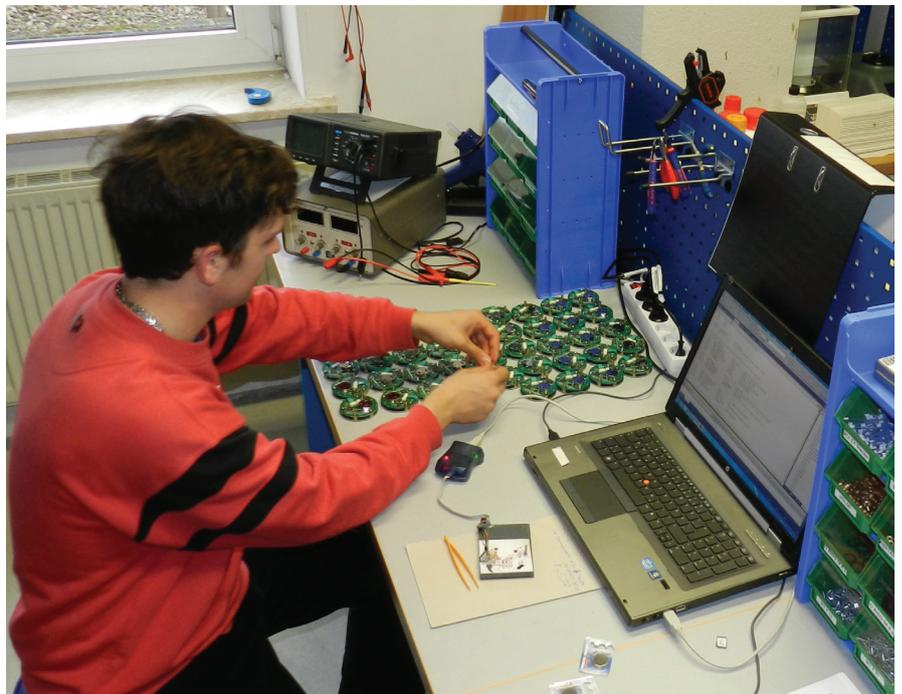
Calibration records any deviation from this standard and corrects it when necessary. Each instrument has a specific calibration procedure which indicates exactly how and what must be checked. Regular and traceable calibration combines the forces of accuracy and certainty and provides you with the key aspect of ISO 9001:2015 certification.

Your benefits:

- Ensure highly accurate measurements
- Provide certification and mandatory documentation for instrument calibration standards
- Enjoy peace of mind with CMT-certified calibration expertise and components

Ordering Information

The calibration process varies for each device group. Please contact our sales team for specific informations or quotes.



Installation and Commission Service



Our long experience with installation and commissioning on board seagoing vessels ensures cost-effective retrofit or new building installations including final commissioning that are carried out with a minimum on interruption to your business. As a turn-key supplier we can handle every phase of a project from design and engineering to installation, commissioning and training.

CMT has a qualified team of installation and commissioning engineers with a wealth of experience in on site requirements. Installations and commissioning can be offered with all equipment purchased from CMT.

The expanding world fleet operates in an uncertain environment, with ever tougher competition and increasing price pressures, which puts the spotlight on safe and cost-effective ship operation. This requires a partner able to maintain the new, more advanced vessels as well as keeping the ageing fleet operating safely, more efficiently, and up to date to stricter standards. Off-hire must be mitigated or prevented.

Highly skilled and qualified support for the start-up of your condition monitoring system.



We have teams of experienced and qualified technicians to provide you with support for the turn-key installation and commissioning of condition monitoring systems purchased from CMT.

When we provide installation and commissioning services – whether for a control systems or a complete package – our technicians work alongside the project managers and engineers to ensure smooth and efficient installation to the highest standard.

In the early stages of your system life we want to ensure you get everything you need to meet project time lines and site needs.

Our services include:

- Installation
- Pre-commissioning and Commissioning
- Site Acceptance Testing
- Personnel Introductory Training
- Support at system start up
- Operating and Maintenance Documents
- Spares installation / repair
- Fault Finding

A tailored commissioning visit proposal can also be produced (if not offered as part of the original contract) based on a set of specific terms and conditions. CMT service engineers regularly travel the World, keeping our valued overseas clients equipment in full working order. In most cases seven days notice is needed to arrange a commissioning visit.

Even if the condition monitoring equipment was not installed by CMT, our team will be happy to quote for a commissioning visit, safety inspection, or full material handling service contract. Just make a request and we'll take care of your condition monitoring equipment service needs.





CMT has developed commissioning routines that ensure the work is carried out safely and effectively, and that your crew has the knowledge and confidence to operate the vessel to a high standard.

All CMT Automation products are designed with easy installation and commissioning in mind and will have passed comprehensive testing at the factory before they reach the shipyard or the vessel. The commissioning process follows established routines that ensure the work is carried out effectively, safely, and to a high standard which will provide the foundation for reliable life cycle performance.

The on-site commissioning activities include visual inspection, electrical and mechanical tests on equipment, and functional and integration tests on systems. The commissioning phase ends with sea trials which include the final tuning of the equipment, handover of updated documentation, and performing the official tests for the equipment and vessel.

Your benefits:

- Worldwide Service with flying crew.
- System installations and commissioning of systems are undertaken with minimum interruption to your facility
- Flexibility for challenging vessel schedules, weekend or evening work
- Method statements and risk assessments carried out
- Special training programmes undertaken - see Training section for more information

We are always happy to discuss specific requirements and our business is based on tailoring services to your exact needs - please contact us for any further information you require.



Overview Training

Doing business in an environment which relies heavily on the help of machinery to get the job done put high demands on the education of the employees seeing to the operation and maintenance.

Vessels, machines, plants and industrial sites are environments where a good education of the work force makes sure to protect your investment and is key for a flawless operation.

Either make sure that your employees are properly trained in the use of a tool you have invested in or raise their level of knowledge about a specific topic both will make sure that your equipment life will be optimal, lowest maintenance cost levels are achieved and reliability is at a maximum.

We at CM Technologies GmbH understand that and are offering several training courses for fixed topics. However we also understand that the background of the participants can be very different and that each customer looking for a training may have unique requirements therefore we are able to offer customized trainings suited for the needs of the individual customers.

Trainings are being held at our facility or a nearby conference centre. Upon request trainings can be held on site at the customer facilities may they be a marine vessel, factory or office.

Standard course duration is usually one working day, customized trainings may deviate. Small groups ensure an efficient training so we usually limit the number of participants to a maximum of 8-12 persons. If you have a larger group you want to book a training for, contact us to discuss possibilities.



Deliverables:

- Training on basic to advanced monitoring topics, professionally delivered by knowledgeable CMT trainer and, as appropriate, by external speaker.
- Certificate to participants.
- Detailed seminar documentation for later reference.
- Small groups for most effective training.

Your benefits:

- Increase competency and value of personnel.
- Increase equipment life, reliability and availability through effective and efficient monitoring practices.
- Opportunity for engineering / maintenance personnel to learn and exchange useful information.
- Updated on most current industry knowledge and experience as well as on latest legislation.



Oil Test Seminar

Oil is used in various crucial different applications and has different important tasks to fulfil. Lubrication oil is used to avoid friction between moving parts and therefore to avoid wear or damages.

Hydraulic oil is used to transmit forces and the hydraulic systems are used in nearly all industries. Oils are also expected to cool or to avoid contaminations which would cause harm to the engine. Oils in modern equipment are complex and expensive liquids. It is therefore important to understand and maintain the oil. Oil can tell us long stories about the performance of the equipment.



Lube oil is the life blood of your engine!

Training Topics :

- Introduction
- Basic tribology
- Friction, wear and lubrication
- Life-cycle of the oil
- Sampling and sample handling
- Trend analysis in laboratories
- Interpretation of results
- On-site testing - blessing or burden
- Frequencies of testing

Target Group:

- Sales personnel of mineral oil companies
- Technical application engineers
- Technical crews from seagoing vessels
- Technical superintendents
- OEM and component producers
- Service providers in the area of lubrication, lubricants and tribology



Specification:

- Participants: max. 12
- Location: Training Centre Elmshorn or on-site
- Duration: 1 day 9:00 – 17:00

Deliverables:

- Training held by industry professionals
- Modified training content on request
- Hot lunch
- Non-alcoholic beverages & snacks during training
- Training documents (printed and on a USB Flash drive)
- Certificate of participation

Vibration Analysis Seminar

Vibration diagnostics tools are here to help us to predict the machine failures. When predictive maintenance is applied and the machines are checked regularly, machine faults can be discovered at an early stage and appropriate action can be taken. By doing so you can avoid unexpected machine shutdowns and you can prevent replacement of parts which are still in good condition.

To use the tools effectively and to help with the implementation CMT offers a Vibration seminar. Depending on the level of the knowledge of the participants the seminar can be amended accordingly. Also in some cases an on site training may be beneficial so make sure to let us know your requirements.



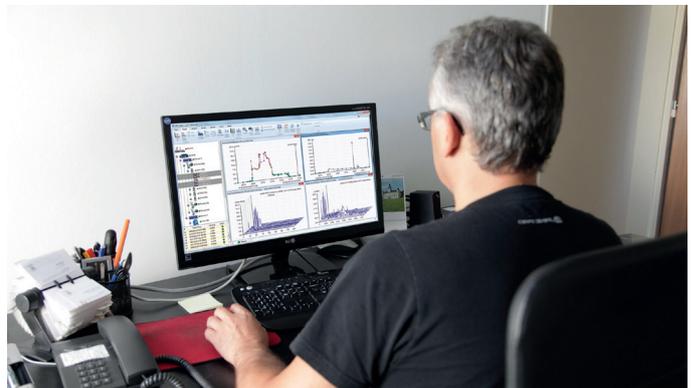
Increase the lifetime of your equipment!

Training Topics:

- Introduction into Vibration Analysis Monitoring
- Measuring parameters or perform vibration diagnosis
- Vibration monitoring devices
- Machinery vibration diagnostic
- Bearing vibration diagnostic
- Air leaks detection
- Working with DDS Database
- Hands-on training with VA portable instruments
- Using routes for effective data collection
- FFT Frequency analysis and data export
- Typical failure modes
- Field experience

Target Group:

- Technical application engineers
- Technical crews from seagoing vessels
- Technical superintendents
- Service and maintenance personnel
- Service providers in the area of vibration monitoring



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Diesel Performance Seminar

The challenge of upholding a maintenance regime on board ships is to protect the vessel against costly downtime and to operate it cost effectively. Engine maintenance can be planned, thus saving in parts and labour by changing engine parts based on need, not based on timing intervals.

Slow or late combustion is one of the most common problems in diesel engine operation. Balancing the cylinder load extends engine life, increases efficiency, and reduces emissions to assist with environmental compliance. Proper ignition timing reduces the exhaust gas temperature and rate of excess carbon build-up. Tuning the engine may reduce specific fuel oil consumption resulting in significant savings which are paramount to a ship owner's bottom line.



Improve the efficiency of your engine!

Training Topics:

- Introduction into Diesel Engine Performance Analysis
- Defining different pressures and angles, calculate indicated power
- Identification of problems by using the pressure / angle and pressure / volume diagram
- Cylinder load balance
- What influences the ignition time?
- Results of late ignition and how can it be identified?
- Slow or late combustion. Results and how can it be identified?
- Interpreting results and taking actions.
- Field experience

Target Group:

- Technical application engineers
- Technical crews from seagoing vessels
- Technical superintendents
- OEM and component producers
- Service providers in the engine maintenance



Specification:

- Participants: max. 12
- Location: Training Centre Elmshorn or on-site
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- Certificate of participation



Cylinder Drain Oil Management Seminar

Cylinder oil in a main engine has two main tasks. It should lubricate the engine to have an acceptable low wear level and it has to neutralize the sulphuric acid to avoid unexpected acid corrosion in the liner.

By analysing scrapedown oil collected from the scavenge space shipboard personnel are able to monitor the condition of the engine's cylinders and detect changes as they occur. This task helps to protect the engine, optimise the feed rate, monitor for mechanical & corrosive wear and reduce maintenance and operating costs.



Protect the liner of your engine!

Training Topics:

- How is a cylinder lubricated / piston running conditions / different lubrication systems
- Cylinder wear, types of wear and how is it detected and measured / monitored
- Low / high sulphur fuel – what does sulphur in respect of the lubrication regime? Legislations
- The sulphur / base balance – optimise the feed rate
- Cylinder Drain Oil Analysis – onshore / on board
- Sampling the drain oil, how and when
- Interpreting results and taking actions
- Field experience

Target Group:

- Sales personnel of mineral oil companies
- Technical application engineers
- Technical crews from seagoing vessels
- Technical superintendents
- Service providers in the area of lubricants and tribology



Specification:

- Participants: max. 12
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- Duration: 1 day 9:00 – 17:00

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- Certificate of participation

Marine Water Test Seminar

Water is an important topic onboard a vessel which due to different regulations concerning it also a quite complicated one. As key topics we have identified Potable Water, Sewage Water and Ballast Water for which we each offer training courses.

If you would like to combine topics let us know and we will work on a customized seminar that is tailored to your needs. Our experienced seminar speaker will tackle topics that need to be addressed as well as answer questions which originate from the daily work experience of the participants.



Safe potable water secures good health!

Training Topics :

- Introduction into potable water
- Risks for fresh water supply and making on board
- Hazardous contaminations (microbes / chemical elements)
- Different methods of disinfection
- Legionella and other bacteria
- Legislation framework
- Risk Management and Water Safety Plan
- Ship owners / masters duties
- Water testing: What, When, Where, Why?
- How to use on-board test kits

Target Group:

- Technical application engineers
- Technical crews from seagoing vessels
- Technical superintendents
- Service and maintenance personnel
- OEM and component producers
- Service providers in the area of water monitoring



Specification:

- Participants: max. 12
- Location: Training Centre Elmshorn or on-site
- Duration: 1 day 9:00 – 17:00

Deliverables:

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ISO 9001:2015 = ISO 14001:2015

