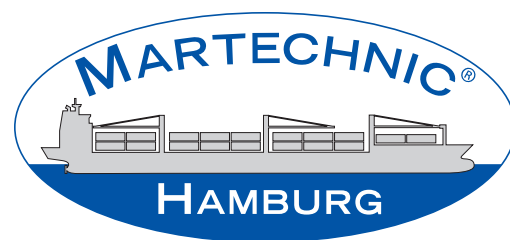


2019/1



## COMPANY PROFILE & PRODUCT GUIDE



FUEL LUBE-  
HYDRAULIC-

**OIL**  
MANAGEMENT







## ABOUT MARTECHNIC®

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Fuel, lube and hydraulic oils are crucial fluids in operating nearly all types of engine – and have become an ever more precious resource. Martechnic's® dedication is to provide engineers with equipment and management solutions to conduct continuous preventive and conditionbased maintenance. The aim is to assist engineers in effectively and safely running various engine types, and thereby reduce cost, save precious resources and protect the environment.

Martechnic's® mineral oil test kits enable users to test and evaluate fuel, lube and hydraulic fluids promptly and on-site.

The procedures are easy to perform and provide operators with an independency and re-assurance not achievable by external laboratory analysis alone. And because any results gained either by lab and by on-site test will always reflect on the sample drawn, Martechnic® provides suitable sampling equipment to obtain representative samples, so that efforts invested in maintenance can pay off.

Applications where Martechnic® equipment is in use are manifold, yet especially in places where engineers can rely only on their equipment and expertise alone. Customers are shipping companies, navies, power plants, oil companies, process industries, railways, mining and construction companies, and others.

Martechnic's® daily commitment is to meet the customer's requirements with fast and individual response, application specific solutions, and efficient order processing.

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### TEST CHEMICALS CONSUMABLES AND CLEANING AGENT



## PORTABLE TEST EQUIPMENT

It is important to know the actual condition of mineral oil in order to run engines without waste of these fluids, unnecessary down times or even catastrophic engine failure. Martechnic® brings test equipment to the user on site, allowing immediate assessment of the oil quality, and effective decisions as well as measures taken at the right time.

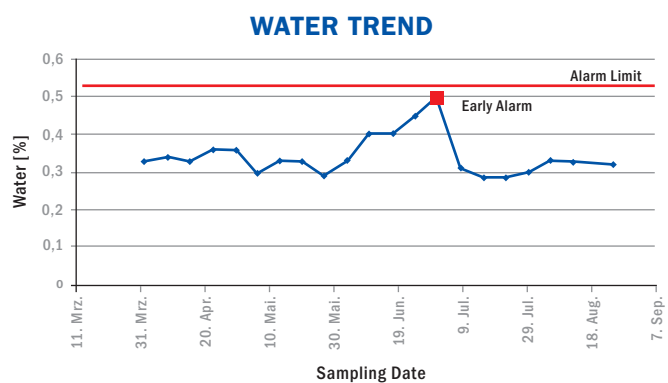
Inferior or degraded quality of a product may get noticed; engine wear may be recognized before severe damage or failure occurs; maintenance intervals can get adjusted right as actually necessary; or in the worst case the reasons for engine problems can get traced. Different applications have different important parameters, and so various combinations of tests could make sense.

## TREND ANALYSIS

One of the most valuable benefits of frequent on board testing: TREND ANALYSIS

### Example:

Development of Water-in-Oil Content on a generator engine.



# TWIN CHECK 4.0

## Electronic Water-in-Oil / BN Test



TWIN CHECK is delivered as a test kit including the reagents and accessories required for Water-in-Oil and BN tests

Water in oil is, has been, and will be omnipresent threat to any mineral oil application, and base number is a crucial parameter for diesel engines. TWIN CHECK has been both developed and designed to achieve immediate indication on the oil condition on-site, as well as continuous trending of it in daily operation.

To provide best possible and cost-effective options for on-site water-in-oil / BN measurement, Martechnic® has redesigned its well-established product TWIN CHECK.

Besides, the improved TWIN CHECK 4.0 is modified in accordance with digitalization concept: easy-to-use navigation menu, optimized measurement procedures, automatic data recording and storing, USB to serial connection (terminal program) for accurate trend analysis etc.

✓ The interchangeable parts of the TWIN CHECK 4.0 include a display in conjunction with a mainboard, a cable connection between the mainboard and pressure transmitter (pressure sensor), 9V block battery, a cable connection to the battery, USB cable and a reaction vessel.

## FEATURES

### Measuring range

- Water-in-Oil: 0 – 1.0 vol. % H<sub>2</sub>O
- Base number:
  - Standard: 0 – 100 BN
  - Extended range: 100 – 150 BN
- Processing time: min. 2 min. – max. 20 min.
- Accuracy: +/- 3%
- Also available as single test  
WIO CHECK E, ALCA CHECK.

## BENEFITS

- Improved design with easy-to-follow navigation menu for high accuracy measurements
- Internal memory chip with average data storage capacity of two and a half years
- Digital read-out of test results
- USB to serial cable connectivity for data transfer and trend analysis
- BN determination: six modes for up to six various oil grades of different engines
- Maintenance and repair on board is possible



# WIO CHECK

## Traditional Water-in-Oil Test

Since its introduction as an on-site test in the mid-70ties, the water-in-oil test has become the most portable test kit item for checking oil quality on spot. WIO CHECK keeps on with this tradition and provides a sturdy and time proven measuring unit for reassurance about current water content at any time. It has integrated modern chemical development in order to provide up-to-date reagent solutions.

### ➤ FEATURES

#### Measuring range

- Water-in-Oil: 0 – 0.4 / 1.0 vol. % H<sub>2</sub>O
- Measuring time: up to 20 min.
- Accuracy: +/- 3 %
- Easy to maintain
- Gauge could get changed by user



WIO CHECK is delivered as a test kit with necessary reagents and accessories

## MT TEST KIT VERIFIER

Modern safety requirements demand ever more procedures followed on board, as for example the ISM Code Part A; Paragraph 10.3

*"...These measures should include the regular testing of stand-by arrangements and equipment or technical systems that are not in continuous use."*

The MT Test Kit Verifier allows the application of this regulation on Martechnic® pressure test equipment: TWIN CHECK 4.0, TWIN CHECK, WIO CHECK, WIO CHECK E and ALCA CHECK by employing a calibrated pressure check. That way regular calibration requirements could get met, or a device verified against possible malfunction at any time.



## COMPA DENS CHECK

### Density, Compatibility and Stability Determination – Triple Test Kit

Fuel is paid by weight and delivered in volume. The key to this critical calculation is DENSITY. The precise determination of a fuel's density is essential when calculating its weight from its volume.

The COMPA DENS CHECK enables accurate determination of density in light and heavy fuels as well as lubricants and hydraulic fluids from 0.82 up to 1.05 g/ml, directly converted to the standard temperature of 15 °C.

Almost all heavy fuel oil is blended at some stage. This is an increasing development connected to the lowered sulfur cap and increased demand of low sulfur fuels. During blending or on subsequent storage, reactions can occur that result in sludge formation. The aromaticity or solvent capacity of the fuel oil can be too low and an asphaltene precipitate will occur. Filter blockage, reduced fuel injector performance, poor combustion, and even damage to piston rings and liners may occur.

Fuel blends should get checked for stability upon delivery. Bunkers of different supply should be kept segregated whenever possible and being checked for compatibility before getting mixed in the same tank. The test method applied by COMPA DENS follows ASTM D4740-04(2014).



### > FEATURES

- Measuring range: 0.82 – 1.05 g/ml
- Measuring time: about 2 min.
- Required sample: 150 ml
- Quick and adjustable heating
- Direct readout in g/ml @ 15 °C

### > BENEFITS

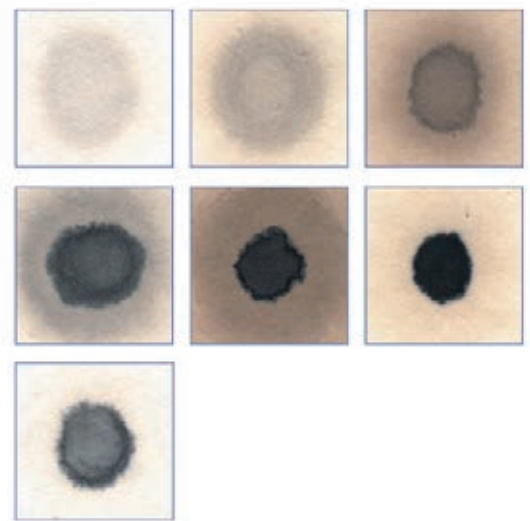
- Quick and adjustable heating
- Direct readout in g/ml @ 15 °C
- Easy to use even for non-trained personnel
- Handy and time proven

## SPOT CHECK

### Quick Insoluble Test

Just drip one drop of oil on SPOT CHECK paper and let it dry out. The oil flows through the capillary structure of the chromatographic paper and the picture of the resulting spot will indicate:

- Degree of soot contamination
- Fuel dilution
- Remaining detergent-dispersive power of lubricating oils.



✓ The **SPOT CHECK** is quick and cost efficient. And it may in time give valuable indications on irregularities and impending malfunction of an engine, saving the trouble and the cost of avoidable down-times and repairs.

# IRON CHECK E

## Digital Test for Chemical Determination of Iron Content



Referring to the significance of iron in lube oil, especially with regard to cylinder drain oil in the light of the phenomenon of cold corrosion in two-stroke marine diesel engines, Martechnic® has developed an easy-to-handle iron test for direct on-site iron content determination. The measurement method is based on a chemical reaction of indicator solution with iron present in its special state - corrosive and/or abrasive.

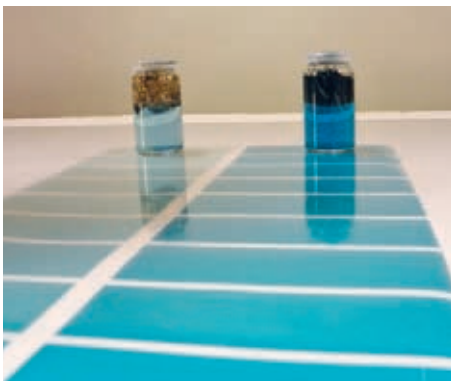
As different states of oxidized iron require different chemical treatments, the method is divided into two parts: the determination of total iron as result of mechanical friction and corrosion, and the determination of corroded iron caused by acid attack alone.

### > FEATURES

- Measuring range: 15/20 – 1100 mg/kg
- Accuracy: +/- 20 mg/kg
- Semi automatic method

### > BENEFITS

- Precise automatic measurement of iron content (total iron and corroded iron)
- Easy to read, digital display of test results
- No need to use color reference chart
- Early warning of corrosion problems
- Efficient adjustment of lubrication of crosshead engines
- Processing of two samples at the same time



The liquids obtained through the so-called "Prussian blue reaction" have different shades of blue color which directly depend on the amount of iron concentration automatically measured in cylinder drain oil samples.

Following the digitalization concept, Martechnic® has elaborated an electronic test device IRON CHECK E (patent number 2982974).

The new version offers an optimized semi-automatic test procedure, precise measurement of iron content in cylinder drain oil due to electronic evaluation and digital readout of test results. After a quick manual preparation of the oil samples, the glass vials are placed into two reaction chambers of the test device for automatic heating and measurement processes.

The electronic determination of iron concentration is accomplished through the built-in chroma meter with LED transmitted light source. The IRON CHECK E automatically displays and saves the measured values.



# MT CAT FINES CHECK

## Cat Fines Determination Test Kit for Al and Si based Cat Fines

The abrasive action of catalyst fines can significantly reduce the quality of bunker fuel oil and cause very rapid wear on ship engines.

The new test device MT CAT FINES CHECK is specifically designed by Martechnic® to detect the presence of these hard abrasive particles in HFO in a simple and quick test procedure.

The test method is based on the analysis of two samples of heavy fuel oil, i.e. before and after a separator. This enables assessing the general quality of bunker fuel on board and the quality of the HFO purified in a separator.

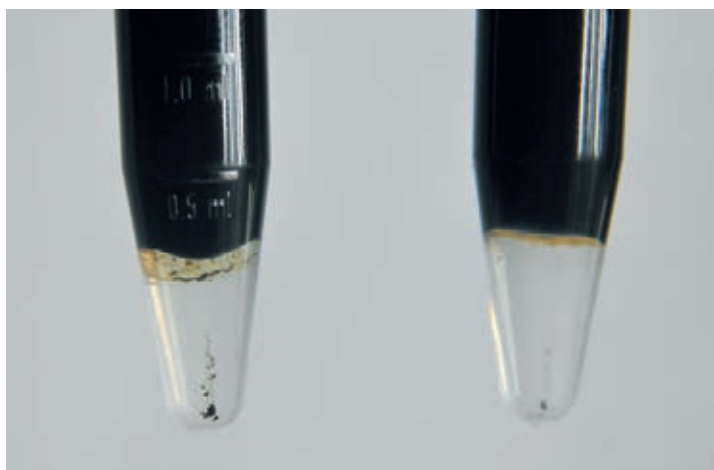


### FEATURES

- Measuring time: approx. 15 min.
- Visuell qualifiable
- Run several tests at the same time

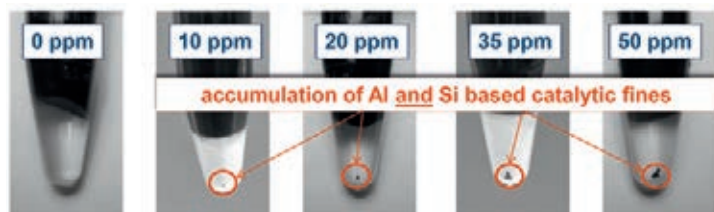
### BENEFITS

- Easy and quick test method
- Applicable for all types of heavy fuel oil
- Demonstrative test results
- Easy to use even for untrained personnel
- Cost effective



BEFORE SEPARATOR

AFTER SEPARATOR



images below in original vial size – for comparing hold vials on red bordered areas



UP TO 8 SIMULTANEOUS MEASUREMENTS POSSIBLE

Test procedure: prepare the HFO samples for analysis. The prepared samples are placed in the centrifuge in a parallel position for the fixed time. After that the samples are ready to be compared. The concentration of cat fines before and after a separator and before the engine is directly visually estimable.

# VISCOSITY COMPARATOR

## Go / No Go Viscosity Determination

Viscosity of lubricating and hydraulic oils should be checked frequently in order to avoid engine malfunction. A deviation of 10% from standard viscosity means a considerable risk.

✓ The **VISCOSITY COMPARATOR** is an easy-to-perform test, providing a go/no go answer whether the viscosity is still in OK range or immediate action is recommendable. The viscosity is compared to fresh oil in one single testing device.



# VISCO DENS PLUS

## Heated Electronic Falling Ball Viscosity Measuring Device

Applying this test device, viscosity and density get measured in the same test tube and of the same sample. Measuring is possible at three different temperatures.



## > FEATURES

### Measuring range

- For viscosity: 1 – 999 mm<sup>2</sup>/s
- Measuring temperature: 40 °C, 50 °C, 80 °C
- For density: 0.82 – 1.05 g/ml
- Required sample: approx. 200 ml
- Measuring time: about 15 min.
- Accuracy: +/- 3%

The test equipment includes 4 hydrometers to measure density. By employing the corresponding hydrometer, the density of fuel oils at 15 °C will be determined. With actual density known, it is possible to measure viscosity most accurately. Simply use the same pre-heated sample and employ the falling ball principle.

Both test results provide excellent information on actual quality of bunker taken in and used. Lubrication oil viscosity could be compared directly with ISO Charts because of the exact measuring temperature of 40 °C.



## VISCO CYLINDER STANDARD AND LOW VIS

### Electronic Falling Ball Viscosity Measuring Device

While one option keeps the measuring range of the analogue device, the other option is designed especially for a very low viscosity measurement, starting in a range from 1 mm<sup>2</sup>/s. Measuring the viscosity becomes easy, as the dimensions of the viscosity meter have been determined in a way that the falling time has a profound relation to the viscosity.

The VISCO CYLINDER is able to automatically take and display the falling-time and the temperature. With its help it is possible to determine fresh oil quality as well as detect deterioration of used oil quality on the spot, e.g. caused by light fuel oil dilution, and to avoid potential risk in this way.



### ► FEATURES

#### Measuring range

- Low Vis: 1 – 10 mm<sup>2</sup>/s
- Standard: 10 – 999 mm<sup>2</sup>/s
- Measuring time: about 5 min.

### ► BENEFITS

- Quick determination of oil quality
- No consumable parts
- Easy to use on site
- Handy and time proven

## JUNG CHECK

As other option we continue to offer the original analogue falling ball viscosity meter with a measuring range between 10 to 999 mm<sup>2</sup>/s.

### ► FEATURES

- Measuring range: 10 – 999 mm<sup>2</sup>/s
- Measuring time: about 5 min.
- Accuracy: +/- 3%



## AN CHECK

### Easy to use AN titration test

High operation temperatures severely stress the oil. This results in oxidation and nitration, viscosity increase, forming of acid sludge and sludge deposits. Acid number or AN is a measure of both organic and inorganic acid contamination within the oil. The handy and easy to use titration test is even possible to use on site like for hosting winches, steering gears, cargo cranes, etc.

With our new AN RMD CHECK we are also able to test RMD fuel.

## > FEATURES

### Measurable Parameters

- Measuring range: 0-3 AN
- Measuring time: about 3 min.
- Area of application: hydraulic, gear and turbine oil
- Accuracy: +/- 0.1 AN



## SALT CHECK

### Salt Water Determination Test Kit

It is important to know the nature of water (fresh or salt) found in lubricating or fuel oil as it might give some help in identifying the source of the leakage.

✓ The **SALT / FRESH WATER CHECK** is an easy and quick method to check the salinity in fluids: through the color change of the indicator pad the salt test proves this in a few minutes.





# SAMPLING KIT

## Quick Sample taking

The Sampling Kit enables to take a sample of fuel, lube and hydraulic oil with a tube which is fixed at a telescope rod. By using the vacuum pump which is coupled with an adapter at a sample bottle, it is possible to suck the oil sample out of the tank from top, middle and bottom.

With the included detection paste it is possible to prove if free water is in the tank. Free water can get detected within 30 seconds, by a colour change of the paste. If the paste doesn't change the color, water in oil test with WIO CHECK from Martechnic® could be done to determine if saturated or emulsified water is in the oil.

## > FEATURES

- Provides an indication of free water in the oil tank
- Operating time: about 2 min.
- The sample bottles are suitable for water, emulsions and low viscous mineral oils up to a viscosity of 1200mm<sup>2</sup>/s at 20°C.
- Adhering iron filings at the magnetic head of the telescope rod could be an indication of friction

## > BENEFITS

- Easy to handle also for untrained personnel
- Quick detection of free water in oil tanks



# INSOLUBLES CHECK

## Visual Particle Determination

It is the purpose of the INSOLUBLES CHECK to provide detailed information about particles regarding their nature, size and relative quantity.



## > FEATURES

- Measuring range: Particle > 3 µm
- Measuring time: about 15 min.
- Application: Lube- and hydraulic oil

## > BENEFITS

- Corresponding to the particles on the filter the result is readable directly
- Problems can get recognized at an early stage
- Easy to handle also for non-trained personnel
- Handy to use and for transport

The test procedure is based on a vacuum filtration system used to filter insoluble particles out of the oil sample. These particles will form a deposit on a molecular filter, allowing their visual inspection by a micro magnifying lense.

It so becomes possible to determine the relative quantity, the size and actually the source of the contamination, e.g. whether their nature might be out of rubber, chrome, brass, steel or rust.

Friction at pistons, pumps, etc. could get recognized even at an early stage – and maintenance measures effectively directed at the root cause of a problem.





# FLASH POINT CHECK

## Closed Cup Flash Point Test / Pensky-Martens

The identification of possibly hazardous liquids is a safety issue in manifold applications. The Flash Point Check allows this both right on-site and right on-time where and when flash point verification of mineral oils is required.



### > FEATURES

- Measuring range: 25 – 200 °C
- Measuring time: about 15 min.
- Accuracy:  $\pm 2\%$  < 100 °C  
 $\pm 6\%$  > 100 °C

### > BENEFITS

- Closed cup method leaning on ISO 2719 DIN EN 22719 and ASTM D-93
- Flash point read-out in °C
- Approved by German Navy for field use

The FLASH POINT CHECK consists of a Closed Cup (PM) flash point tester as specified by ISO, DIN EN and ASTM. It is designed to be used either with the electrical heater provided or to determine flash points below 65 °C it can be heated to 100 °C by placing in an external oven or hot water bath.





## FULL RANGE OF MEASURING EQUIPMENT

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- Water-in-oil
- Flash point
- Insolubles
- Viscosity
- Density
- Pour point
- BN (alkalinity reserve)
- Compatibility / Stability
- Salt water determination
- Cat Fines
- Iron
- AN

Water in oil is the omnipresent enemy to every mineral oil application and requires focused attention. Gas oil and lube oil are enemies, too, because a reduced flashpoint of a lubricant gives the risk of a crankcase explosion. Viscosity is a major criteria to assess whether a supplied product matches with the quality stated on the delivery note. Fuel gets delivered by volume and is paid for by weight, and so density is a critical commercial factor. These are only a few reasons to test, and in so many cases it is most beneficial to get assuring results right on the spot, rather than only with delay and detour through an external lab.

All test equipment has been designed to be quick and easy in operation and to be used also by persons unskilled in laboratory procedures. However, the attention paid by the user, cleanliness and maintenance of the equipment as well as its storage conditions may affect the degree of accuracy obtainable. Portable test kits do not have the same accuracy as laboratory analysis devices. They do not fully replace, but complement them.

We offer following standard test kits for nearly all areas of application. Customized test kits are available on special request.

## ALWAVIS CHECK

VARIO – Lube Oil Test Kit for 3 different Parameters

### ➤ FEATURES

#### Measurable Parameters

- Water-in-Oil
- Base Number
- Viscosity comparator



## LUBE OIL CHECK 5

VARIO – Lube Oil Test Kit for 5 different Parameters

### ➤ FEATURES

#### Measurable Parameters

- Water-in-Oil
- Base Number
- Viscosity comparator
- Salt water contamination
- Insolubles





## LUBE OIL CHECK 6

**VARIO – Lube Oil Test Kit for 6 different Parameters**

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### ➤ FEATURES

#### **Measurable Parameters**

- Water-in-Oil
- Base Number
- Viscosity, falling ball
- Salt water contamination
- Insolubles
- Viscosity comparator



## COOLANT & LUBE TEST KIT

**COOLANT – Customized Test Kit Example for an Emergency Generator**

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### ➤ FEATURES

#### **Measurable Parameters**

- Water-in-Oil
- Hardness
- Chlorides
- pH
- Antifreeze
- Corrosion inhibitor
- Viscosity comparator
- Insolubles



COOLANT – Customized Test Kit Example for an Emergency Generator.

# FUEL AND LUBE OIL TEST CABINET

## Fuel and Lube Oil Test Cabinet for up to 12 tests

The TEST CABINET is a portable laboratory and provides efficient and exact condition monitoring of fuel, lube and hydraulic oil in engines.



By executing the short and easy-to-handle test procedures, nearly instant confirmation on the essential fuel and lube oil properties gets achieved, enabling the user to take effective decisions right at the time when they are required. It is possible to prolong maintenance intervals or to avoid damage in engines. Available also with Cat Fines and Iron Check.

## FEATURES

### Allows testing of major oil parameters

- Viscosity (absolute and comparison)
- Density
- Water-in-Oil
- Base Number
- Salt water contamination
- Compatibility/ Stability
- Insolubles and optional:  
Pour Point, Flash Point





## STATIONARY SENSORS

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Lots of operators desire to be supported in terms of monitoring systems which reliably monitor the sensible components of machinery by day and night. The only way to achieve this aim is to install sensors which permanently control the oil status and quality by measuring certain parameters as they are crucial and individually important for the operation of engines and machines. The Martechnic® Oil Sensors are such devices.

A major breakthrough from Martechnic® in maintenance technology offers operators and manufacturers advanced warning and peace of mind in lube oil management. Water-in-lube-oil is a constant threat to a broad array of machinery. With state-of-the-art infrared technology Martechnic® can now offer a sensor system to provide constant surveillance and quantitative measurement of water contamination – in saturated, emulsified and free states.

Particles measured by laser-light extinction, viscosity, humidity and iron wear are further parameters which are covered by the Martechnic® Oil Sensor range. These sensors could stand alone or can get readily integrated into predictive maintenance or expert management systems.



## MT MODULAR MONITORING SYSTEM

The MT MODULAR MONITORING SYSTEM is an assembly of various sensors connected with a data logger. It is possible to monitor water content, viscosity and particles on the same engine, or any other combination of applications.

The components can get selected individually – and specifically for certain applications. Should monitoring for any parameter not being required, the corresponding components get taken out of the scope of supply, and the investment will be amended accordingly.

### > FEATURES

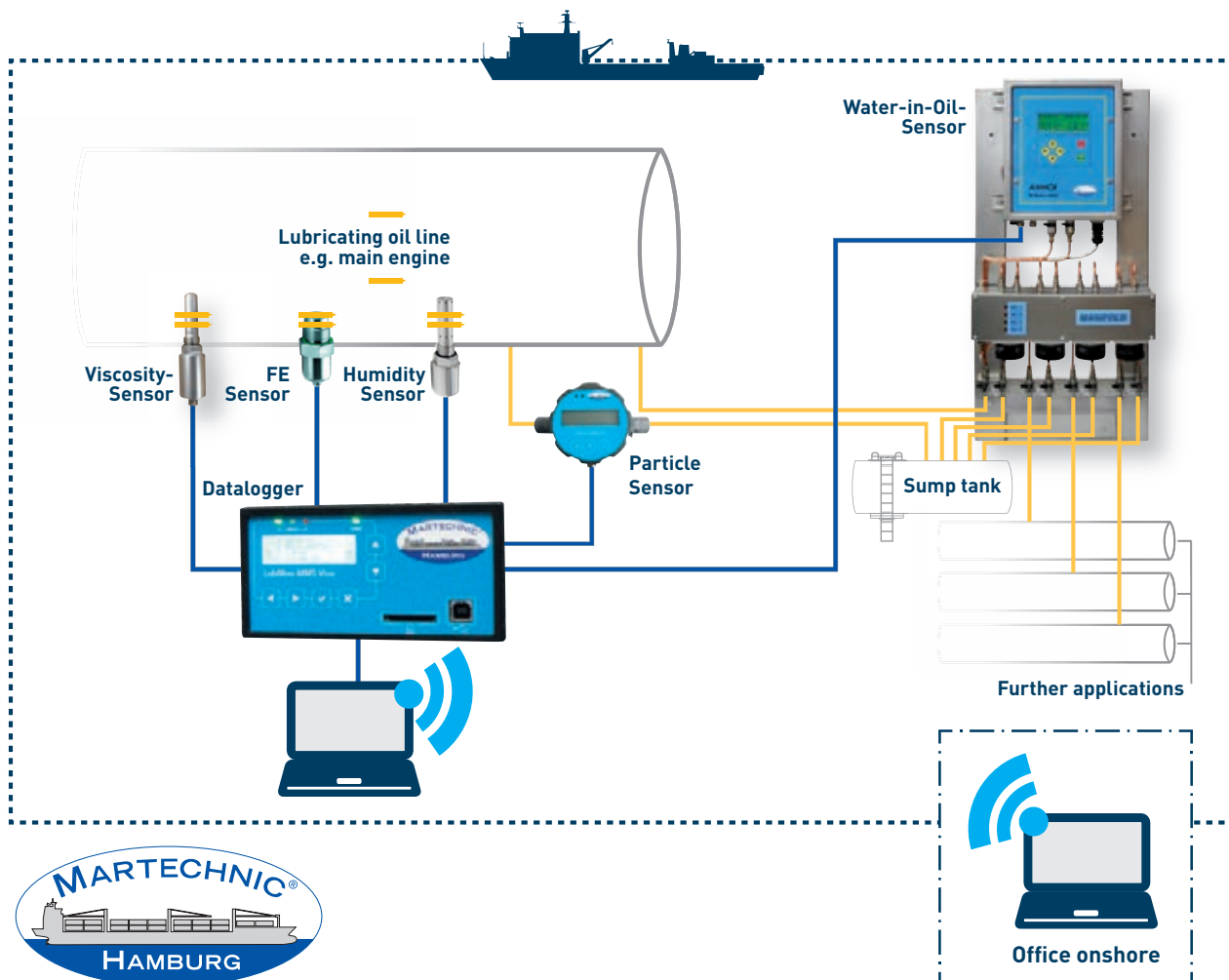
#### Measurable Parameters

- Water-in-Oil / Humidity
- Viscosity
- Particles
- Iron

### > BENEFITS

- Continuous Monitoring
- Plug & Play
- Customized to any Application

### MARTECHNIC „MODULAR MONITORING SYSTEM“



# PARTICLE SENSOR

## Application area

The Particle Sensor is a compact measuring device for continuous monitoring of the oil contamination in hydraulic fluids and lubricants.

## Measuring principle

This sensor is an optical particle counter which applies the so-called laser-light extinction principle. This means that the particles are classified within a measuring cell regarding their size and quantity. The measured values are displayed according to ISO 4406:99 and SAE AS 4059 respectively.

The Particle Sensor monitors and displays precisely any change of contamination in an oil system. In that way it is possible to react quickly when an increase in particle concentration occurs and the appropriate countermeasures can be taken before subsequent damage occurs.

## > TECHNICAL DATA

- Measuring range: 4, 6, 14, 21  $\mu\text{m}$
- Cleanliness classes according to: ISO 4406:99 and SAE AS4059
- Voltage: 9 – 33 VDC
- Fluid pressure: up to 420 bar
- Fluid rate: 50 – 400 ml / min
- Temperature: -20 °C to +85 °C
- Protection class: IP 67
- Interface: RS232 / CAN; 4 – 20 mA
- Data memory: 3000 data records (internal)
- Fluid compatibility: mineral oils (e.g. HLP), ester oils (e.g. HEES / HETG)



## AHHOI IR – WATER IN-LINE

The **AHHOI – Infrared Water-in-Oil Sensor** (patent number: 2009439) is a development by Martechnic® using the IR principle to detect water in lubricants of different nature and application. It measures all three possibilities of water being present (saturated, emulsified and free water) in molecular form up to 10000 ppm/ 1.0 vol. % and operates on a bypass system. It is applicable with diesel engines, gearboxes and hydraulic systems, and can be readily integrated on-site or remote alarm systems and maintain a permanent condition record for survey compliance purposes. Software for trend analysis is available on the Martechnic® website.

Due to the bypass nature of the installation the system could get fitted with a manifold to connect up to four sampling points, making the IR Sensor useable for up to four engines/ applications. The management of the four channels is made by the system, with four different calibrations available, adapted individually for the oil grade(s) in use.



### ► FEATURES

- Measuring range: 0 – 10000 ppm / 0 – 1.0 vol. % water
- Operating voltage: 100 – 240 V AC / 50 – 60 Hz, 24 VDC is available on request
- Electric power: 100 – 220 V AC / 50 – 60 Hz
- Pressure oil system: 1 – 10 bar
- Operating pressure: 0.8 – 1.5 bar
- Temperature: 0 – 59 °C

### ► BENEFITS

- Low maintenance expenditure
- Continuous measurement of water content
- All states of water
- Easily installed, retrofit or new installation

The system has to be connected to the oil system of the machinery with a pressure range between 1 to 10 bar. The sensor of the system is protected by an inbuilt oil filter and should be operated at a constant pressure of 1 bar which is managed by a constant pressure reducing valve. The AHHOI requires a pressure free outlet (atmospheric drain) and incorporates a flush through system for cleaning.

The system is housed in a A3 sized IP 54 steel box and requires 100 – 220 V and has both serial and analogue outlets (0-20 / 4-20 mA) available.



# HUMIDITY SENSOR STANDARD

## Application area

High concentration of water can cause severe disturbance in operation and damage the engine and the auxiliary diesel for example. In laboratories, the absolute water content is defined in ppm (parts per million). This has the advantage that it is not necessary to know the saturation limit in order to determine if there is free or dissolved water. The relative humidity is calculated in % in the range from 0 % (no water detected) to 100 % (complete saturation / existence of free water). The Humidity Sensor Standard provide all basic functions of humidity measurement in any mineral oil based application but is the ideal tool were the space for installation is limited.



## > TECHNICAL DATA

- Measuring range: 0 – 100 % (rel. humidity)
- Temperature range: -20 °C to +85 °C
- Voltage: 9 – 33 VDC
- Max. fluid pressure: 50 bar
- Protection class: IP 67

## Example

- Mineral oils (e.g. HLP) have a comparatively low water absorption capacity. 500 ppm may signify that the oil is over-saturated and free water exists.
- Ester oils (e.g. HEES) have a relatively high water capacity. 500 ppm may show that the oil is just saturated by 15 %.

## Note:

Warm oil can absorb more water than cold oil. Therefore the relative humidity of the oil increases in case of no further water supply. Hot, relatively dry oil may suddenly contain free water if the ambient temperature cools down. The Humidity Sensor Standard points out the current saturation of the oil with water. Additionally, an automatic alarm level could get set.

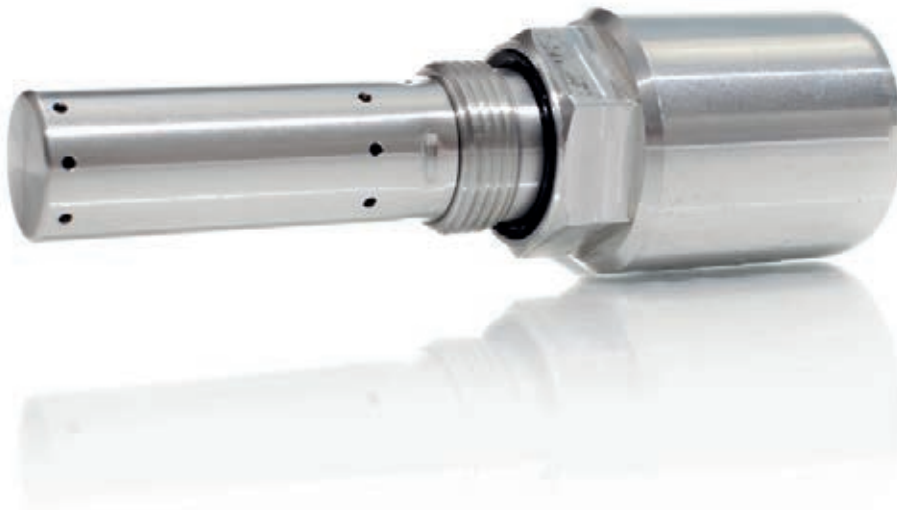
The sensor is ideal to use for small diameter pipes because of its depth of immersion of 29 mm, only. Besides, the Humidity Sensor Standard is essential with regard to unsaturated ester oils which can't be assessed with portable test devices employing reagents.

# HUMIDITY SENSOR PLUS

## Application area

The Humidity Sensor Plus is a variant of the Standard version and in addition measures the conductivity and relative permittivity of the oil at current temperature during the learning phase when the database has to be created. Upon completion of the learning phase it also processes the measured values at reference temperature of 40 °C. The three-field measurements enable further evaluation of the general oil quality and actually turns this sensor into a somewhat new generation of “semi-intelligent” sensors. The increased functionality of our Humidity Sensor + provide a temperature corrected RH measurement which allowed to filter out increasing or decreasing humidity values due to temperature changes.

In connection with the Data Logger these three values could get set into relation for making further calculations, e.g. the remaining useful lifetime of the oil.



## Measuring Principle & Performance features

Any changes in lubricant characteristics are evaluated automatically. The ageing effect and ageing rates of the oil will be specified with long-term gradients of the temperature and the acidification.

On the basis of the characteristic values it is possible to distinguish different oil types and to verify whether the right oil grade is in use. Oil refreshments and oil change intervals could be determined/optimized and relative humidity as well as free water could be identified.

## ➤ TECHNICAL DATA

- Measuring range:  
Relative Humidity: 0 – 100 %  
Relative Permittivity (dielectric number): 1-7  
Conductivity: 100 – 800000 pS/m
- Temperature range: -20 °C to +85 °C
- Voltage: 9 – 33 VDC
- Max. fluid pressure: 50 bar
- Protection class: IP 67

# VISCOSITY SENSOR

## Application area

The Viscosity Sensor is a service tool for determination of viscosity and temperature in hydraulic and lubricating oils, while taking the density into account. The sensor is a screw-in and immersion device respectively and has been designed for continuous monitoring of the oil quality. It is especially suitable to detect light fuel oil dilution. The Viscosity Sensor provides easy to read out viscosity measurement engine specific for any mineral oil applications.

## > TECHNICAL DATA

- Measuring range:  
SAW-dynamic viscosity: 8 – 400 mm<sup>2</sup>/s  
Rel. dielectric number: 1 – 7  
Temperature: -20 °C to +85 °C
- Accuracy:  
SAW-dynamic viscosity: +/- 5 mm<sup>2</sup>/s  
Rel. dielectric number: +/- 0.02  
Temperature: +/- 0.5 K
- Voltage: 9 – 33 VDC
- Max. fluid pressure: 50 bar
- Protection class: IP 67



## Measuring principle & Performance features

The sensor continuously measures SAW-dynamic viscosity and relative dielectric number at current temperature throughout the learning phase. Once the learning phase is over and the required database is established, the measured values are additionally automatically converted to reference temperature of 40 °C.

The device allows both measurement and documentation of changes in hydraulic liquids and lubricants. Damage can get recognized at an early stage, or even get completely avoided. An early warning provides the opportunity to counter machine malfunction by appropriate preventive actions. Maintenance and oil change intervals might get extended. It is also possible to check on service measures and the use of the prescribed lubricant quality.



# FE SENSOR

## Application area

The FE Sensor is a device which is screwed in the oil line directly for monitoring the iron abrasion and the erosion in lube and hydraulic oil systems. Smallest particles affect on slide faces, damage them and thereby produce further particles as a so called metal-metal-contact during the cold starting. The particle contamination causes an intense wear in gear boxes. While accessing on the approved principle of magnetic screw, the FE Sensor is concentrating on ferromagnetic particles. The FE-Sensor provides real time monitoring of magnetic Ferrous wear of any kind of gearboxes, thrusters and hydraulic units such as CP Propeller.



## Measuring principle & Performance features

The FE Sensor is immune to disturbances like vibrations and has a high sensitivity. The condition evaluation is done automatically; there is no manual inspection or sample taking necessary. The measuring signal is proportional to the amount of the settled particles.

An automatic purging process makes a low maintenance operating possible. Through the adjustment to the approved magnet screw principle the sensor is small and compact. To avoid breakdowns and to bring down operational costs, the wear monitoring could be an essential tool.

## > TECHNICAL DATA

- Measuring range: 0 – 100 %
- Accuracy: +/- 1 %
- Voltage: 9 – 33 VDC
- Max. fluid pressure 20 bar
- Temperature: -40 °C up to +85 °C
- Protection class: IP 67



## DATALOGGER

The Datalogger is an all-purpose display unit for the oil condition sensors used in the MT Modular Monitoring System but also for storing the data when using, for example, the Humidity Sensor separately. The Datalogger makes it easy to read and save data from the sensors. It is possible to install alerts when sensor parameters are reaching their critical range. The device has USB/LAN connections as well as a SD card slot.

### ► TECHNICAL DATA

- Environmental conditions, storage:
  - Temperature: 0 – 60 °C
  - Humidity: 0 – 95 %
- Environmental conditions operation:
  - Temperature: 5 – 50 °C
  - Humidity: 0 – 95 %
- Internal Memory: 1000 records
- LED Display
- Voltage: 9-33 VDC
- Interface: RS-232, analogue 4 – 20 mA
- SD card up to 4 GB

## SAMPLING

The results obtained from any tests, either in the laboratory or on-site, will reflect the condition of the sample. Care must be taken to ensure that the sample is representative. So Martechnic® provides sampling equipment and bottles of various sizes and materials for mineral oils and other fluids.



In-line drip sampler for fuel oil with mounted sample container



For fuel oil samples (“MARPOL” samples) to be drawn, stored and transported, Martechnic® offers Drip Samplers, cubitainers (5 or 10l) and sampling bottles of 500 or 1000ml. Reliable protection from tampering or external contamination during bunkering is achieved using a sealing strip with unique number. Sampling bottles with retained samples are equipped with a label made of tear resistant and oil proof material and sealing with individual number directly on the seal instead of on a bottle’s cap.

# DRIP SAMPLER PRESSURE PLUS

## Drip Sampler with optimized back pressure

This new design takes into account the actual situation of flow into a bunker line which is not a laminar stream, but a turbulent one. Also, as fueling hoses usually have a smaller diameter than shipboard bunker pipes and get elevated up to the ship's manifold, a decrease in pressure is caused which might lead to a partial vacuum occurring.

The continuous problems with low or even counter-pressure on the traditional drip sampler led Martechnic® to revise the design and improve the back pressure. This development took place in close cooperation with German Lloyd who has approved the design as to perform according to MARPOL legislation requirements. The improved "PRESSURE PLUS" design provides maximum back pressure and allows continuous fuel sampling, eliminating many problems of the traditional design. The DRIP SAMPLER PRESSURE PLUS design has become integrated part of DIN 86210 in summer 2013.

### > FEATURES

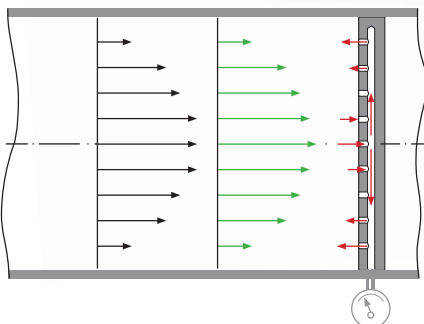
- Material: stainless steel (SUS304/1Cr18Ni9)
- Size: available in three sizes to cover range from DN 80 to DN 300

### > BENEFITS

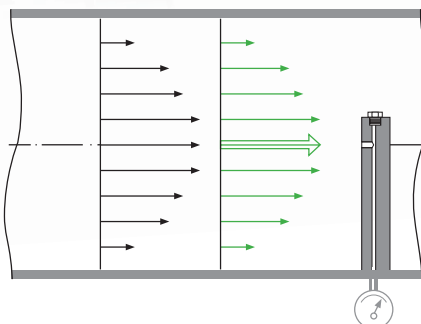
- Representative fuel oil samples
- Optimized back pressure
- Three-hole bore connection on welded flange to secure right sampling direction



### ▼ TRADITIONAL DESIGN



### ▼ IMPROVED DESIGN



The DRIP SAMPLER PRESSURE PLUS provides continuous fuel sampling with optimized pressure.



# SAMPLING BOTTLES

When taking a sample it is essential to use a clean container which is safe for handling, storage and/ or transport to laboratory. For that purpose we offer a wide range of clean sampling bottles and cubitainers, delivered with mounted caps to avoid any contamination prior to sampling. So, for example, small 120ml bottles for lube and hydraulic oil samples are equipped with sealable screw caps. Owing to the practical screw-thread design, the bottle caps will get automatically sealed through screwing.

Pre-defined sets of bottles, seals and labels are available especially for sampling fuel oil, but we also could provide you with your own customized sampling bottle system for either fuel or lube oil, complete with accessories as required and including logistics service.

OUR STANDARD RANGE OFFERS:		
Round bottles	Square bottles	Cubitainer
120 ml	50 ml	5 l
500 ml	100 ml	10 l
1000 ml	250 ml	
	500 ml	
	1000 ml	



# MT SAMPLE RETENTION SYSTEM

## Equipment to comply with MARPOL 73/78 Annex VI

The IMO legislation demands that ship operators comply with strict regulations concerning emissions while the MEPC.182 (59) guidelines regulate the collection, retention and storage of bunker fuel oil samples in front of this legislation. The MT SAMPLE RETENTION SYSTEM with its manifold equipment enables shipboard staff to follow the rules in a safe and efficient manner.



### ► FEATURES

- Conform to requirements of MARPOL 73/78 Annex VI and MEPC.182 (59)
- Provides a safe (lockable) repository for retained samples and documentation
- Compact and space saving (100 x 56 x 40 cm), weight approx. 37 kg

### ► BENEFITS

- Easy to handle sample bottles
- Seals for all bottles and cubitainer
- Leak protection, tools and cleaning material including

As a feature the MT-SRS cubitainer and sampler are secured with sealing with unique number which is threaded through the fitted holes on drip sampler and on cubitainer. This allows prevention of tampering or external contamination during sampling following the articles 5.2.5 and 5.3 of MEPC.182 (59).

Besides, this method does NOT restrict the manual valve operation as with some designs on the market. This ensures that the valve is operable throughout the bunkering period enabling adjustment to control the flow of the primary sample as required (see 5.2.4 of MEPC.182 (59)). Labels provided actually are not simple paper stickers, but made of tear resistant and oil proof material and fitted with a hole so that a uniquely numbered cable strip create a tamper proof combination of sampling bottle, label and cap.

### Contents:

- 1 x Strong secure lockable storage chest
- 1 x Martechnic® fuel oil drip sampler 6" or 8" plus 2 x spanner to mount sampler
- 20 x One litre wide neck sample bottles complete with unique numbered sealings and suitable labels
- 5 x cubitainers complete with unique numbered sealings
- 1 x set of pouring tap and handling box for cubitainer
- 2 x pair of oil resistant gloves plus safety glasses
- 5 x oil absorbing mats

## ULTRA SONIC CLEANING TANK

Piezoelectric ultrasonic devices create high-frequency sound waves, which release mechanical energy in the cleaning solution, the so-called “push-pull” effect on the surface of the items to be cleaned. This cavitation effect produces vacuum bubbles which implode on the surface of the items. The deposit and dirt get thoroughly removed – also at difficult-to-reach areas, while the implements stay undamaged.



Cleaning Tanks

### > FEATURES

- US frequency: 30 kHz
- Voltage: 50/60 Hz – 230 or 440 (380) V
- Material: Stainless Steel ASTM A240 / DIN 1.4571 2 mm welded

### > BENEFITS

- Easy to handle and the arrangement is possible in many places
- More efficient than traditional cleaning methods
- Low noise development
- Quick cleaning, e.g. the following items:  
Cylinder cover, cooler, valves, lube- and fuel oil filter, turbocharger impeller, charge air cooler

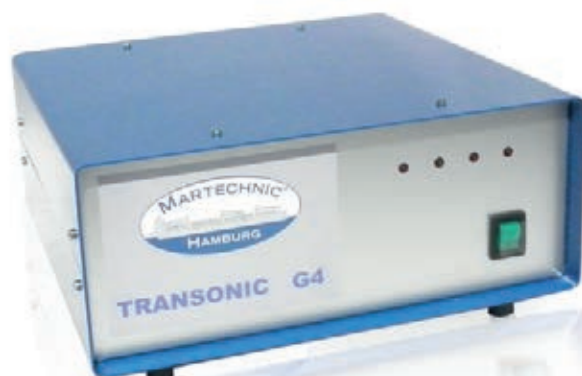
## STANDARD TANK SIZES (EXAMPLES)

TYPE	INNER DIMENSIONS (L x W x H mm)	CONTENT (ltrs)	EFFECTIVE HF POWER (Watt)	HEATING (Watt)
U-Sonic 380	500 x 300 x 300	38	400	1800
U-Sonic 500	550 x 350 x 300	50	500	1800
U-Sonic 800	600 x 400 x 400	80	600	3000
U-Sonic 1700	750 x 500 x 500	170	1000	4500
U-Sonic 2000	750 x 500 x 600	200	1000	5400
U-Sonic 2500	1000 x 500 x 600	250	1200	5400
Octa-Sonic	560 x 560 x 800	370	2400	5400



## ULTRA SONIC CLEANING

Economic and effective cleaning is of great advantage for onboard applications. The ultrasonic cleaning is gentle for surfaces and ideal for separator discs (avoidance of scratches). Even filter elements and engine parts with complex bores and holes could be cleaned deeply by using ultrasonic technology. In comparison with usual chemical cleaning procedures it is an ecologically friendly method. We offer portable transducers to operate in any existing tank onboard and cleaning tanks for fixed installation.



Generator



Portable Transducer

One generator can operate with max. 4 transducers. Necessary energy for tank application is approx. 5W/l, depending on tank size.

## TRANSDUCERS AND GENERATORS

MODEL		DIMENSIONS (L x W x H mm)	EFFECTIVE HF POWER (Watt)
<strong>TRANSDUCERS</strong>			
U-Sonic	TD 10	155 x 85 x 455	500
U-Sonic	TD 12	155 x 85 x 525	600
U-Sonic	TD 15	245 x 85 x 460	750
<strong>GENERATORS</strong>			
U-Sonic	G4-2	400 x 380 x 182	max 1500
U-Sonic	G4-4	400 x 380 x 182	max 3000

## TEST CHEMICALS CONSUMABLES AND CLEANING AGENT

PRODUCT NAME		ORDER CODE	AREA OF APPLICATION
WA-SOL		S 300	Water-in-Oil Test
WT 05 Solution		S 220	Water-in-Oil Test, max 0,5 % H <sub>2</sub> O, dangerous goods
WIO Solution		S 201	Water-in-Oil Test, dangerous goods
Solution A	250 ml	S 281	MT CAT FINES CHECK
Solution A	500 ml	S 032	Water-in-Oil Test for old test devices
Solution A	1000 ml	S 102	Water-in-Oil Test for old test devices
Solution B	50 ml	S 103	Water-in-Oil Test for old test devices, dangerous goods
ALCA Solution		S 205	BN Test
Solution L		S 191	AN Test, dangerous goods
Solution M		S 192	AN Test, dangerous goods
Solution W	100 ml	S 282	MT CAT FINES CHECK
Solution W	250 ml	S 136	Salt Water Contamination
Saltesmo		S 154	Salt Water contamination
Cooly		S 210	Pour point, dangerous goods
Test Kit Cleaner		S 105	Cleaning agent for all devices
Flash Clean		S 602	Cleaning agent Flash Point Test device, dangerous good
Liquid Gas Cartridge		S 615	Refill for Flash Point Tester, dangerous goods
Spot Test Paper, A4		C 172	1 Sheet for Spot Test
Spot Test Paper, 57 x 57 mm		S 170	100 pcs for Spot, Compatibility Test
Replenishment Set		S 143	IRON CHECK
Replenishment Set		S 283	MT CAT FINES CHECK





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