



Winter 2022

# OELCHECKER



## HOT TOPIC

Condition-based oil changes – save money & protect the environment

## PARTNER FORUM

Enjoy environmentally friendly travel with Bayerische Regiobahn

## OELCHECK INSIDE

New all-inclusive analysis kits for fuels, coolants and AdBlue

AND MUCH MORE...



## CHECK-UP

“ Fed up with never-ending crises and political turmoil? You won't find them here! Back in 2011, Dr Markus Söder, Bavarian State Minister for the Environment and Health, confirmed that waste through oil analyses should be avoided in his welcoming address to the first OilDoc Conference & Exhibition. In light of recent events, we've once again taken the initiative and turned to the government for support. When it comes to carbon emissions and cost savings, we believe it's high time to raise awareness among consumers as well as machine and lubricant manufacturers of the role that oil analyses can play in the areas of sustainability, waste avoidance and reducing our carbon footprint.

The first step in doing so was contacting members of the Bavarian Parliament from Alliance 90/The Greens and the Christian Social Union in Bavaria (CSU) with the following information:

- In Germany, over 900,000 tonnes of lubricants and operating materials are consumed each year.
- More than 25% – over 200 million litres – of this enormous amount could be saved if oils were only changed when necessary.
- The effects of only changing oils when necessary speak for themselves. In addition to consumers enjoying lower costs for fresh oils, fewer transports of fresh and used oil would be required. This, in turn, would lead to lower waste of resources when collecting and processing waste oils and significantly lower CO<sub>2</sub> emissions.
- These positive effects could be achieved easily. Users who consume more than 200 litres of oil each year to operate their machines, systems or fleets should be required to provide proof and have the oil analysed prior to a scheduled oil change. The oils should only be replaced once the analysis data is available – and depending on their condition rather than after a fixed interval. OELCHECK can prove that oil change intervals can often be extended up to ten times the original recommendation based on more than four million samples tested, sent to our laboratory for analysis by over 40,000 customers over the last thirty years.

Our proposal immediately caused a stir, as shortly afterwards we entered into personal discussions with members of the CSU and Alliance 90/The Greens and provided them with detailed information via video conference. We were promised the issue would be discussed in the Economic and Environmental Committees and the options offered by longer oil change intervals would be referred to in publications focusing on CO<sub>2</sub> and cost savings.

We're yet to make great strides in the short term, but we have succeeded in raising awareness of the issue. We hope we'll be able to achieve a bit more today than with our 2011 initiative due to changed environmental behaviour among companies and consumers as well as increased cost pressures. This time we'll be sure to keep up the good work!

*Paul Weismann Barbara Weismann*



*Alliance 90/The Greens (from left to right) during a visit to Brannenburg: Dr Christoph Rohbogner (Head of Tribology), Peter Weismann (Advisory Board), Paul Knobloch and Claudia Köhler (Members of the Bavarian Parliament), Paul Weismann (Managing Director)*

## CONTENTS

- **HOT TOPIC**  
Condition-based oil changes – save money and protect the environment .....3-4
- **OELCHECK INSIDE**  
2022 UN Climate Change Conference / GfT honours Peter Weismann /  
High-level visit from the USA.....5-6
- **TECHNOLOGY FOCUS** AdBlue – A cleaning agent with no residual alcohol..... 7
- **OELCHECK INSIDE – ALL ANALYSES FROM A SINGLE SOURCE**  
AdBlue – New all-inclusive analysis kits ..... 8  
Fuels – Investigations pursuant to DIN now available for almost all types ..... 9  
Coolants – New Ultra analysis kit for faults in the cooling system..... 11
- **OELCHECK PARTNER FORUM**  
Bayerische Regiobahn – Climate- and environmentally friendly travel.....12
- **FAQ** The tribologists at OELCHECK – Their knowledge and tasks ..... 13
- **OILDOC NEWS** OilDoc Conference & Exhibition / Seminar highlights ..... 14-15

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# CONDITION-BASED OIL CHANGES

## SAVE MONEY AND PROTECT THE ENVIRONMENT

Protecting the climate and saving energy and resources are topics that are right on trend. Almost every company is working hard to reduce its carbon footprint. Meanwhile, returning a profit is becoming increasingly difficult, with manufacturing costs having only gone up in recent months. Savings are on everyone's agenda wherever possible, and all operational processes are being put in the spotlight. However, too little attention is often paid to lubricants. Even if higher-quality premium lubricants are used for the first time, they are often replaced far too early due to the fact that they have always been changed at fixed intervals or because it has been stipulated by the oil supplier. When monitored using OELCHECK all-inclusive analysis kits, however, lubricants can be changed based on their actual condition. At the same time, the systems' operational safety is ensured as the analyses also detect contaminants and any wear processes. This means the cost-effective analyses pay for themselves in short time.

If oils are changed based on their condition instead of at fixed intervals, you'll be doing your bit for the environment. Fewer oil changes mean the following:

- Less need for fresh oil
- Less oil extraction and crude oil transport
- Fewer energy-intensive refinery processes
- Less transport of fresh and used oils
- Less reprocessing or disposal of used oils

The bottom line is that fewer oil changes reduce the formation of CO<sub>2</sub>. The production and disposal of lubricants alone creates CO<sub>2</sub> emissions of approximately 1.5kg CO<sub>2</sub> per litre of oil\*.

However, fewer unnecessary oil changes also have an additional effect that should not be underestimated, particularly in today's climate – they have a positive effect on the cost balance sheet. We illustrate the amounts involved using two practical examples.

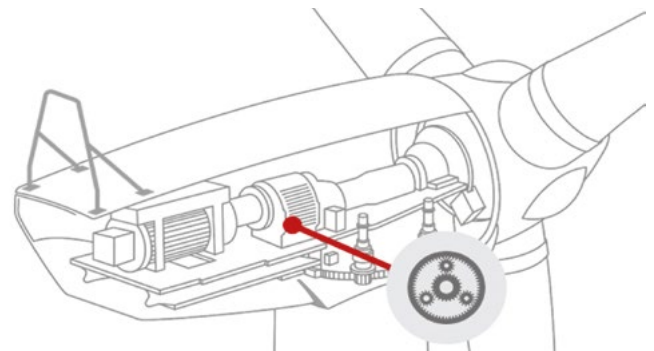


**3MW wind turbine – Main gearbox**

The components in a wind turbine are hard to access. Inspections, maintenance work and oil changes take place at high altitudes, and components failing result in long interruptions to operations. Changing the oil just once costs several thousand euros.

Components in a wind turbine require a range of different lubrication oils, greases and coolants. To clarify the cost-benefit balance of condition-dependent oil changes, which are accompanied by OELCHECK oil analyses, only the 1,100 litres of synthetic gear oil that lubricate the planetary gear of a 3MW system have been taken into account in the example.

Analyses of the gear oil carried out every six months in the OELCHECK laboratory have shown that the gear oil's service life can be doubled from 30,000 operating hours (5-6 years) to 60,000 operating hours (10-12 years).



**Initial situation**

**Component:** Planetary gear of a 3MW wind turbine  
**Gear oil type:** Synthetic CLP gear oil ISO VG 320  
**Oil volume:** 1,100L  
**Costs per litre of gear oil:** Approx. €9.50

**Costs for changing the gear oil after 30,000 operating hours**  
 Fixed interval; no oil analysis costs

Gear oil	€10,500
+ Loss of production (3MW * €0.2 * 6 hours)	€3,600
+ Service technician (external)*	€1,500
<b>Total</b>	<b>€15,600</b>

**Costs for changing the gear oil after 60,000 operating hours**  
 based on 12 OELCHECK all-inclusive analyses

Gear oil	€10,500
+ Loss of production (3MW * €0.2 * 6 hours)	€3,600
+ Service technician (external)*	€1,500
+ 12 x OELCHECK analysis kits (approx. €80/kit per year)	€960
+ 12 x 2-hour service technicians €80/hour for sampling*	€1,920
<b>Total</b>	<b>€18,480</b>

**Savings on an oil change after 60,000 operating hours instead of 30,000 operating hours**

Total costs for two oil changes every 30,000 operating hours	€31,200
/ Total costs including oil analyses after 60,000 operating hours + service technician (external)*	€18,480
<b>Cost savings after 60,000 operating hours (10 years)</b>	<b>€12,720</b>
<b>Annual cost reduction</b>	<b>Approx. €1,000</b>

\* Values are approximate and rounded.



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**Goods vehicles – Euro 6D six-cylinder diesel engine**

A well-known German freight forwarder is leading the way in reducing their CO<sub>2</sub> emissions. They have around 150 trucks on their books that run solely on biodiesel (B100), which reduces CO<sub>2</sub> emissions by around 80% compared to running on diesel (B7). With an average consumption of 33 litres per 100 kilometres and a mileage of around 120,000 kilometres per year, each heavy goods vehicle emits 70 tonnes less CO<sub>2</sub> each year.

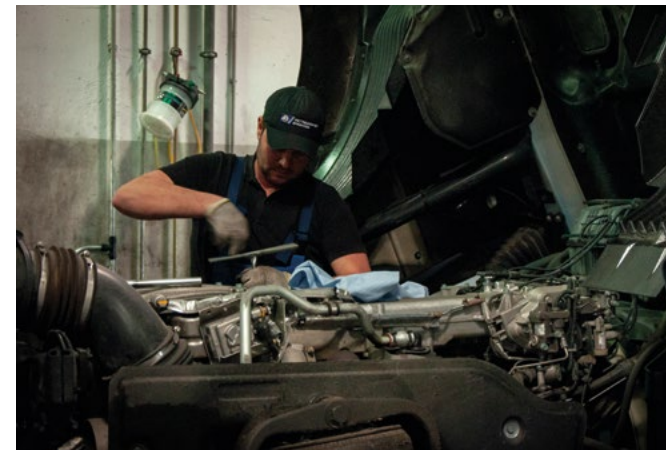
Unfortunately, there’s a catch. Several years of findings relating to running engines on pure, non-esterified rapeseed oil indicate that engine manufacturers still stipulate that B100 engine oils should be changed at shorter intervals. This should eliminate the risk of increased fuel entry when running on B100 and of any resulting subsequent damage to the engine.

To meet the engine manufacturer’s warranty conditions as defined in the lease contracts, the freight forwarder had to shorten the oil change intervals from the usual 120,000 kilometres to 30,000 kilometres.

Shortening the intervals led the cost accounts for oil changes and the CO<sub>2</sub> balance sheet to soar due to the following:

- The amount of used and fresh oil increased four-fold
- The costs for changing the oil and the associated downtime quadrupled
- Additional, avoidable CO<sub>2</sub> emissions generated during the production, transport and disposal of engine oils

Based on the initial situation, the freight forwarder and OELCHECK launched a trial in collaboration with the truck manufacturer.



**Initial situation**

**Components:**  
Four Euro 6D six-cylinder diesel engines in long-haul trucks  
**Engine oil type:**  
SAE 5W-30 based on polyalphaolefin and ester; meets the specifications ACEA E4, E6, E7, E9; API CJ-4; JASO DH-2  
**Oil volume:** 41.5L per engine

<b>Costs for changing the engine oil</b>	
Includes fresh oil, oil filter and labour	
According to the freight forwarder’s specifications	<b>€500</b>

As part of the test, the engine oils in the four trucks with Euro 6D six-cylinder diesel engines were analysed in the OELCHECK lab every 5,000 kilometres. The limit values of the individual parameters were agreed with the vehicle manufacturer in advance. In this light, the following values came under particular scrutiny in the OELCHECK lab: any B100 fuel entry into the engine oils, a change in viscosity, oil oxidation and wear parameters. The short analysis intervals of 5,000 kilometres acted as a safeguard so we could intervene at short notice should serious deviations be detected and therefore avoid significant damage to the engines.

In all four trucks, the engine oils reached the 30,000-kilometre milestone – the point at which an oil change would otherwise have been due, according to the manufacturer’s instructions – without presenting any issues. The oil quality also returned good results at that point. The oil showed signs of ageing in the following 30,000 kilometres (up to 60,000 kilometres). However, this proved to be within scope. As expected, the fuel content in the oil increased throughout the test. The fuel entry was only proven to be moderate in all four vehicles observed, and the viscosity did not change as a result. The limit values agreed with the manufacturer were never reached, while wear metals could only be detected in low concentrations.

The analysis data showed that the vehicles’ oil should be changed every 90,000 kilometres. To be on the safe side, however, the vehicle manufacturer involved in the test approved extended oil service intervals of up to 65,000 kilometres based on the data established for the haulage vehicles used in long-haul transport.

<b>Saving per truck with an extended oil change interval after 90,000 operating hours</b>	
Previous costs for two oil changes every 60,000 kilometres 2 x €500	€1,000
/ Current costs for an extended oil change interval after 60,000 kilometres	€500
<b>Annual cost savings per truck</b>	<b>€500</b>

The freight forwarder, which runs over 150 vehicles on biodiesel (B100), would save over €75,000 in engine oil costs per year due to tripling the oil change intervals as determined by the oil analyses. In addition to the cheaper biodiesel costs, the forwarder would secure a much more favourable cost structure in the much-discussed freight forwarding industry as well as a better CO<sub>2</sub> balance.





## 2022 UN CLIMATE CHANGE CONFERENCE

### INTERVIEW WITH PAUL WEISMANN IN THE KLEENOIL PANOLIN AG VIDEO

Taking effective measures to protect the climate is becoming increasingly urgent. In this context, the Vision 2045 project showed new paths to an all-round sustainable future at the UN Climate Change Conference held in Sharm el-Sheikh in November 2022. The three-day summit saw international business and industrial leaders exchange ideas and present business approaches with a positive impact on our planet's future. Mr Milorad Krstic represented one of fifty innovative, medium-sized companies selected by the organisers. He has been Chair of the Board of KLEENOIL PANOLIN AG and a pioneer in his entrepreneurial field since 1986. In his presentation, he shed some light on the positive effects of microfiltration technology and durable, rapidly biodegradable oils. A unique company video was also filmed ahead of the conference to discuss the issue further, which also featured input from KLEENOIL PANOLIN AG's long-standing partners.

Paul Weismann, Managing Director of OELCHECK GmbH, explained why you would not be flying blind with the longer oil change intervals recommended by KLEENOIL thanks to regular laboratory analyses. KLEENOIL PANOLIN AG was one of the first companies to recognise the benefits of lubricant analyses, and has been working with OELCHECK, the leading laboratory for lubricant and fuel analyses

in Europe, for thirty years. This partnership means that users receive laboratory evaluations of the products used. The analyses are independent of the oil and machine manufacturers, and OELCHECK tribologists often include over 40 parameters in their diagnostics reports. We use high-quality analyses and our unique expertise to extend the service life of oils and help detect any damage to the lubricated components at an early stage. We ensure lubricants are used throughout our evaluations, which are independent of system and lubricant manufacturers. Doing so allows us to create the conditions to make a positive contribution to the CO<sub>2</sub> balance over the long term.



## THE ROSENHEIM HERBSTFEST



We really missed this party! At the end of August, it was once again time to come together after the pandemic, as all OELCHECK staff were invited by the management – as is tradition – to attend the 'Rosenheimer Wies'n' on 27 August and have some fun.

The Herbstfest is one of the best – and largest – folk festivals in Bavaria. Some aficionados even prefer it to Munich's Oktoberfest, because you still get the family vibe and wholesome experience. With tables reserved in the Flötzinger tent (a private brewery based in Rosenheim), we were able to enjoy the cheerful, relaxed atmosphere and great food in traditional surroundings.

## A BUSY AUTUMN FOR OUR TRADE FAIR TEAMS



Things really picked up in the autumn from September onwards. In Germany alone, we were present at five major international trade fairs. OELCHECK's stand was a huge hit at each event, with customers and interested parties from around the world getting the chance to have all their questions about lubricant and operating fluid analyses answered. The new additions to our ever-expanding portfolio of all-inclusive analysis kits and services meant that a whole host of topics were covered, including delving into the technical details. Discussions with visitors focused on the options and benefits offered by all-inclusive analysis kits as well as our free web portal, LAB.REPORT, and our handy OELCHECK App 4.0.

We were so busy our trade fair teams hardly had time to breathe! The events focused on a range of fields:

- **Lubricant Expo, Essen, 6-8 September.** The new event in Germany was aimed at trade visitors across all industries in which lubricants play a role.
- **InnoTrans, Berlin, 20-23 September.** InnoTrans, the international trade fair for transport technology in Berlin with a spotlight on the world of railway technology and infrastructure.
- **WindEnergy, Hamburg, 26-30 September.** As the name suggests, in Hamburg everything revolved around using wind power to generate energy and how it can be used.
- **bauma, Munich, 24-30 October.** Just an hour away from OELCHECK, bauma is the key event for the construction, building materials and mining machinery industry worldwide.
- **Energy Decentral/EuroTier, Hanover, 15-18 November.** A large exhibition of state-of-the-art processes and technical solutions for making the best use of local, renewable energy sources.

The busy autumn trade fair season drew to a close in November. However, we'll be back on the road in spring 2023, as we head to nextlube in Düsseldorf (18-19 April) and then on to the OilDoc Conference & Exhibition in Rosenheim (9-11 May).



## PETER WEISMANN

### MEMBER OF GESELLSCHAFT FÜR TRIBOLOGIE E.V. (GfT) FOR FIFTY YEARS

Peter Weismann was honoured at the GfT Conference in Göttingen in September 2022 for his fifty-year membership of the GfT with an award that, to date, only a handful of others have received. This means that OELCHECK's founder, who has spent the last fifty years working as a tribologist, is also one of the longest-serving members of Gesellschaft für Tribologie e.V.

During his studies focused on mechanical engineering, Peter Weismann was fascinated by lubricants and the teaching surrounding friction and wear. As part of his thesis, in 1972 he developed a test bench to recover oil in oil-mist lubrication at the former Hoesch Stahl AG plant in Dortmund. Optimised back-misting nozzles allowed the oil content to be reduced in any air escaping by more than 60 %. This represented a huge step forwards in protecting the environment and, above all, employees' well-being. Even back then, Peter took a sustainable approach to everything he did, even though talk of 'sustainability' was just as rare as 'tribology'.

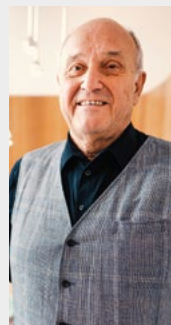
After finishing his studies, he held management positions in sales departments in the mineral oil industry before laying the foundations for OELCHECK GmbH as we know it with his wife, Barbara, in 1991. The company has since become a recognised market leader in lubricant and operating fluid analyses in Europe, and Peter is still involved at almost 75 years of age. As Technical Director (on the Advisory Board), he is a key driving force behind both OELCHECK GmbH and the sustainable use of lubricants. In October of this year, members of Alliance 90/The Greens visited the OELCHECK laboratory in Brannenburg to learn about his initiative on waste caused by changing oils following rigid specifications set by oil and machine manufacturers.



Presentation of honorary certificate during the GfT Conference 2022

However, if oils are monitored using oil analyses on a regular basis before they are changed, the oils can normally continue to be used without a second thought. Fewer unnecessary oil changes has the following benefits:

- Less need for fresh oil – and therefore lower costs
- Less oil extraction
- Fewer energy-intensive refinery processes
- Less transport of fresh and used oils
- Less repeat refining or combustion of used oils
- Significantly lower CO<sub>2</sub> emissions overall



Less can be so much more!

To protect our planet, we all need to take a critical look at our behavioural patterns and be ready for change, both in our private and professional lives. We should limit our use of the Earth's resources wherever and whenever possible. Saving lubricants and operating fluids that can still be used is just one small piece of the puzzle, but an important one nonetheless – and with far-reaching effects.

## DON'T GIVE FIRE A CHANCE!

Safety first! All OELCHECK employees recently underwent training exercises for extinguishing a fire. The training covered general safety instructions, such as what to do in the event of a fire as well as escape and rescue routes, and how to handle fire extinguishers. Employees then had a practical fire-extinguishing exercise on their agenda.

An additional evacuation exercise meant employees faced a race against time to evacuate. Staff had to leave our three buildings in an organised fashion as quickly as possible. The first members of staff arrived at the assembly point after just 25 seconds, and everyone had evacuated after 1 minute 45 seconds.



## HIGH-LEVEL VISIT FROM THE USA

Kazushige Yokoyama is Professor of Organic Chemistry and Physical Chemistry at Geneseo – The State University of New York. Founded in 1871, Geneseo is one of the leading public universities for humanities in the United States. In autumn 2022, Professor Yokoyama attended a trade conference in Germany and stopped off in Brannenburg to meet one of his former students.

Paul Weismann attended Professor Yokoyama's lectures during his chemistry studies in the United States (2000-2004) and had fond memories of him. After all, Professor Yokoyama successfully nominated Paul Weismann for the Chancellor's Award for Student Excellence in 2004. This award recognises students who have proven that they can combine academic excellence with leadership qualities, sport, professional achievements, charitable work, or the creative and performing arts. As the only European on the team, Paul captained the College Ice Hockey Team from 2002 to 2004. Both men were delighted to see each other again, catch up on old times and discuss the latest developments in the OELCHECK laboratory.



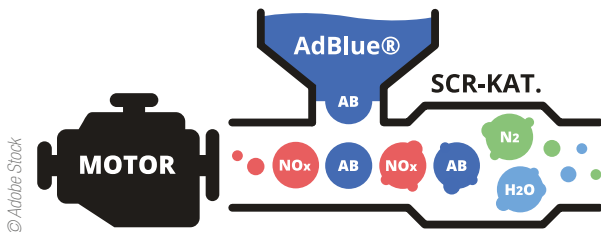
# ADBLUE

## A CLEANING AGENT WITH NO RESIDUAL ALCOHOL

It goes without saying that the idea of 32.5% urea in one litre of fluid doesn't sound appealing. AdBlue is produced purely industrially while human urine, on the other hand, is anything but clean. It contains 3-4% urea, protein, other impurities – and often, residual alcohol, too.

### Lower emissions and lower diesel consumption

However, it was precisely because of the sanitary connotations that the name AdBlue came into being. In principle, the name AdGreen would be a better description for the role of the concentrate. After all, AdBlue is key to reducing NOx emissions in the commercial vehicle sector and in diesel cars.



The urea injected into the exhaust dissolves into ammonia and very small quantities of carbon dioxide (CO<sub>2</sub>) in the hot exhaust gas. The ammonia forms a compound with nitrogen oxides in the catalytic converter when exposed to heat. This produces nitrogen and water vapour, both natural components of the atmosphere and therefore completely harmless in the exhaust gas. This reaction is known as selective catalytic reduction (SCR). For vehicles, the urea solution is the storage or transport form for ammonia, which can also be used directly to reduce NOx in the SCR catalytic converter in stationary systems.

Using this technology offers a way to reduce pollutants in diesel engines, which 'suffer' from the NOx particle trade-off due to combustion. Depending on the design, the engine generates either more NOx and fewer tiny soot (particles), or less NOx and more soot (particles). Both require an effective after-treatment process for exhaust gases. While the requirements of the Euro 5 emissions standard could still be fulfilled using internal engine measures (such as recirculating exhaust gases) and a diesel particulate filter, the emissions standard requires the use of an SCR system with AdBlue from Euro 6 onwards. Using an SCR system with AdBlue means that engines can be used differently, the soot quantity can be reduced over the entire operating range, the load points can be improved and, in addition to reducing NOx, fuel savings of up to 6 % can be achieved.

This technology reduces the nitrogen oxides in the diesel exhaust gases emitted by commercial vehicles by 85 % for Euro 5 and by 95-98 % for Euro 6 – and that's all down to an AdBlue system. If a vehicle is equipped with such a system, however, it won't run without AdBlue, as the engine won't start if AdBlue is not present. And there is also a fiscal reason for this, too, as incorrect exhaust gas after-treatment would constitute tax evasion.

Demand for AdBlue has soared to extreme levels. Whereas a diesel car consumes only 1.5 to 2.8 litres every 1,000 kilometres, a commercial vehicle requires around 5 % – and large engines even up to 10% – of the diesel requirement in AdBlue. This equates to an estimated total consumption of AdBlue of between 2.5 and 5 million litres per day in Germany alone.

### Characteristics at a glance

AdBlue is a registered trademark of the German Association of the Automobile Industry (VDA (Verband der Automobilindustrie e.V.)). Outside Germany, designations such as DEF (Diesel Exhaust Fluid) and AUS 32 (Aqueous Urea Solution) are also used.

The quality requirements for the product are set out in ISO Standard 22241-1. The pure urea content must be 32.5%. A higher concentration of 40 % (AUS 40) is required pursuant to ISO Standard 18611 for use in the large engine sector (marine or engine power plants).

Substances other than pure water and dyes are not permitted in AdBlue. Elements such as calcium and aluminium may only be present in very small traces. Under no circumstances may AdBlue be contaminated with non-ferrous metals such as zinc, copper or nickel, or elements such as sulphur, sodium or potassium. SCR catalytic converters are sensitive to what are known as catalyst poisons, and contaminated AdBlue significantly reduces a catalytic converter's service life.

The transparent liquid is non-flammable and non-toxic, but may irritate the eyes, skin and respiratory tract. You should therefore rinse your skin under plenty of water if it comes into contact with AdBlue. Furthermore, AdBlue is corrosive to steel, iron, nickel and non-ferrous metals, while paints and plastics can be damaged by prolonged exposure.

### Shelf life and storage

AdBlue's shelf life depends primarily on the temperature and the circumstances in which it is stored. AdBlue can be stored for around 18 months at a storage temperature of -5 °C to +25 °C. It should be noted, however, that prolonged storage above 25 °C may cause the urea to decompose. If AdBlue is stored at temperatures above 30 °C, its shelf life is significantly reduced.

The following apply as a general rule of thumb: The storage stability decreases by six months for every 5 °C over 30 °C. If the product is still used at some point, this may result in damage to the catalytic converter system and the engine.

AdBlue freezes from -11 °C, but can be used once it has thawed out. A word of caution, though: AdBlue expands like water in frosty conditions and may cause containers to burst.

In principle, AdBlue should be kept out of direct sunlight and not stored at extreme temperatures. The containers must be well sealed to prevent dirt from penetrating and prevent the product from concentrating due to evaporation.



## OELCHECK – ALL ANALYSES FROM A SINGLE SOURCE

OELCHECK offers all-inclusive analyses from a single source for all product groups, whether it's oils, lubricating greases, fuels, coolants or AdBlue. This means customers not only benefit from the expertise of the market leader, but also have a single point of contact for all the investigations they require.



### ADBLUE ALL-INCLUSIVE ANALYSIS KIT



AdBlue is the technical prerequisite for operating modern diesel engines with exhaust gas after-treatment systems. However, selective catalytic reduction (SCR) catalytic converters, in particular, are highly sensitive to 'contaminated or unclean AdBlue'. To avoid any potential damage, urea solutions of the highest purity and quality are required. However, these are not always available in the current climate. To ensure that operators remain on the safe side, four new OELCHECK all-inclusive analysis kits will be available for AdBlue from January 2023.

The manufacturing of AdBlue requires large quantities of ammonia. However, its production has severely slowed down since autumn 2021 due to the sharp rise in the price of natural gas. This, in turn, has meant that less urea is available for AdBlue, which in itself is becoming increasingly scarce and more expensive. As a result, AdBlue of significantly lower quality is being sold, which is contaminated with foreign substances that may damage SCR catalytic converters. The injection can also be negatively impacted by such foreign substances. Deposits on the tip will affect the spray pattern, while catalytic productivity (turn-over number (TON)) in the SCR catalytic converter will fall. This, in turn, reduces the efficiency

of the exhaust gas after-treatment system as a whole. In addition, the use or admixture of unsuitable urea (such as from fertiliser) can poison the catalytic converter.

#### Quality control is more important than ever

The strict quality requirements for AdBlue set out in ISO 22241-1 (or ISO 18611 for the marine sector) have been defined in consultation with the OEM. All operators of diesel engines with exhaust gas after-treatment systems, such as freight forwarders, municipalities, agricultural and forestry companies, railway companies, energy companies or shipping companies, benefit from complying with these requirements.

We support all operators with our new all-inclusive analyses for AdBlue, which provide valuable services for incoming goods inspections (delivery samples), for sampling campaigns for fleets and fuel depots as well as for verifying any mixtures.

#### AdBlue analysis kits at a glance

Four all-inclusive analysis kits will be available from January 2023. They vary in the scope in terms of the investigations they contain.

- The analysis kit **1AB** provides base values such as urea concentration, pH value, density and the amount of insoluble foreign substances.
- The **2AB** kit also detects elements using ICP and therefore detects potential catalyst poisons, such as coloured and/or alkali or earth alkali metals.
- The **3AB** kit also measures alkalinity.
- The all-inclusive analysis kit **4AB** is used to check all key data pursuant to ISO 22241-1, including the contents of aldehydes and biuret.



We require a quantity of 1 litre to analyse AdBlue. OELCHECK PETG sample containers are available.

Alternative vessels should not be used, and under no circumstances should metal, aluminium or glass containers be used. Metals tend to corrode and glass, with its high silicon value, is leached by AdBlue to return false lab results.

TEST RESULT/PROCEDURE	1AB	2AB	3AB	4AB
Refractive index at 20°C	✓	✓	✓	✓
Urea content	✓	✓	✓	✓
Insoluble	✓	✓	✓	✓
Density (20°C)	✓	✓	✓	✓
pH value (25°C)	✓	✓	✓	✓
Elements_Phosphate (PO <sub>4</sub> ), calcium, iron, copper, zinc, chromium, nickel, aluminium, magnesium, sodium, potassium		✓	✓	✓
Alkalinity (NH <sub>3</sub> )			✓	✓
Aldehydes				✓
Biuret				✓





### Ideally equipped for testing AdBlue

The OELCHECK laboratory is better equipped to analyse lubricants and operating fluids than almost any other lab worldwide. For years, we have specialised in researching coolants and more. AdBlue analyses now also benefit from our expertise in this field. That said, our extensive, existing equipment fleet for coolants had to be expanded to allow us to handle the increasing number of AdBlue and coolant samples in the future. In addition, we also added an entirely new device: a Perkin Elmer Lambda 365+ spectrophotometer.

We use the new spectrophotometer to determine the levels of aldehydes and biuret in the AdBlue. Both should only be present in traces. Under certain operating conditions in the catalytic converter (temperatures below 300 °C), aldehydes can react with ammonia when water is separated to form hydrocyanic acid. The release of such a toxic compound is prevented by ensuring the relevant monitoring takes place. Biuret also has negative properties. An ageing product of urea, it is – from a chemistry perspective – a dimer formed by the release of ammonia. This increases the alkalinity of the solution and can lead to it being incompatible with the fluids used in the supply circuit. In addition, when heated to above 188 °C, biuret breaks down into melamine and cyanuric acid. The latter

decomposes to become cyanic acid, another highly toxic compound whose release should be prevented, under the conditions present in the SCR catalytic converter during a violent reaction.

During the examination, the spectrophotometer uses a substance's 'colour fingerprint'. Polychromatic light is broken down into monochromatic light by a prism for the measurement to be taken. The sample to be measured is irradiated in a cuvette with monochromatic light and a quantitative statement about defined analytes can be made based on the absorbance level measured. Aldehydes, for example, form a coloured complex compound in a sulphuric acid solution by reacting with chromotropic acid, which absorbs light at 565 nm (violet). The colour complex is measured using the spectrophotometer at 565 nm and converted to an aldehyde concentration using a calibration curve. Biuret develops a purple-coloured complex with a maximum absorption of 550 nm in an alkaline solution in the presence of potassium sodium tartrate with bivalent copper.

Got any questions about the new OELCHECK all-inclusive analysis kits for AdBlue?  
Contact us by email at [sales@oelcheck.de](mailto:sales@oelcheck.de) or by phone on +49 (0)803 49 04 72 50!



### FUEL ALL-INCLUSIVE ANALYSIS KIT

OELCHECK is expanding its range with new all-inclusive analyses for almost all types of fuel. We have partnered with ASG Analytik-Service AG to bring to market all-inclusive analysis kits for petrol, synthetically produced e-fuels, EL heating oil and aviation and marine fuels from January 2023. All tests included shall be carried out pursuant to the applicable specifications set out by the DIN, ISO or ASTM standards. And this also applies to diesel, too.

By expanding our range, OELCHECK now offers all-inclusive analyses from a single source, whether you need to analyse oils, lubricating greases, fuels, coolants or AdBlue.

### Joining forces with ASG

OELCHECK continues its tradition of analysing fuels in its own laboratory in Brannenburg (Upper Bavaria). Some parameters, however, are now also being examined by our partner ASG. OELCHECK has entered into a new partnership with ASG to this end. Founded in 1992, Analytik-Service GmbH (and since 2021, Analytik-Service AG; ASG for short) is a DAkkS-accredited testing laboratory for fuel analyses based in Neusäß, near Augsburg. They have focused on both fossil fuels and renewables from the very beginning. Alongside standard and special analyses for liquid, solid and gaseous motor and heating fuels, their portfolio also includes the manufacture of test fuels and quality assurance materials.

## Fuel analysis kits at a glance

The DIN, ISO or ASTM standards define the requirements – depending on the product – for the quality of the fuels as well as for checking their quality. OELCHECK will offer comprehensive analyses for the following product groups as from January 2023:

### ■ Petrol

**Complete scope of analysis pursuant to DIN EN 228.**

For unleaded petrol. Also with the addition of up to 10 % ethanol, such as in Super E5, Super E10 and Super Plus.

### ■ Diesel fuels

**Complete scope of analysis pursuant to DIN EN 590.**

For conventional fossil diesel fuels. Also with the addition of up to 7 % biodiesel, such as in B7.

**Note:** Diesel fuel containing biodiesel may be contaminated by bacteria. These multiply in the area between the fuel and water resting at the bottom of the tank. Frequently blocked fuel filters and lines, sludge-like deposits in the tank and the loss of engine performance are typical signs of diesel being infested with bacteria. OELCHECK's additional test for contamination provides a quick, clear answer as to whether bacteria have formed in the fuel.

### ■ Synthetic diesel fuels

**Complete scope of analysis pursuant to DIN EN 15940.**

For synthetic diesel fuels HVO and GTL.

1.4 billion cars and a huge number of commercial vehicles with internal combustion engines remain on the road around the world. Even though a vehicle's largest CO<sub>2</sub> emissions throughout its life cycle occur during production, it should be powered by alternative, carbon-neutral fuels where possible. E-fuels or synthetic fuels are increasingly the fuel of choice to move the running of such vehicles away from fossil fuels. Both e-fuels and synthetic fuels are expected to play an increasingly important role in protecting the planet, and as such OELCHECK is offering all-inclusive analyses for synthetic diesel fuels.

Synthetic fuels are chemically produced or synthesised and can, in principle, originate from different sources.

E-fuels

**GTL** Gas-to-Liquids Fuel is an alternative synthetic diesel fuel produced using natural gas. It burns far cleaner than conventional diesel and emits significantly less dust and nitrogen oxide. GTL has a high cetane number (75-80) and therefore boasts higher combustibility and better combustion quality than fossil diesel. Where CO<sub>2</sub> is used instead of natural gas as a carbon source to build up the hydrocarbons, this is referred to as e-diesel. This is, in fact, carbon-neutral, as the CO<sub>2</sub> needed can be extracted from the air or separated during an industrial process. This means that no 'new' CO<sub>2</sub> is released from fossil sources, and the 'existing' CO<sub>2</sub> can be reused in a circular process.

**HVO** is based on hydrogenated vegetable oils, which are converted into hydrocarbons using a catalytic reaction with the addition of hydrogen. This is what is known as a second-generation biofuel. The result is a 100 % fossil-free diesel product made only from renewable raw materials. Using HVO, an engine's CO<sub>2</sub> emissions can be reduced by 65-90 % compared to conventional diesel.

### ■ EL heating oil

**Complete scope of analysis pursuant to DIN 51603-1.**

For conventional EL heating oil and low-sulphur EL heating oil.

### ■ AvTur

**Complete scope of analysis pursuant to ASTM D1655.**

For aviation fuel for jet aircraft, turboprop jets and helicopters.

### ■ Marine fuels / Distillate fuels

**Complete scope of analysis pursuant to ISO 8217.**

For marine fuels in classes DM or DF.

These middle distillates are comparable to EL heating oil and diesel fuel. They are used in engines on cruise ships and inland waterway vessels.

### ■ Marine fuels / Residual fuels

**Complete scope of analysis pursuant to ISO 8217.**

For marine fuels of the residual fuel type.

Any leftover fuel from refinery processes is referred to as residual or heavy fuel oil. These residual fuels are mainly used in large marine engines.

## Sample quantities, containers and returns

The fuel all-inclusive analysis kits come with aluminium sample bottles. Each container has a capacity of one litre. However, two litres are required for running a petrol analysis. These analysis kits therefore go out to customers with two one-litre bottles.

### It is essential to observe the following when filling:

#### Please fill the sample bottles to the brim!

There must be no free space present to allow the fuel to release vapours in the aluminium bottle. If space is present, we will be unable to determine the vapour pressure correctly in the laboratory.



The new fuel all-inclusive analysis kits are valuable tools for incoming goods and overall quality control. They can also detect any contamination that may affect the operation of filters, injectors and other components. In practical terms, too, the principle of getting all your analysis kits from a single source simplifies the invoicing modalities and helps you maintain a clear overview of your costs.





## ULTRA ALL-INCLUSIVE ANALYSIS KIT

### FOR FAULTS IN THE COOLING SYSTEM

Aqueous coolants are extremely important in ensuring the safe operation of engines and many other systems. They are monitored with OELCHECK's unique, trusted all-inclusive analysis kits. When researching in the laboratory, the focus lies on the remaining performance potential of the respective coolant and whether any indications of damage to the cooling system are visible.

With the new Ultra all-inclusive analysis kit, we now have an investigation package available for even the most peculiar of issues. It offers highly detailed information about the state of a coolant and the cooling system – and is a particularly valuable tool in searching for the root cause when faults or damage have occurred. OELCHECK also recommends the new Ultra all-inclusive analysis kit when developing cooling systems, for test benches and when accepting or handing over devices.



The new Ultra all-inclusive analysis kit for coolants includes all test procedures currently used in the existing kits and has been supplemented with the following six procedures:

#### + Microscopic particle counting

The number of insoluble particles offers an indicator of the level of contamination in a system from the outside, but also sheds light on erosion or cavitation from the inside. Photographs of the particles allow possible causes to be identified more easily. The additional information on particle size provides valuable data when optimising filtration.

#### + Filtered element analysis

In the case of heavily contaminated coolant samples, OELCHECK measures the elements using filtration at 0.45 µm. This not only allows you to protect your test devices, but is also a handy additional test for unfiltered measurements of smaller impurities and, in particular, turbid coolants. While the unfiltered measurement detects undissolved, but suspended tiny particles (i.e. < 5 µm), the filtered measurement (0.45 µm) establishes only the components dissolved in the coolant. The results can provide additional insight into the additives used, the type of chemical bonds or the origin of the elements.

#### + Reserve alkalinity

The pH value and reserve alkalinity take a coolant's acid-base balance into account. The pH value describes the current state, while reserve alkalinity allows us a glimpse into the future, providing information about the quantity of acid that the additive system can still neutralise. However, the assessment of reserve alkalinity depends heavily on the additive technology and the materials used.

#### + Water content according to Karl Fischer

As a rule of thumb, a coolant's glycol content is calculated using the refractive index. It is assumed that the remaining part is water. However, this does not apply if a coolant contains very large quantities of additives or additives of glycerin, or if it is a mixture of different types of glycol or mixed with other aqueous fluids (such as AdBlue or alcohol derivatives). In that case, it is best to establish the water value using the Karl Fischer method to take an unknown factor out of play.

#### + Contamination

Although contamination in coolants is relatively rare, it does occur every so often. The conditions for growth are often ideal – low-temperature circuits are rarely hot enough to boil everything in sight, but are warm enough to generate growth. This results in the formation of a biofilm on surfaces in circulation, which can dissolve and lead to turbidity of the fluid. In the worst case, deposits form in the filters or on heat-transfer surfaces, and the formation of acid and subsequent corrosion may also occur. This could then lead to a system failure.

#### + PQ index

The Particle Quantifier index provides information about magnetisable iron wear particles in the entire sample. These originate, for example, from production residues, damage to moving parts (such as the coolant pump), and from external contamination or wear due to cavitation.

#### Top tip: Premium coolant analysis kit for e-mobility

Electric cars need coolants, too. They are crucial in fast-charging vehicles, in particular. Based on a mixture of glycol and water, these coolants are somewhat similar to the conventional coolants used in cars with internal combustion engines.

Coolants with little or no conductivity are often used, and they are usually based on organic additives. These organic acid technology (OAT) coolants contain corrosion inhibitors based on organic acids.

Any changes in these organic additives should be controlled. As a result, OELCHECK recommends the Premium all-inclusive analysis kit for analysing coolants from electric vehicles and monitoring the performance of the key coolant operating fluid.

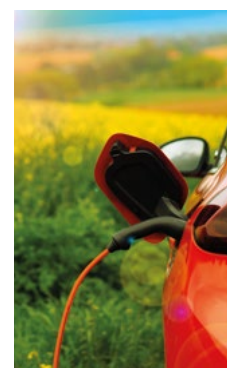




Image of Mireo Plus H Bayern (Photo: Hydrogen train. Copyright Siemens Mobility GmbH)

## ENJOY CLIMATE- AND ENVIRONMENTALLY FRIENDLY TRAVEL WITH BAYERISCHE REGIOBAHN

**Bayerische Regiobahn (BRB) transports passengers around the most picturesque regions of Bavaria and contributes to ensuring these regions remain there for a long time to come. In some areas of the large network, Bayerische Regiobahn has already taken green steps and is using electric railcars. On track sections still awaiting electrification, however, Bayerische Regiobahn mainly uses 'lightweight, innovative local public transport railcars' (LINT). Powered by diesel fuel, these latest-generation vehicles emit up to 90 % less nitrogen oxide and particulate emissions than previous models. The cooling circuit in a LINT railcar is responsible for keeping the engine and the transmission running. Coolant analyses make sure the circuit and any connected units remain operational and free from issues over a long period of time.**

As rail is the most environmentally friendly mode of motorised transport, neither the transport revolution nor the climate transition will work if the rail companies are not on board. The transport sector is expected to reduce its total emissions by 48.5 % by 2030. Bayerische Regiobahn is already taking steps to reduce emissions through targeted measures.

Today, 35 environmentally friendly electric railcars are in service on the BRB's Chiemgau-Isntal network. What's more, the diesel railcar fleet on the Oberland network was successfully replaced in June 2020 – with the switch from the former Integral to the new LINT 54 vehicles being completed almost five years ahead of schedule. This reduced nitrogen oxide and particulate emissions from diesel railcars by 90 %. The two-carriage trains can hold 125 passengers each and allow passengers to travel in comfort. When higher passenger volumes are expected, several units can be coupled together with ease. Three 390 kW diesel engines power a LINT 54 up to its top speed of 140 km/h. The engines can be engaged or disengaged as required, depending on the terrain on the route. The Oberland region, for example, requires all three engines to be engaged due to its large number of uphill gradients. Yet when the train is travelling on a level track, two engines are perfectly adequate for providing sufficient power, resulting in less diesel fuel being consumed and lower emissions. Drivers at Bayerische Regiobahn also receive training in energy-efficient driving right from the start. As an example, engines are not left running when preparing the diesel fleet for use in the morning, as the compressed air required for operation is generated by a stationary supply system. This reduces the consumption of diesel fuel as well as the emissions and noise pollution even further. Protection against unnecessary noise is particularly important in the Bavarian Oberland, with its winding routes. Bayerische Regiobahn not only provides greater noise protection with optimised flange lubrication, but also installs special rings on the vehicles' wheel sets to absorb noise.

Delays can happen, but should be avoided if at all possible. That's why railway operators are always keen to discover any technical deficiencies in advance where possible. Bayerische Regiobahn has used OELCHECK all-inclusive analysis kits for coolants for several years now, since unexpected defects were detected in the cooling

systems on a fleet of new LINT railcars. According to the railway manufacturer's specifications, the coolant should be replaced every three years. However, wear and corrosion had occurred even before the three-year period had expired, while some radiators were also leaking.



OELCHECK examined the coolants from a range of cooling systems in the lab, looking at the following:

- Condition of the coolants and their ageing
- Water quality
- Content of degradation products and changes to additives
- Content of any impurities

After completing the analyses, it was suspected that copper ions had been released from the cooling water lines, corroding the aluminium transmission heat exchanger.

Following consultations with the OEM, the transmission heat exchangers were converted to stainless steel. In addition, the cooling systems were filled with a silicate-free agent to protect the radiators, in which organic salts act against any corrosion. The existing LINT railcars will also be converted to use the same protective agent. OELCHECK laboratory analyses will support the conversion process. In taking this action, Bayerische Regiobahn ensures the continued operation of its cooling systems, engines and transmissions.

### Bayerische Regiobahn – part of Transdev GmbH

Bayerische Regiobahn (BRB) is part of Transdev GmbH, based in Berlin. With more than 7,400 employees and a turnover of around €1.1 billion, it is the largest private mobility provider in Germany. All subsidiaries in the rail and bus sector transport more than 133 million passengers to their destinations each year safely and in comfort using modern vehicles. Transdev Germany is part of the international Transdev Group. The Paris-based mobility provider is active in 18 countries across five continents. The shareholders are Caisse des Dépôts and the Rethmann Group.

See [www.brb.de](http://www.brb.de) for more information.



**By the way: OELCHECK also analyses engine oils for rail vehicles, too!**





## FAQ



## TRIBOLOGISTS AT OELCHECK

OELCHECK tribologists evaluate and report on the results of their lubricant and operating fluid analyses. But what is a tribologist, exactly? And what specific knowledge do OELCHECK tribologists need to have to do their job?



The multidisciplinary science of tribology – known as lubrication technology until 1970 – is a branch of mechanical engineering in which everything revolves around friction, wear and lubrication. As such, OELCHECK tribologists and lubrication technicians not only have extensive specialist knowledge of the materials used to build machines and engines, but they also understand the relationships of lubricants from a physics and chemistry perspective. As builders of machines, they are also familiar with a wide range of production processes and the systems used, as well as their special operating conditions.

The term 'tribology' is derived from the Greek and means 'knowledge of friction'. Lubricants are used to reduce friction and the resulting wear. However, lubricants play more roles than simply protecting the contact surfaces and ensuring they are as low-friction and wear-resistant as possible.

Friction, wear and lubrication are inseparably linked. Based on their experience in practice, the Egyptians used water, animal fats and olive oil as lubricants when building the pyramids. Leonardo da Vinci (1452-1519) is regarded as the founder of modern tribology and defined the laws of dry friction – and therefore the laws of friction.

**Conclusion:** Tribology earns its place in the climate change discussion and is fascinating from a scientific perspective. It's a particularly exciting time to be an OELCHECK tribologist!

## Tribology – Now more important than ever

Far too little is known about the important role that tribology plays today in the fight against wasting energy and therefore against global warming. To move mechanical components in machines and engines, the friction between them must be removed using energy. Friction – and therefore energy consumption and the heating of components and oil – is already reduced through improved roughness of the paired surfaces, lower viscosity and optimised additives in modern lubricants. However, their full potential is far from being realised. Around a fifth of the world's total energy consumption is still used to overcome friction so components can run smoothly.

Finding ways to minimise friction and wear through new technologies in tribology is therefore crucial in moving towards a greener and more sustainable world. The application of tribology in technology extends to all areas of the development, design, production and maintenance of mechanical motion systems in a whole host of industries and economic sectors. Tribology helps to lower energy consumption and temperatures, reducing the cost of maintaining and replacing lubricants and machine components. Tribology can therefore have a huge economic and commercial impact.

Join the OELCHECK team! See our current vacancies at [oelcheck.de](http://oelcheck.de).



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

## Wir suchen Sie

## TRIBOLOGE (M/W/D) Arbeitsort: Brannenburg

## Ihr Anforderungsprofil

- Abgeschlossenes technisches Studium im Bereich Maschinenbau, Mechatronik, Verfahrenstechnik oder einer vergleichbaren Fachrichtung
- Fundierte Kenntnisse über Schmier- und Betriebsstoffe sowie deren Anwendung und idealerweise auch Analyse
- Hohes Maß an Kundenorientierung, Empathie sowie Kommunikationsfähigkeit
- Selbstständige, zuverlässige Arbeitsweise, Einsatzbereitschaft, Eigeninitiative und Flexibilität
- Sehr gute Englischkenntnisse in Wort und Schrift
- Sicherer Umgang mit PC-Standardanwendungen

## Wir freuen uns auf Sie!

## Ihr Aufgabengebiet

- Sie beurteilen und kommentieren die in unserem Labor ermittelten Untersuchungsergebnisse und erstellen präzise Diagnosen für Schmier- und Betriebsstoffe.
- Sie setzen Ihr Expertenwissen bei der technischen Kundenberatung und bei diversen Sonderprojekten ein.

## Unser Angebot

- Aufgeschlossenes, kollegiales Team und modernste Arbeitsplätze
- Hohes Maß an persönlicher Selbstständigkeit
- Faire, leistungsgerechte Vergütung
- Eigene Cafeteria mit Fresh Cooking
- Unvergessliche Firmenevents
- Firmeneigenes Fitnessstudio mit Sportkursen
- Betriebliche Altersvorsorge

Senden Sie Ihre aussagekräftigen Bewerbungsunterlagen an unseren Geschäftsführer Paul Weismann ([bewerbung@oelcheck.de](mailto:bewerbung@oelcheck.de))



# 2023 TRAINING DATES

## Current dates

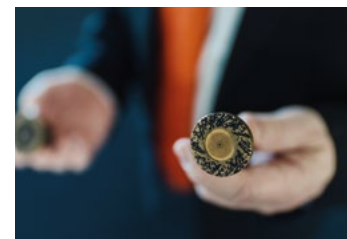
17-18/01/23	Lubrication and oil monitoring for stationary gas engines	From €720
24-26/01/23	Lubrication and oil monitoring for turbines/turbo-compressors	From €1,050
31/01-02/02	Fundamentals of Lubricant Application I Part 1 of the lubricant expert certification	From €1,050
07-08/02/23	Damage to Bearings, Gears and Motors – Causes and Solutions Part 4 of the lubricant expert certification	From €720
01-02/03/23	Online Oil Sensors – A practical seminar	From €720
07-09/03/23	Lubrication and oil monitoring for gears	From €1,050
14-15/03/23	Fundamentals of Lubricant Application II Part 2 of the lubricant expert certification	From €720
16-17/03/23	Lubrication and oil monitoring for combustion engines	From €720
18-19/04/23	Professional Lubricant Management Part 3 of the lubricant expert certification	From €720
24-27/04/23	Expert Knowledge for Lubricant Professionals – CLS certificate course	€1,320
25/05/23	Coolant – the underestimated operating fluid	From €450
13-15/06/23	Lubrication and oil monitoring for hydraulics	From €1,050
20-21/09/23	Damage to Bearings, Gears and Motors – Causes and Solutions Part 4 of the lubricant expert certification	From €720
26-27/09/23	Lubricating greases – properties, selection and monitoring	From €720

## Your contact for further training:

OilDoc GmbH  
Petra Bots, Rüdiger Krethe  
Kerschelweg 29  
83098 Brannenburg - GERMANY  
Tel. +49 (0)803 49 04 77 00  
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](https://oildoc.com/seminare)



## Highly qualified with an OilDoc Certification Courses

Get one step ahead with an additional qualification! At the OilDoc Academy, you can acquire valuable specialist knowledge and document your achievements with **recognised certificates!**



### Lubrication – Fundamentals, Applications and In Practice

#### Become a certified lubricant expert!

Acquire comprehensive fundamental and practical knowledge on lubrication and lubricants.

This course is suitable for both beginners and experienced practitioners. All four modules are offered on a repeat basis – allowing you to get started at any time. A new series will be launched in January 2023, which can be completed in September. You can also book all four modules individually, of course, but it's certainly worth following all four units.



At the end of the training course, you will take a multiple-choice exam, receive a high-quality certificate after passing the test, and be able to use the official "Professional Lubricant Consultant" logo. The certificate documents your in-depth knowledge of lubrication and lubricants. As a Professional Lubricant Consultant, you are well on your way to becoming an expert and passing the CLS certification examination in the future.

31/01-02/02/23	Module 1: Fundamentals of Lubricant Application I
14-15/02/23	Module 2: Fundamentals of Lubricant Application II
18-19/04/23	Module 3: Professional Lubricant Management
20-21/09/23	Module 4: Damage to Bearings, Gears and Motors – Causes and Solutions



### Expert knowledge for lubricant professionals Certified Lubrication Specialist (CLS) certification

A Certified Lubrication Specialist (CLS) holds the most prestigious certificate on an international level in the lubrication industry. This means the holder has extensive knowledge of lubrication-related relationships as well as in-depth knowledge of lubricant applications.

Our Expert Knowledge for Lubricant Professionals course provides the ideal preparation for gaining the certificate. It goes far beyond the scope of traditional lubricant seminars and requires participants to have in-depth knowledge. The seminar offers an integrated presentation of the technical applications of lubricants and lubrication technology, as well as monitoring and oil maintenance.

19-22/06/23 "Expert Knowledge for Lubricant Professionals" certification course (4 days) **in English**  
Certification examination via an online portal on your preferred date.





**OilDoc**  
Conference & Exhibition

May 9-11, 2023  
Bavaria · Germany

Lubricants  
Maintenance  
Condition Monitoring

Europe's trendsetting event on the themes of lubrication, maintenance and condition monitoring will once again take place as a live, face-to-face event in Rosenheim from May 9-11, 2023!

A whole host of exciting and innovative presentations have reached us in recent months. The international programme committee is currently compiling the seminar programme, which is due to be published in January 2023. New technologies and global trends, such as sustainability, e-mobility 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!

**Highlights:**

- + Two-day intensive conference featuring over 90 lectures from top-class speakers in up to four parallel sessions
- + An exhibition running alongside featuring 40+ international exhibitors
- + A come together reception for attendees on May 9, 2023
- + A big Bavarian Evening on May 10, 2023
- + Practical workshops and/or excursions on May 11, 2023
- + A professional event app for networking and creating your personal event schedule

**Sign up now and enjoy an Early Bird discount!**

The Early Bird fee of just 899 € (excl. VAT) applies until March 31, 2023 (usual fee: 995 € (excl. VAT)).



→ Don't forget to book your hotel in good time!

**Key Themes**

**Condition Monitoring & Maintenance 4.0**  
Gears • Turbines and turbomachinery • Engines • Hydraulic systems • Roller and slide bearings • Special applications

**Fluid Condition Monitoring**  
Oil, grease and anti-freeze analyses • Oil sensors • On-site measurements • Problem-solving and case studies • Digitalisation • Artificial intelligence

**Asset & Fluid Management**  
Sustainability • System and lubricant management • Lubrication procedures, equipment and systems

**Tribology – Research in Practice**  
Friction and wear • Materials, surfaces and contact mechanisms • Tribometry

**Lubricants – Current Developments**  
Base oils • Additives • Lubricating greases and pastes • Solid lubricants

**Electromobility and Lubrication**  
Lubricants for e-mobiles • Concepts and solutions • Energy efficiency

**Lubricants – Design to Application**  
Engines • Gears • Hydraulic systems • Bearings • Turbines • Wind turbines • Energy-efficient lubrication • Sustainability

The following exhibitors have already signed up (State: December 2022):


## OUR ADVANTAGES AT A GLANCE



Quality



Speed



Expertise



Experience



Customer focus



Innovation



Individuality



Independence



All-inclusive analysis kit



International

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