SPRING 2023

OELCHECKER

HOT TOPIC

9 golden rules for storage + handling of lubricants

PARTNER FORUM

Best solution. Smart recycling. Doppstadt shredding technology

OELCHECK INSIDE

New and only at OELCHECK: Automated visual assessment!

AND MUCH MORE...

CHECK-UP

What about the "lived togetherness" of employees and management? Do we really still live and work together as we would like? After all, we have had a few turbulent months. First of all, the challenges of the pandemic had to be overcome. Then it was time to move into our third and largest building in Brannenburg. In the course of this, the equipment and capacity of our laboratory were expanded. At the same time, IT had to ensure that the ever-increasing number of processes worked together seamlessly. And let's not forget: many new employees had to be hired, trained and integrated.

We have achieved all of this together. But how are our employees currently doing? What about the working atmosphere and employee satisfaction? Do we really still deserve the name "dream company", as we have been allowed to call ourselves since 2010?

We wanted to find out more and put ourselves to the test with the help of Traumfirma GmbH. At the beginning of March 2023, Werner Siedl, Managing Director of Traumfirma, conducted a large anonymous survey of OELCHECK employees. 95 out of 105 employees commented on 22 topics.

We eagerly awaited the result and were pleasantly surprised. Despite the increased number of employees and the challenges of recent years, the positive overall result of the 2021 survey was even somewhat exceeded.

Our employees have thus confirmed: OELCHECK is definitely a "dream company"! This is the sixth time that we have received the Dream Company Award since 2010. This award is given to companies which are distinguished by a particularly employee-friendly and appreciative corporate culture. The 2023 benchmark comparison even showed that OELCHECK is better than the average of all dream companies in 17 areas.

In the survey, OELCHECK employees rated 14 of the 22 questions on average as "very satisfied/very good" and 7 as "satisfied". The following responses were particularly positive: "The collaboration within our own department works well. My colleagues are exemplary colleagues. I know what my boss/my co-workers expect from me. Hygiene and cleanliness in the company are excellent. I've had the opportunity to learn new things and to develop myself further."

A survey conducted at the same time on psychological stress also showed a positive result. The level of mental stress is measured as a percentage: The mental stresses in the work activity, work organisation and social area were surveyed. Areas where more than 50 % of participants answer "somewhat disagree" are considered to be risk factors according to the checklist. At OELCHECK, none of the areas above 50 % were rated as "somewhat disagree".

For some participants, the most severe stress was indicated under the point time/deadline pressure (44 %). This means that the overall result is exceptionally good compared to other companies.

Overall, thanks to the anonymous employee survey, we have received a meaningful "mood picture", particularly with regard to employee satisfaction, internal cooperation and the working atmosphere. We were delighted to once again be named a "dream company". However, we also know in which areas we still have potential for improvement in the future and will be careful to maintain the current mood picture in the future.

Paul Weismann *Barbara Weismann*

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STORAGE AND HANDLING OF LUBRICANTS

9 RULES PROTECT AGAINST ERRORS AND THEIR CONSEQUENCES

Every day, lubricants ensure the reliable operation and service life of machines and systems around the world. To achieve this, the properties of the various lubricants are precisely matched to the components to be lubricated, the operating conditions and maintenance requirements. Everything could be so simple, but unfortunately it's not. When storing and handling lubricants alone, errors repeatedly occur and can cause a variety of problems. This can be avoided by proper handling of oils and greases. Nine simple rules help!

Rüdiger Krethe Dipl.-Ing.
Managing Director
OilDoc GmbH

The figures from practice illustrate how important careful handling of lubricants is. Studies by renowned experts have shown that 80 % of damage to hydraulic pumps that fail well before their predicted service life is due to deficiencies in maintenance and operation (Totten, G.E.: Handbook of Hydraulic Fluid Technology). Statistics on early failures of rolling bearings tell a similar story.

The numbers may be frightening, but the triggers of the damage are often homemade. The following factors repeatedly play a major role in this:

- Solid and liquid impurities
- Mixing of different oil types
- Exceeded oil-change intervals
- Use of unsuitable fluids.

On the way to the machine alone, starting with transport, storage or when filling, refilling or topping up in operation, a lubricant can be contaminated in many ways. Premature ageing can also occur.

Most of these shortcomings can be avoided by following simple rules. This article presents the most important of these rules regarding the storage and handling of lubricants. These should cover the entire life cycle of the lubricants in operation and be embedded in a professional lubricant management system in order to have a truly sustainable effect.

1 Lubricant selection

This primarily concerns the **technical suitability of the lubricants**. This evidence is checked, for example, on the basis of the following criteria:

- Approvals or lubricant lists of machine or component manufacturers (OEM)
- ACEA or API classifications (mobile applications)
- DIN or ISO standards (industrial applications).

In addition to technical suitability, it is important to minimise the number of lubricants and container sizes used. On the one hand, storage space and handling can be simplified. On the other hand, the number of lubricants used also reduces the risk of mix-ups.

Lubricant suppliers should be assessed mainly on the basis of their supply portfolio, delivery times and technical service.

2 Incoming goods inspection

The first step is **to check the conformity of the ordered and delivered lubricants** based on the complete lubricant designation and the quantity. At the same time, it involves a **visual inspection**, for example at least for damage to the packaging and containers. It is also very useful to record the delivery documents, batch numbers and results of the visual inspection. When delivering large quantities, for example as loose goods, it is strongly recommended that a reference sample be taken. This can be subjected to a visual inspection at the same time as the sampling.

3 Requirements for storage space

Enclosed, dry premises that are subject to the lowest possible temperature fluctuations are appropriate for storing the lubricants. It makes sense to limit access to the lubricant storage facility to a narrow, trained group of people. This means that not only the incoming goods but also the sampling of lubricants can take place and be documented in a regulated manner. Observance of the legal regulations for the storage of lubricants must of course be taken into account.

The horizontal storage of drums outdoors prevents the ingress of condensate when the two openings made on the upper front side are in the 3 or 9 o'clock position. Alternatively, original sealed drums can also be stored on a clean pallet, upside down.

However, lubricants should only be stored outdoors in exceptional cases. Products such as insulating liquids, refrigerator oils, lubricating greases and aqueous products/concentrates should only be stored indoors.

Not like that, please!

4 Identification and traceability

Commercial designations of lubricants are often long and often lead to mix-ups in practice. The end user is often unaware that a single letter is crucial in determining whether the lubricant is the right one.

Continuous, easy-to-handle labelling of lubricant containers, transport containers, tools, aids and lubrication points ensures that the correct lubricant actually arrives at the lubrication point.

© OilSafe

Depending on the number of lubricants in operation, colour coding can be applied, possibly combined with simple symbols or meaningful abbreviations. In this way, mix-ups and confusions can be avoided as much as possible.

5 Minimise impurities

© OilSafe

Not only during storage, but especially when filling, refilling or topping up lubricants, **there is a risk of solid or liquid impurities entering the lubricant**.

Therefore:

- Oil storage must be a place of cleanliness
- Containers must always be stored closed
- Containers and transport containers must be immediately resealed after opening for sampling or refilling
- Aids and tools are cleaned regularly and stored appropriately.

When refilling or topping up lubricants in sensitive systems, such as hydraulic systems, recirculating lubrication systems, increasingly also production-critical transmissions, filtration before filling is useful.

6 Avoid overlaps

For classic lubricating oils, the **minimum shelf life** is usually between two and five years. For certain, very sensitive product groups, such as concentrates for aqueous cooling lubricants, this can also be significantly lower. An appropriate organisation of the storage facility will help to ensure that the shelf life is not exceeded.

The quantity stored should be based on the annual requirement or the planned oil changes. Depending on the delivery time and dynamic distribution of the annual quantity over the different months, a safety buffer should be provided.

Consistent compliance with the **FIFO principle (First In – First Out)** helps to avoid overlaps as much as possible.

7 Tools and aids

The **containers, tools and aids used to refill or top up the lubricants should be suitable for the oils or greases and be clean**.

Simple tools and aids such as drum pumps, oil cans or grease guns should only be used for one lubricant and be marked accordingly. Their appropriate storage prevents the lubricants contained therein from ageing, mixing or becoming contaminated in an impermissible manner.

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If more complex tools or aids for different lubricants are used, they must be cleaned and flushed before and after use.

8 Oil change and disposal

After the oil change, the **waste oils are temporarily stored in specially approved containers**. According to the Waste Oil Ordinance, professional disposal is carried out by accredited specialist companies.

The collection and disposal method are specified on the basis of the waste code number indicated in the safety data sheet of the lubricating oil in accordance with AVV (Waste Register Ordinance). Disposable containers containing oil are disposed of properly in accordance with the German Packaging Act via the Gebinde-Verwertungsgesellschaft der Mineralölwirtschaft mbH.

9 Sustainability

Simple **work instructions and documentation** help when it comes to applying the rules safely. Their integration into quality or asset management ensures their application and gradual further development in the best possible way. The economically positive effects are also particularly sustainable.

Top tip:

OELCHECK all-inclusive analyses quickly provide clarity if there is a suspicion of possible contamination, mix-up or confusion of lubricants.

They are also an important aid for ensuring quality during incoming goods inspections and for checking the suitability of lubricants for demanding applications.

Take a professional approach to the topic!

You will receive support in the introduction or optimisation of sustainable lubricant management in your company in the regularly held **OilDoc seminar "Professional Lubricant Management"**.
Further information & registration:
www.oildoc.de/schmierstoffmanagement

RUNNING FOR A GOOD CAUSE

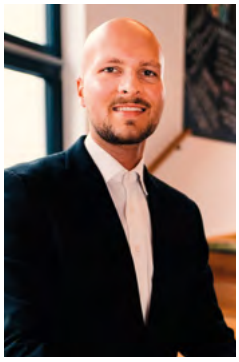
BIG FUNDRAISING GALA AT OELCHECK

51 runners had a goal in 2022: a symbolic run around the world in one year. They have not only achieved this major goal, but have far exceeded it. They covered a good 64,000 kilometres and thus circled the world 1.6 times for a good cause. More than 100 sponsors have donated a sum of money to Lacrima, the Rosenheim Trauerzentrum für Kinder, for every kilometre run. A total of EUR 20,860 was raised in this way.

OELCHECK not only supported the campaign with 500 euros last year, but also organised the large fundraising gala. On February 10, over 70 athletes and sponsors were invited to the OELCHECK cafeteria. Over the course of the evening, a cheque for the EUR 20,860 was handed over to the representatives of Lacrima. The sum will directly benefit the Lacrima bereavement centre of Johanniter-Unfallhilfe Rosenheim.

© Diana Fuchs

Here, bereavement companions voluntarily help grieving children and young people who have lost a parent, for example, to find their own bereavement path in the protected space. Children in particular need support and sympathy to regain stability and new confidence. – Following the great success of the campaign, we will now continue. Kilometres and donations will be collected again during the 2023 charity run. The money is earmarked for the "Heart's Desire Hospice Mobile" project of the Bavarian Red Cross, which once again fulfils a dream for people in their final phase of life.

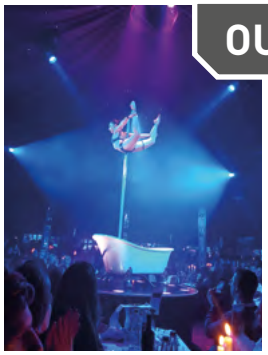


INTRODUCTION: DOMINIK BOHNERT, KEY ACCOUNT MANAGER

"The position of Key Account Manager appeals to me because of the new and interesting challenges I face every day. No two days are the same. I am in direct contact with customers from Germany and other European countries. For them, I am the central contact person and at the same time I exchange ideas with colleagues from other OELCHECK departments."

Mr Dominik Bohnert has been working for OELCHECK since May 2015 and is very familiar with the processes in our company. He worked in the areas of sample collection, technical assistance, sales and agent support.

Mr Bohnert has been a Key Account Manager at OELCHECK since October 2022.



OUR MAGICAL YEAR-END AT TEATRO

A visit to Teatro in Munich is a feast for all the senses!

Last December at our Christmas party in the legendary mirror tent, we were able to experience magical moments. Spectacular acrobatics and charming comedy brought us into a world of laughter and wonder. We were treated to an excellent menu. It was an enchanting evening that we could enjoy together.

THANKS TO OUR EMPLOYEES!

3 X 20 YEARS!

Many employees remain loyal to OELCHECK for many years! They appreciate the good cooperation in our company, the optimally equipped working environment, the many opportunities for further training and development as well as the mutual appreciation of employees and management.

Just a few weeks ago, we were able to congratulate three employees on their 20th anniversary! Annemarie Huber is active in the OELCHECK laboratory, the heart of our company. Wolfgang Käsweber has passed through several departments and has been QM Officer for two years now. Josef Obermaier is a network administrator. He maintains, configures and looks after our extensive IT landscape.

From left to right: Barbara Weismann, Annemarie Huber, Josef Obermaier, Paul Weismann

Wolfgang Käsweber with Paul and Barbara Weismann

We would like to express our heartfelt thanks to the three employees celebrating their anniversaries and look forward to many more years of cooperation!

A Doppstadt INVENTHOR 9 in action

DOPPSTADT

BEST SOLUTION. SMART RECYCLING.

Doppstadt is an internationally active solutions provider for recycling/environmental technology and recovery of recyclable material. The company offers systems and shredding technology for mobile and stationary use that are used for the processing of a wide range of materials, such as waste wood, domestic, commercial and industrial waste, organic waste, excavated earth and green waste. From Velbert, Wülfrath and Calbe, Doppstadt supplies state-of-the-art machines and systems in more than 40 countries worldwide. The systems for processing waste wood as wood chips for heating systems or chipboard are becoming increasingly important. However, their operating conditions pose a number of challenges, especially for the gearboxes of the systems and their oils. For this reason, Doppstadt always sends a sample of the gear and hydraulic oils to the OELCHECK laboratory for analysis during every system maintenance.

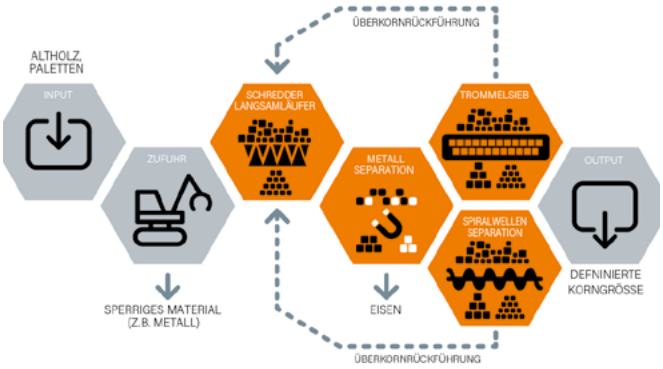
In times of a shortage of raw materials and energy shortages, waste wood is increasingly being used as a valuable resource. Depending on the level of quality, waste wood is used for energy purposes, such as combustion in biomass power plants or as a material in the wood materials industry. Waste wood is industrial waste wood from wood working and processing companies, residues of composite materials and used wood from a wide range of sources.

In order to make waste wood usable, it must be prepared. This is no easy task, because it is not only simple wooden pallets that have to be processed, but often also window frames, doors, cable drums and even railway sleepers. However, Doppstadt's special systems break everything down and master a wide range of challenges. They work efficiently and achieve high quality and throughput with low operating costs. This allows them to fully exploit the potential of wood as a recyclable material.

These units break everything down

Doppstadt offers both mobile-modular and stationary high-performance complete solutions that precisely match the requirements on site and can be integrated into existing components – including impressive services for future-proof, successful operation.

Whether mobile or stationary, the optimally combined units shred waste wood, remove magnetisable metal parts and sift through different material sizes. All this is done without interruption in a single operation.



Shredding, sorting, filtering – non-stop to the end product in a single operation.

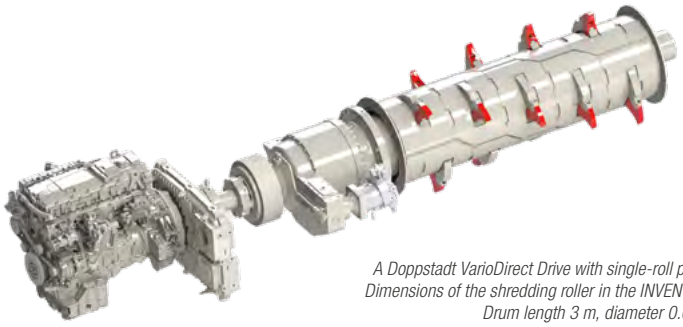
During mobile use on site, slow-moving shredders from the Doppstadt INVENTHOR series take on the heavy work of shredding. The machines reliably pre-shred the material with high torque. They feature an effective drive train with high power reserves, intelligent material feed and configurable shredding systems. Designed accordingly, they achieve an output of 90,000 t per year, even with large material flows.

For example, an INVENTHOR 9 equipped with a crawler trolley weighs 35,000 kg. In the working position, it is over 16 m long and 3 m wide. Thanks to the crawler trolley, the INVENTHOR 9 can change its position on site automatically. Its diesel engine meets the EU Stage V emissions standard and, with its 530 hp, ensures enormous power.

The INVENTHOR is based on Doppstadt's proven single-roll principle. The highlight of the model series is the patented VarioDirect Drive installed as standard. The unique direct drive concept

impresses with high efficiency, optimum torque and low fuel consumption. Thanks to hydraulic support, the drive force can be transferred variably to the shredding roller and thus offers ideal possibilities for effective shredding. This means that the speed of the roller can be flexibly adjusted to the shredding task or even reversed, while the motor operates highly efficiently at a constant speed.

The patented VarioDirect Drive, a power-split planetary gear, transfers the relatively high motor speed to a low roller speed of 5 to 32 min $^{-1}$. Depending on the size of the unit, the gearbox is supplied with 50 l to 250 l of a synthetic industrial gear oil with friction-reducing properties of type CLP 220. Shredding waste wood is a hot topic, but a highly efficient radiator geometry of the Doppstadt Shredder ensures demand-oriented cooling despite the narrow installation space. However, the gearboxes and their oils have to cope with a whole range of other challenges. The machines often operate in an extremely dirty environment. Just like water, which occurs as condensation due to often high humidity, dust can enter the lubrication circuit despite an oil-resistant sealing system. In addition, there are impacts and vibrations up to the maximum torque.



A Doppstadt VarioDirect Drive with single-roll principle. Dimensions of the shredding roller in the INVENTHOR 9: Drum length 3 m, diameter 0.6-0.8 m

Oil analyses in the maintenance concept

Whenever a mobile INVENTHOR or stationary CERON shredder is serviced, the Doppstadt technicians take a sample of the gear oil and send it to OELCHECK for analysis. The condition of the gear oil is examined in the laboratory. Any impurities, such as water, dust or sealing materials, are detected in the same way as oil oxidation due to excessive temperature or elements as an indication of impending wear. The laboratory reports with informative comments from OELCHECK tribologists provide Doppstadt technicians with important information. Based on this, the oil change intervals of the individual gearboxes are adjusted. In addition, the laboratory reports with comments allow conclusions to be drawn about the necessary repair requirements for the gearboxes. The operational safety of the systems is a top priority at Doppstadt. After all, operators should be able to rely on the everyday use of their machines. Regular maintenance of the machines is essential for this, because unplanned downtime or even damage can be minimised or completely prevented.

Service packages tailored precisely to the needs of customers ensure that no inspection is forgotten in day-to-day business and downtime is reduced to a minimum. In addition, there is worldwide security of supply, fast repair service on site and all-round carefree packages as part of service and maintenance contracts. Because Doppstadt knows: "Every machine is only as good as the service behind it."

Smart recycling solutions and products

Founded in 1965 by Werner Doppstadt in Velbert as an agricultural business, the family-run company is today a world-leading, recognised partner in environmental technology. Approx. 700 employees plan, implement and manufacture systems and shredding technology for mobile and stationary use, which are used for the processing of a wide range of materials. The company's employees share a passion for environmental technology and the aspiration to find ever better and more sustainable solutions for customers. This results in resource-saving, economical and innovative products as well as the best possible personal service.

For further information: **www.doppstadt.de**

COME AND MEET US!

We will be present at the following trade fairs and conferences in 2023. Will you be there too? Then we would be delighted if you could arrange a meeting with us in advance (sales@oelcheck.com) or drop by our booth!

nextlub

18-19/04/2023 | Düsseldorf

OilDoc Konferenz & Ausstellung
Schmierstoffe Instandhaltung Condition Monitoring
Mai 9-11, 2023 Rosenheim - Bayern

09-11/05/2023 | Rosenheim

stle LONG BEACH May 21-25, 2023
77th STLE Annual Meeting & Exhibition

21-25/05/2023 | Long Beach, CA – USA

UNITI Mineralöl-technologie-Forum
UNITI Mineral Oil Technology Congress

04-05/07/2023 | Stuttgart

HUSUM WIND

12-15/09/2023 | Husum

LUBRICANT EXPO

26-28/09/2023 | Essen

WINDENERGIETAGE

08-10/11/2023 | Potsdam

ASTM COMMITTEE WEEK

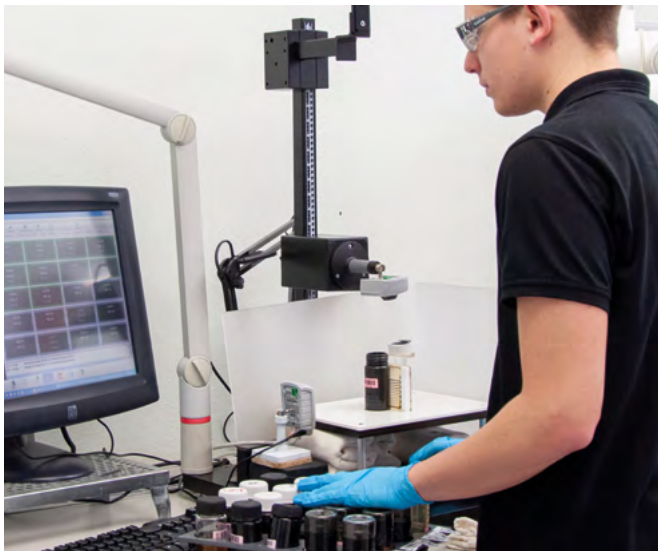
03-07/12/2023 | New Orleans, LA – USA

PRECISE, FAST AND OBJECTIVE

AUTOMATED VISUAL ASSESSMENT

This test device is unique! It was developed jointly by **OELCHECK** and **HF-Innovation GmbH**, which manufactured it according to our requirements. The innovative device ensures an even more objective assessment of the samples. It handles several work steps in one process and relieves our laboratory staff. The new automated visual assessment has already examined the first test samples and is expected to start full operation by summer this year.

Until now – manual, elaborate and subjective



All samples received by OELCHECK are still visually inspected by our laboratory technicians before further investigations are started and subjected to the so-called "crackle test" for the rapid detection of water. To do this, the sample bottles are first placed upside down, i.e. on the lid, stored upright. Any foreign substances in the oil fall to the white inner surface of the lid and are easily recognisable when the bottles is quickly turned over and opened. The laboratory technician's first diagnostic view therefore immediately falls on the white inner surface of the lid seal, in which abnormalities in the lubricant are visible, e.g. in the form of particles. The inside of the lid and the well-lit, open sample bottle are captured by a camera. After the photograph is taken, an initial assessment is made of the appearance of the oil sample, its colour and any sediments in the lid by means of a comparative assessment.

The previous visual assessment is not only made up of many elaborate steps, but is inevitably subjective, because people do not all see e.g. colours the same.

In the near future – automated, fast and objective

Our new colleague, Automated Visual Assessment, will be installed in the OELCHECK laboratory in the next few weeks. The interior of the device contains a variety of high-quality camera systems, special lighting equipment, motors, grippers, heating elements for the crackle test and a computer-assisted image evaluation. In the future, the new test device will take over several tasks of the laboratory technicians.

The system holds up to 80 sample bottles per sequence and operates in multiple steps:

- A gripper takes one of the sample bottles on its lid and transports it to the first camera system. Here, the barcode of the sample is scanned, a photo of the sample bottle is taken and the various parameters, such as colour, turbidity and filling level, are automatically read out.
- The sample is now transported to the next photo station. The bottle is rotated and the lid removed so that the inside of the sample lid and any particles that may be deposited here are visible. A computer-assisted image evaluation reads out the degree of contamination. Photos are also taken from a bird's eye view of the inside of the sample lid and of the opened bottle. As before, these photos will be included in the laboratory report for the customer.
- A pipette system takes a small amount from the sample and subjects it to a crackle test, a fast method of detecting free water. An oil drop (0.2 ml) is sprayed onto a 180 °C hot plate.

If the droplet contains more than 0.1 % or 1,000 ppm of water, it escapes from the oil with a crackling sound, often in conjunction with steam bubbles. Previously, this reaction was evaluated optically and thus subjectively by a laboratory technician, but now a camera system goes into action. It records the sequence of the reaction and evaluates it objectively.

- From the remaining sample residue in the pipette, a part is placed in a tube for subsequent IR spectroscopy. The pipette is then cleaned in a washing station and dried with compressed air before it returns to action for the next sample.

During the crackle test and preparation of the sample quantity for IR spectroscopy, the sample bottle is closed again with its lid and returned to the batch by a gripper.

An idea became reality

We had the idea of automating the visual assessment for a long time. The thought of this just wouldn't let us go. In 2021, we finally contacted HF-Innovation GmbH. The company from Hörstel in Westphalia develops and supplies complete semi-automatic and fully automatic solutions for laboratory systems from preparation to fully integrated analysis. We had already had good experience with HF-Innovation GmbH in the complete automation of the determination of the PQ index.

And after initial consultations, it was soon clear this time too: We are tackling the new project together.

However, it was a long journey before the device became a reality. Countless real samples were repeatedly tested, values compared and improvements made. After installation in the OELCHECK laboratory, all processes must be precisely adapted and the device must be integrated into our laboratory information and management system, LIMS for short. Our LIMS developed by OELCHECK IT combines a wide range of different, coordinated processes. It captures all examination results and controls workflows.

The new Automated Visual Assessment is still in the test phase, but the device is scheduled to start normal operation this summer. Initially, it will provide precise and objectively determined values for some test procedures, such as hydraulic and gear oils. At the same time, OELCHECK laboratory technicians no longer need to carry out some time-consuming work, especially the manual opening and closing of many hundreds of sample containers per day.

AGGRESSIVE ACIDS IN GAS ENGINE OILS

AN ADDITIONAL TITRATOR FOR DETERMINING THE i-pH VALUE

There are now 20 titrators in use in the OELCHECK laboratory. One of them is a Mettler Titrator Excellence T7. It has proven itself in the determination of the i-pH value of gas engine oils. A second similar device has now been added as a replacement for a predecessor model. The new titrator enables fast operations and also delivers absolutely precise results. Changing samples, complex titrations* and cleaning steps are all automated and facilitate the work of our lab technicians.

20 titrators are currently operated by our laboratory technicians in the OELCHECK laboratory.

The 20 titrators are mainly used to determine the base number (BN), acid number (AN) and water determination by means of Karl Fischer titration. The two Excellence T7 titrators are specialised in the measurement of the i-pH value (initial pH value). This is an important parameter for oils from gas engines that are operated with biogas, biomethane, sewage gas or landfill gas, among other things. Gas engine oils are often so heavily loaded with acids that they can no longer neutralise them sufficiently and therefore cannot protect the engine from their attacks.

Apart from the base number (BN) and acid number (AN), OELCHECK therefore determines the i-pH value of these oils. It provides crucial additional information about their acid load.

The AN specifies the quantity of acids in the oil that are produced during engine operation and increase over time. The BN provides information on whether alkaline active ingredients are still present in the engine oil in order to be able to neutralise acids that have formed. In the case of gas engine oils, the acid-base balance must be considered particularly closely. Even if the BN shows that alkaline active ingredients are still present in the gas engine oil, it may have already been enriched with acids, which primarily come from burning the impurities of the gases.

The i-pH value proves even more accurately the exposure of a used oil to strong and therefore corrosive acids. Even the smallest acid quantities can lead to a measurable reduction of the i-pH value, even if the value of the AN has not yet increased significantly. On the other hand, an increased acid number can be alarming in itself, while only a small change in the i-pH value demonstrates that it is predominantly weak acids which are less corrosive

Safety in a three-pack: By determining the BN (base number), AN (acid number) and i-pH value, OELCHECK analyses provide precise information on the acid-base balance of gas engine oils.

** Titration is a procedure used in quantitative analysis in chemistry. A known substance, such as sulphurous acid, the concentration of which in the oil is unknown, is reacted in a chemical reaction using a standard solution, the concentration of which is precisely specified.*

Q&A

A LAB REPORT WITH NO INDICATION OF WATER CONTENT

In our laboratory reports, you have always until now reported a value for the water content in %, which was determined using FT-IR. For the first time, we have now had a polyglycol-based oil analysed with one of your all-inclusive standard sets and this value is missing from the laboratory report.
Is there a reason for this?

Don't worry, we haven't forgotten the value for water using FT-IR (%)! With your polyglycol oil, it is just not expedient to determine the water content using this method. And there are reasons for this, as well as an alternative option!

Polyglycols are different

Polyalkylene glycols (PAG), referred to as polyglycols for short, are not oils in the conventional sense, but polyethers. These are produced from polyvalent alcohols by polymerisation. As polyglycol oils have a high natural capacity to absorb pressure, they are primarily used for lubricating roller and slide bearings and worm gears. As high-temperature oils, they are used, among other things, in compressor and hardening oils as well as in metalworking and heat transfer fluids. Polyglycol oils have better physiological compatibility than mineral oils and are therefore often used as lubricants in the food industry in accordance with NSF-H1. They also serve as the basis for flame-retardant hydraulic fluids as well as biodegradable HEPG (hydraulicoil environmental polyglycol) hydraulic fluids.

Water in polyglycols

Polyglycol oils generally have an increased dissolving power of water. Some of them are even hygroscopic. If they have absorbed water, it does not settle and therefore cannot be removed.

Depending on the raw materials used and the polymerisation, polyglycol oils can absorb water in a very wide concentration range from a few hundred ppm to a double-digit percentage range. Here, however, water determination with the IR method reaches its limits here just as much as with ester-based synthetic oils or lubricating greases. There is one complicating factor when examining glycols: so-called "hydroxy groups" are found in their structure. These are detected in the IR spectrum in the same range as water. This can lead to significant blurring in the determination of water.

A titrator is used to determine the water content of polyglycols as a reliable alternative. The Karl Fischer method is used for this purpose. Titration is a procedure used in quantitative analysis in chemistry. A known substance such as water, the concentration of which in oil is unknown, is reacted in a chemical reaction using a standard solution, the concentration of which is precisely specified.

Karl Fischer's so-called coulometric method can detect extremely low water concentrations in trace levels ranging from 10 ppm (mg/kg) to values of around 10,000 ppm (mg/kg), i.e. 1%, in the oil.

This process is therefore the method of choice for polyglycols and ester-based products, but also for mineral-oil-based insulating oils, many hydraulic and gear oils, as well as refrigerant compressor oils, which can only absorb small quantities of water during operation.

For polyglycol-based products that are inherently high in water content, such as flame-retardant hydraulic fluids, we determine the water content using the volumetric variant of Karl Fischer titration.

You can also read the article "This is how precisely OELCHECK detects water".
Published in OELCHECKER Summer 2021.
https://en.oelcheck.com/wiki/

Water determination according to Karl Fischer

Customised OELCHECK all-inclusive analysis sets with a combination of the appropriate test methods are available for every type of lubricant or every operating material, every industry and every issue. Our analysis set 1 (white set) already contains water determination using FT-IR for most applications.

However, as explained above, in many cases it is the better choice to perform water determination using the Karl Fischer method. We will be happy to help you select the appropriate set.

OELCHECK also answers your questions on the topics of lubricant and operating materials analyses and tribology.
Contact us by email (info@oelcheck.de) or fax +49 8034 9047-47.

Ihr Treffpunkt im Herzen Europas

OilDoc

Konferenz & Ausstellung

Mai 9-11, 2023
Rosenheim · Bayern

Schmierstoffe
Instandhaltung
Condition Monitoring

OILDOC CONFERENCE & EXHIBITION 2023

HOT TOPICS, NEWS AND THE TRENDS OF THE FUTURE!

The OilDoc Conference & Exhibition in Rosenheim will finally take place again from 09-11/05/2023. Since 2011, the event has developed into an important date for leading lubricant experts, tribologists and maintenance staff.

In 2023, participants can expect a diverse and comprehensive programme...

New technologies and global trends, such as sustainability, sensor technology and digitalisation, are shaping our future. Many challenges, risks and opportunities lie ahead. Rather than letting the developments come to you, you should take action to successfully shape the future yourself. And to succeed, we must always keep our finger on the pulse with technological developments. The hot topics at the OilDoc Conference & Exhibition are just one way of staying up to date!

- 90+ top-class presentations
- 30+ international trade exhibitors
- 4 lecture halls
- 2 evening events
- Workshop & excursion day
- 350+ possible business contacts

EXPERIENCE OELCHECK LIVE...

OELCHECK tribologists and laboratory managers are absolute experts in the field of lubricant and operating materials analysis. They are happy to pass on their knowledge to maintenance staff, service technicians and lubricant experts in a practical and competent manner.

You should therefore not miss their presentations during the OilDoc Conference!

You can also experience more than 80 other top-class international speakers, including Fluitec, Total Energies, BASF, AC2T research, NYNAS. Perkin Elmer, Metrohm, HY-PRO Filtration, IBR Solutions, ExxonMobil, HYDAC, Tribotronic, Hermann Bantleon, Petro Canada, and much more.

The keynote speech entitled "Lubricant chemistry management: A better way to maintain turbine oils" will be given by Peter Dufresne Jr. from EPT CleanOil and sure to be a special highlight for everyone involved in the topic of turbine lubrication.

Dr Christoph Rohbogner – Head of Tribology
Extended lubricant analysis using Nuclear Magnetic Resonance (NMR)
Analysing wear and additive elements in greases: XRF, RDE-OES or ICP-OES?

Stefan Mitterer – Director of Technology/Service/Sales
Limit values for the evaluation of lubricant analyses

Carsten Heine – Technical Support Manager
Nitration in diesel engines – underestimated corrosion source

Sina Malenke – Scientific team assistant
Multivariate prediction models for oil condition monitoring using infrared spectroscopy

Matthias Aßmann – Tribologist
Component Cleanliness in Cooling Systems – Special Focus on Flux

Dr. Raphael Grötsch – Scientific Team Assistant
AdBlue – what a laboratory analysis reveals

Rainer Schöpf – Tribologist
Tribology – research with a practical focus: Hydrogen and oil analysis

Early bird price registration!

The early bird deadline has already passed – but we have a special offer for all attentive readers of the OELCHECKER: Enter **OELCHECKER2023** in the online registration form under "Do you have a promo code?" and you will still receive **a €100 discount** on the regular fee of €995 + VAT.
Link to the registration form at www.oildoc-conference.de or simply scan the QR code.

DON'T MISS: BAVARIAN EVENING

A special highlight of the event is always the Bavarian evening in the Auerbräu Festhalle. With live music, a large buffet with Bavarian delicacies, traditional dance groups and many surprises.

So pack your traditional costume (if you have one 😉) and enjoy a cosy evening!

The third day of the event is designed as a "practical day" for the first time in 2023. Select one of three events:

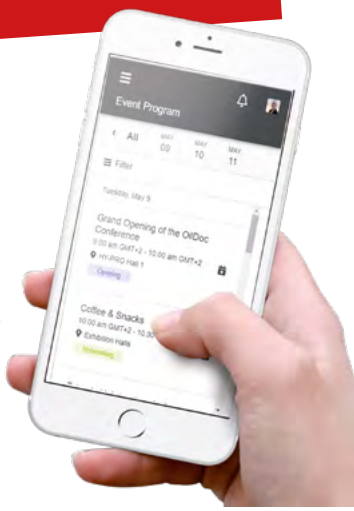
- **Workshop at OELCHECK in nearby Brannenburg**
  "Enhancing reliability using fluid analyses – Information content of laboratory report and subsequent data analysis". Including guided tour "Test methods in practice" through the extended OELCHECK laboratory. Arrival and departure by shuttle bus.

- **Workshops of our exhibitors at KU'KO in Rosenheim**
  Visit up to two workshops of the companies: CINRG Systems Inc., ESI Elemental Service & Instruments GmbH, Filtertechnik Ltd. Contents: Solutions or devices for effective and modern monitoring of lubricants.

- **A technical excursion to the mountains**
  Experience a trip with Germany's oldest high mountain cog railway on the 1,838 m high Wendelstein.

DAY 3 – THE PRACTICAL DAY

Don't forget: Be sure to register for your desired programme via the Event app!



NO CONFERENCE VISIT WITHOUT THE EVENT APP!

Be sure to register for our OilDoc Conference App to experience the event in full!

- You will create your personal presentation timetable.
- You can book your individual program for the excursion/workshop day here.
- You can get in touch with all speakers, exhibitors and other visitors in advance or during the event via chat or video call. You can even arrange fixed meetings.
- You can download all abstracts, manuscripts and presentations provided by the speakers directly.
- During the presentations, you can enter your questions for the speakers. You will then be answered.
- You will automatically receive all information about any changes and additional events before and during the conference.

Online at: eventmobi.com/oildoc

EXHIBITORS

OILDOC SEMINAR PROGRAMME

Current dates	
24-27/04/23	Expert Knowledge for Lubricant Professionals CLS certificate course
14/06/23	Coolant – the underestimated operating fluid
19-22/06.23	Expert Knowledge for Lubricant Professionals CLS certificate course ***ENGLISH***
28-30/06/23	Lubrication and oil monitoring for hydraulics
11-13/07/23	Fundamentals of Lubricant Application I Part 1 of the certification for lubricant experts (m/f/d)
21-22/09/23	Damage to Bearings, Gears and Motors – Causes and Solutions Part 4 of the certification for lubricant experts (m/f/d)
26-27/09/23	Lubricating greases – properties, selection and monitoring
10-11/10/23	Lubrication and oil monitoring for paper machines***BACK IN PROGRAMME***
17-18/10/23	Lubrication and oil monitoring for stationary gas engines
19-20/10/23	Online Oil Sensors – A practical seminar
24-25/10/23	Fundamentals of Lubricant Application II Part 2 of the certification for lubricant experts (m/f/d)
07-09/11/23	Lubrication and oil monitoring for turbines and turbo compressors
14-16/11/23	Lubrication and oil monitoring for gears
28-29/11/23	Lubrication and Oil Monitoring for Construction Equipment ***BACK IN PROGRAMME***
04-07/12/23	Monitoring of machinery through oil analysis (MLA certification course)

Your contact for further training:
OilDoc GmbH
Petra Bots, Rüdiger Krethe
Kerschelweg 29
83098 Brannenburg
Tel. +49 8034 9047700
info@oildoc.de

All of the current dates, detailed seminar content and conditions of participation as well as the links to uncomplicated online registration can be found on our website:

oildoc.com/seminare

BACK IN PROGRAMME

Upon multiple request, the OilDoc Academy has once again added two seminars to its programme for the second half of the year, specifically for maintenance workers from the construction and paper manufacturing industries.

Lubrication and oil monitoring for paper machines

10-11/10/2023: 2-day seminar

This seminar was designed at the special request of leading companies in the paper industry! With its complex subject matter, it is aimed specifically at specialists and managers from the maintenance and servicing of paper machines as well as technical consultants and sales staff of lubricant and component manufacturers. In the further training, seminar leader Rüdiger Krethe discusses the lubrication of paper machines and the most important systems in the area of material preparation, looks at the lubricants available and shows how professional handling of lubricants can prevent recurring practical problems. Participants will also learn how professional oil monitoring works and how it can help to increase system availability.

Lubrication and oil monitoring for paper machines

28-29/11/2023: 2-day seminar

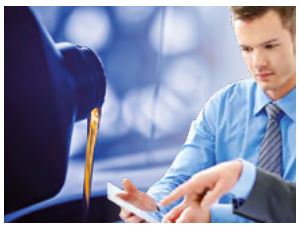
Changing temperatures, humidity, dust and extreme stresses make construction machinery difficult to manage. Nevertheless, they must function reliably. The lubricants of the individual components play a decisive role in this.

The seminar was conceived for specialists and managers from the maintenance and servicing of construction machinery as well as technical consultants/sales staff from lubricant and component manufacturers. You will learn about the optimally suited lubricants and the special features of bio- and synthetic oils. You will also learn how oil analyses can significantly increase the service life of the oil fillings and detect abnormal wear processes and impurities. Potential malfunctions are thus detected at an early stage, increasing the reliability and availability of the machines.

Basic principles and practice of lubrication

11-13/07/2023 Module 1, 24-25/10/2023 Module 2

Basic principles and practice of lubrication – Modules 1 and 2 are the most popular seminars at the OilDoc Academy. No wonder! They convey comprehensive basic and practical knowledge about lubrication and lubricants in a practical and compact manner.



OELCHECK since 1991

OUR ADVANTAGES AT A GLANCE


Quality

Speed


Expertise

Experience


Customer focus


Innovation


Individuality


Independence


All-in-one analysis kit


International

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