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OELCHECKER

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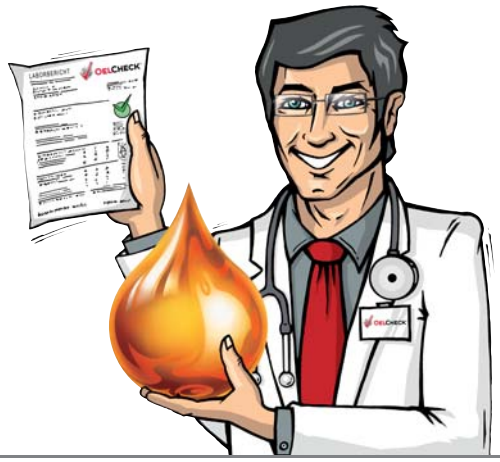


Hansa-Flex – Over 300,000 Customers Always Close By

Specialised Hansa-Flex assembly teams and the quick hydraulic service Flexxpress are always on call with fully equipped service vehicles.

„Who is the most reliable supplier of services in the fluid technology sector?“ This question was recently asked during a large customer survey by one of the most well known manufacturers of hydraulics components. And as expected, most of those asked voted for Hansa-Flex.

Started in 1962 as a supplier of replacement parts for hydraulic hose lines, today Hansa-Flex is Europe's leading supplier of fluid technology systems and a value-adding partner for high-performing companies of all sizes. Over 300,000 customers value the wide range of products and excellent service offered by the German company.

Hardly any commercial operations would work without fluid technology. Without it, many power, signal and energy transmission facilities would not be able to operate. Hansa-Flex knows that the customer's machines, facilities and systems must work safely, reliably, and around the clock. Availability counts, and downtime costs money. Absolute reliability, customer proximity and expert knowledge is critical. The services offered by the company are diverse and complex. Fluid service and monitoring of hydraulic liquids play a special role.

Hydraulic fluids handle a whole range of tasks. They transfer forces, perform control functions, lubricate moving parts, protect against wear and corrosion, provide cooling, dampen vibrations and remove possible contaminants. But the performance of modern hydraulic systems is increasing, and the systems themselves are getting smaller. The increase in operating pressures is made possible not only thanks to optimised pump technology, but also through decreased gap tolerances, better surface finishes and a more fine-tuned valve technology, letting components work even more efficiently and precisely. Lower tank volumes do make modern equipment more compact, but they also increase circulation rates. This means fluids must be regarded with a significantly more critical eye than before.

Check-up

The oil and gas multinational company Royal Dutch Shell buys the BG Group, which is active in the gas business, from Great Britain for €60 million. China's largest chemical company, the China National Chemical Corporation (ChemChina) is well on the way to taking over at least 65 percent of the shares of Pirelli. This and other multi-million dollar deals are commonplace today. International integration is making progress - and OELCHECK is in contact with many of the companies on multiple levels at once. It is important to know the relationships and contexts, and always adapt to changing circumstances and take them into consideration in our own communication systems. Not an easy task with 20,000 customers! But the fact that OELCHECK is well organised and has clear structures puts us in good stead. As a company which has been family owned since it was founded, we can adapt quickly and flexibly to new situations and demands thanks to short decision paths.

This is appreciated by our customers from all sectors who make use of OELCHECK lubricant analyses and many of the other services we offer. Alongside this, almost all well-known lubricant manufacturers operate dedicated laboratories where they examine their own products for customers, sometimes even for free. However, this is not one of their main services. By contrast, OELCHECK is the absolute specialist. As a medium-sized company, we are active in the same sector as the world's largest mineral oil companies. They acknowledge our achievements and expertise. Many of them regularly swap ideas with us or make use of the services we offer. Our complete independence is a crucial factor in this respect. Our network is international and encompasses all sectors - yet OELCHECK is not closely intertwined with any other companies.

Yours, Barbara Weismann

Hansa-Flex Fluid Service and Sensor Technology

For continuous monitoring of the hydraulic fluids, Hansa-Flex focusses on the latest sensor technology. Special sensors and test devices are an integral part of the product range. These allow the oil level, temperature, pressure and possible exposure to water to be checked. Probably the greatest danger for hydraulic systems is the fluid becoming contaminated. Almost 75 percent of unplanned downtime and wear-related problems are caused by contaminated hydraulic oil. With good reason, Hansa-Flex therefore recommends installing inline particle sensors for continuous monitoring of even difficult to reach measuring points. In addition, a particle counting device allows purity classes according to ISO and SAE to be measured on the spot.

OELCHECK Analyses – the perfect addition

Sensors and quick analysis devices are a sensible way to expand condition monitoring, especially for large systems. Sudden problems are identified quickly, most notably thanks to continuous monitoring of the trend's course. But what should be done if the sensor gives an alarm signal? Is the sensor correctly validated? Were the system and the lubricant in proper working order beforehand? These questions can often not be answered in detail based on a single value from the sensor. This is where the advantages of oil analysis in a laboratory become apparent. A classic laboratory analysis combines a range of single values and evaluates them in all of their complexity. The current results of laboratory analysis in combination with the sensor results allow the best of both worlds to be united as events unfold.

For this reason, Hansa-Flex also uses lubricant analyses from OELCHECK in a targeted manner to check and assess the quality of fresh oils, as well as for clarification of problematic cases. Another important area is that of preventative examinations, which are used to analyse trends in order to create a ‚patient file'. This concerns lubricant analyses which are performed at regular intervals and can be used in relation to previous analyses to observe and comment on changes. They do not just indicate when the oil needs changing, but also discover wear and any imminent damage, thereby optimising maintenance costs.

OELCHECK offers various bespoke analysis sets for examining hydraulic fluids. Our analysis set 2 contains a range of tests that are usually sufficient for routine monitoring of small to medium systems. This includes monitoring wear metals, additives, possible contaminants and the current state of the oil. A count of the particles is also given according to ISO 4406 and SAE 4059 which provides information on the degree of contamination. For systems with a large oil volume and for circulating oils, analysis set 5 is the first choice. This set additionally includes a very close look at the aging process of the oil in the OELCHECK laboratory. Special sets are also available for biodegradable and fire resistant fluids.

Hansa-Flex's principle for success is called „system partnership". It is the breadth and depth of the products and services which make the company a valued partner today.

www.hansa-flex.com

Hansa-Flex is Europe's leading supplier of fluid technology systems and is always close to its customers, wherever they may be.

Easy return-service for lubricant samples

Starting immediately, all OELCHECK analysis kits delivered in Germany will receive return orders from our logistics partner UPS. This allows you to send your lubricant samples to the OELCHECK laboratory in Brannenburg with minimum effort and without additional costs, provided that the pick-up address is in Germany.

We receive up to 1,800 samples of lubricant daily. We were therefore able to come to an agreement with our logistics partner UPS so that our customers in **Germany** are able to send the samples free of charge.

Processing them is quite simple. Each of our analysis sets contains an information flyer about how it works. Simply stick the UPS return label onto the front of the OELCHECK shipping envelope, or onto the shipping box if sending multiple samples. You then register the shipment with UPS via telephone or online. You can of course also drop off the samples at one of the 2,200 UPS pick-up points. The general turnaround time is one working day. The UPS tracking numbers will give you information about the current status of the shipment.

OELCHECK customers **abroad** also benefit from the new return-service with UPS. Customers worldwide can send all lubricant samples inexpensively to Brannenburg for easy processing. Samples from the EU usually only need one day, international samples generally have a turnaround of three working days.

The moderate costs for this service can be integrated into the price of the OELCHECK analysis kits. Please contact us for an offer to suit your needs.
akv@oelcheck.de,
Tel. +49 8034-9047-250

Better safety for gas engines and chlorine gas compressors – keeping track of chlorine with a new ICP device

SPECTRO-ARCOS finds over 30 elements

Starting immediately and without extra charges, OELCHECK reveals the total chlorine content during examinations of gas engine oils and compressors. Other gases such as sewage gas, biogas or process gases in the chemical industry, unlike natural gas or liquid gas, can contain chlorine or silicon impurities. If these contaminants get into the oil via fuel or compression gases, the chlorine can cause corrosive wear, or the silicon abrasive wear.

The OELCHECK lab report will show the subsequently increased wear values. In order to explain their cause, silicon has always been checked as standard in the OELCHECK laboratory. But we now measure the total chlorine content. With the help of the optimised OELCHECK analyses for gas engines and compressors, we will provide you with comprehensive information on the causes of possible engine damage so that you can take countermeasures quickly. Whilst the silicon content has always been measured, the chlorine content could only be determined in exceptional cases using expensive and complex processes. In addition to the three devices used to determine elements so far, at the end of 2014 we installed a latest generation ICP device in our laboratory. An expensive, but accurate investment. The new ICP device measures the concentration of more than 30 elements and simultaneously detects the total chlorine content with precision using its specially designed optics and CCD chip.

Whilst the total chlorine value does not allow dangerous water-soluble chlorides, which primarily present the risk of corrosion, to be distinguished from innocuous chlorine compounds, by observing the trend, it is easy to determine whether the chlorine content has changed dangerously.

Although the risk potential of chlorine is known, gas engine and oil manufacturers have so far not set a limit value for chlorine. Based on our experience, we decided to quote the total chlorine content in the lab report if the value exceeds 30 mg/kg. For extremely high values above 800 mg/kg, we will point out possible problems which could occur in connection with chlorides. At the same time, we will also give particular feedback on the values for wear metals (such as iron, copper, aluminium, lead and tin) in connection with altered acid values (AN, BN, i-pH) with regard to corrosion-induced changes.

For turbo compressors which are operated as chlorine gas compressors, the possibility of chlorine entering the oil circulation cannot be ruled out. For the analysis of turbine oils used in compressors such as these, determining the chlorine content also offers clues about dangerous chlorine contamination.

Less is more – OELCHECK determines loss due to evaporation

More than half of all lubricants produced are for lubricating engines. During use, part of the engine oil is led over the crankcase ventilation system and burned along with the air-fuel mixture. Additionally, over 10 percent of the oil evaporates during higher oil sump temperatures and therefore cannot be recycled later on. The lower the loss of oil due to evaporation, the lower the oil consumption and the more stable its viscosity characteristics. With increasing viscosity, on the other hand, fuel consumption usually also increases. Moreover, lubricant components can form deposits in catalytic converters and diesel particulate filters.

Due to the tendency of lubricants to give off volatile constituents at high temperatures, loss due to evaporation plays an important role in determining the burden on the environment in several ways.

The low-viscosity 0W or 5W engine oils required today in view of reduced exhaust gas values can only be achieved using thinner, usually fully synthetic base oils. Since their short-chain molecules boil more easily, the OEM approvals and ACEA specifications set a limit on the maximum permitted evaporation loss for engine oils: The loss due to evaporation of a new engine oil must therefore be indicated. This is also an indication of the engine oil's quality. The higher it is, the more oil is consumed. But loss due to evaporation is a deciding factor for many other lubricants too, such as high-temperature chain oils.

The loss due to evaporation can be determined using the Noack method in accordance with DIN 51581-1 or ASTM D5800. This determines the oil content in % which evaporates in 60 minutes from 65 grammes of oil at a temperature of 250°C.

OELCHECK determines the same loss due to evaporation standardised in accordance with DIN 51581-2 using a gas chromatograph. In doing so, the oil is broken down into its constituent parts. The oil's components are separated in a separation column in order of increasing boiling temperature. After this, the percentage share of the components that evaporate at a temperature of 250°C is determined from the total quantity of all of the components.

Gear and industrial oils for contaminants,

		Wear						
Element	Sign	Warning value mobile	Warning value stationary	mostly in connection with	Possible causes	typical range	mostly in connection with	
Aluminium	Al	45	20	Si, Cu, Mg	Worm wheels (aluminium-bronze), clutches, oil pumps, pressure or aluminium cast parts, housings, aluminium sealing rings	<50	Si	Aluminium
Antimony*	Sb	<7	<3	Sn, Pb, Cu	Hard lead, zinc alloys on bearings, white metal bearings, solder (soft solder)	2		No typical
Barium	Ba	2	2		No typical wear element in gears	<2000	P, Zn	Friction-re industrial g
Beryllium*	Be	3	3	Al, Cu	Lightweight construction parts made from sintered metal, beryllium-copper alloy	2		No typical
Lead	Pb	20	10	Cu, Zn, Sb	Plain bearing running surface, lead bronze, synchroniser rings, coats of paint	<3		Reduces fr (previously
Boron	B	12	12	Fe	Ceramic components, insulation bodies, brake and clutch linings	<400		Friction-re
Cadmium*	Cd	2	2		No typical wear element in gears	2		No typical
Chrome	Cr	20	10	Fe, Ni, Mn, Mo	Roller bearings, alloy constituents of high-strength gearwheels, multiple disc clutches	2		No typical
Chlorine*	Cl	2	2		No typical wear element in gears	<30		Chlorinated lubricants
Iron	Fe	490	150	Cu, Ni, Cr, Mn, Mo	Gearwheels, rolling bearings, oil pumps, steel lamina couplings, cast housings, shafts, radial serrations, planetary carriers	2		No typical
Potassium	K	2	2		No typical wear element in gears	2		No typical
Calcium	Ca	2	2		No typical wear element in gears	<4000	P,S	Detergent engine oils
Cobalt*	Co	2	2		No typical wear element in gears	2		No typical
Copper	Cu	75	40	Zn, Pb, Cu	Bronze worm wheels, friction bearings, roller bearing cages, oil coolers, synchroniser rings, brass	2		No typical
Lithium*	Li	2	2		No typical wear element in gears	2		No typical
Magnesium	Mg	9	4	Al	Aluminium die-cast alloy	<2000		Detergent engine oils
Manganese	Mn	20	20	Fe, Cr, Ni, Cu	Roller bearings, pumps, general high-alloyed steels	2		No typical
Molybdenum	Mo	14	8	Fe, Cr, Ni	Constituent of high-strength alloys e.g. for hardened gearwheels or roller bearing steel	<2000	P,S,Ca,Mg	Molybdenu
Sodium	Na	2	2		No typical wear element in gears	<200		Non-ferrou
Nickel	Ni	17	5		Constituents of high-strength alloys e.g. for hardened gear wheels or roller bearing steel, nickel-plated components	2		No typical
Phosphorus	P	2	2		Phosphated (hardened) surfaces, generally covering with P as additive	<2000	S	Wear and c
Sulphur	S	2	2		No typical wear element in gears	up to 3%	P	Additives t oils
Silver*	Ag	4	4		Plain bearing, silver solder	2		No typical
Silicon	Si	23	9	Al	Aluminium die-cast parts, e.g. housings	<40		Anti-foami
Titanium*	Ti	3	3	Fe	Alloy constituent of high-strength steels	2		No typical
Vanadium*	V	2	2		No typical wear element in gears	2		No typical
Tungsten*	W	2	2		No typical wear element in gears	2		No typical
Zinc	Zn	41	78	Cu	Roller bearing cages, coolers, zinc-coated components (e.g. filter support cores), brass components	<1500		Wear-redu resistance
Tin	Sn	20	20		Plain bearing	<2		No typical

The „mobile" warning values apply to vehicle gears and to oil fillings from mobile systems. The „stationary" warning values refer to oils from gears in stationary industrial systems.
Values above or below the warning values do not always mean that the oil should be changed.
Elements marked with * appear in the standard lab report for gear oils only for values above 1 mg/kg (1 ppm.)

Elements in gear and industrial oils

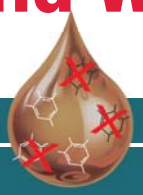
In the Winter 2014 OELCHECKER (download at www.oelcheck.de), we took a close look at the additive, contaminant and wear elements in hydraulic oil samples. In this edition, we look in detail at the origin of these elements which can be found in gear oils and most industrial lubricants, as well as their typical warning values. The values are based on data from over 650,000 samples of used oil from industrial gears of all types which were examined in the OELCHECK laboratory.

Of the 29 elements in the table, we state 18 in the lab report as standard, as well as any with values higher than 1 mg/kg. We also investigate unusual or difficult-to-determine elements such as sulphur, lithium, chlorine or manganese. OELCHECK is the only laboratory to standardise its ICP and RDE devices with its own specially designed calibrating oils. However, some metals can only be determined precisely up to a concentration of 5,000 mg/kg.

Interpreting the values

The diagnostic engineer assesses the interplay of all of the values and also takes into account the customer's specific operating conditions. The limit values and tolerances published here can therefore

– typical warning values additives and wear



Additive	Contaminant		
Possible causes	Warning value	mostly in connection with	Possible causes
silicate-based nanoparticle additive	<20	Si	Dust from mines, e.g. bauxite
additive components for gear oil	<10	Li, Ca	Contamination due to lubricating grease
ducing additive (friction modifier) in automatic gear oils, unusual for gear oils	<15		Contaminant due to greases and pastes containing barium, blending with an ATF
additive components for gear oil	2		Unusual as a contaminant
iction (friction modifier) used as a wear protector, no longer commonplace today)	<3		Blending with leaded grease, leaded paint coats
ducing additive (friction modifier)	<10	Na, K	Cooling-grease and cooling-fluid supplement, fluxing agent for solder joints, detergent supplement, pesticide
additive components for gear oil	3	Cu, Sn, V	Dye pigments, disc brake lubricant (cadmium poses a danger to health and has been banned in many applications in the EU since 2011)
additive components for gear oil	2		Unusual as a contaminant
d additives to protect against wear are only rarely used today as cooling	<30	Fe, Na, K	Seawater, table salt, chlorine gas, PCB, chlorinated refrigerants, supplement in some cutting fluids
additive components for gear oil	2		Additive made from lubricant grease or assembly paste
additive components for gear oil		Na	Gritting salt, synthetic fertiliser, from tap water, sea salt, salty air, coolant (glycol), metal working oil
(cleaning) and dispersent (for keeping in suspension) additives, UTTO,	<15	Na, K, Si	From hard (cooling) water, engine oils, mineral dust (e.g. dolomite), from hydraulic oils, calcium saponified greases
additive components for gear oil	2		Unusual as a contaminant
additive components for gear oil	11	Fe, Pb, Al	Abrasion of friction lining of multiple disc clutch or brakes, from plumping pipes, sealing rings, synchronising sealing rings, high temperature paste
additive components for gear oil	20	Ca, Zn, P	Thickener of multipurpose grease, assembly paste
(cleaning) and dispersent (for keeping in suspension) additives, UTTO,	<15	Ca, Zn, P	Blending with engine oil, tap or waste water, also possible from hydraulic oils, or alloy component constituents
additive components for gear oil	2		Unusual as a contaminant
m-organic additives, for gear oils with PD effect, MoS2	<15	Zn, Ca, P	Assembly paste, grease, blending with engine oil
s metal protection, corrosion protection	<24	Al, Si, K	Gritting salt, synthetic fertiliser or tap water, sea salt, salty air, grease thickener, antifreeze (glycol)
additive components for gear oil	<6		Assembly paste containing nickel
corrosion protection additive, extreme pressure additive	<20	Si, Ca, Al	Dust, synthetic fertiliser,
o protect against wear, in hypoid gear oils, constituent of mineral base	2		Unusual as a contaminant
additive components for gear oil	2		Unusual as a contaminant
ng additives, nanoparticles in combination with Al	19	Al	Dust or arenaceous quartz, glass dust, silicon oil, silicon grease or silicon spray, plastic release agent, silicon sealing compounds
additive components for gear oil	<40		Used as a marker to prove the authenticity of the oil by the manufacturer
additive components for gear oil	<10	Ni,Al, Bi	Constituent in heavy oil, dye and occasionally in greases
additive components for gear oil	<4	Fe	Residue from welding electrodes, TIG welding
cing extreme pressure additive, reduces friction (friction modifier), to ageing	<80	Fe, Cu, Al	Coats of paint containing zinc, abrasion of sealing compounds, blending with oils containing zinc
additive components for gear oil	<9		Soldering joints, coatings, as a constituent of ester oils

only serve as a general guide for a specific usage case with a typical service life and oil fill volume.

Limit values for wear metals should be set lower:

- the larger the oil quantity
- the shorter the service life
- for engines: the lower the engine speed;
- for hydraulic systems: the higher the working pressure
- for gearboxes: the higher the circumferential speed

Additives and their changes should always be scrutinised critically, particularly if they hint at being mixed with an incompatible oil. If zinc is found in used oil which does not contain zinc as an additive in itself, its source must always be investigated.

Contaminants, their warning values apply independent of the service life, quantity of oil and loads. Any dust is always too much!

Our tip:

With one to two yearly lubricant analyses per unit, you not only get substantiated diagnoses from an experienced OELCHECK diagnostic engineer, but also make the course of any trends visible. This is a valuable tool, not only for discovering wear at an early stage.

Pirelli – millions of tyres made for China

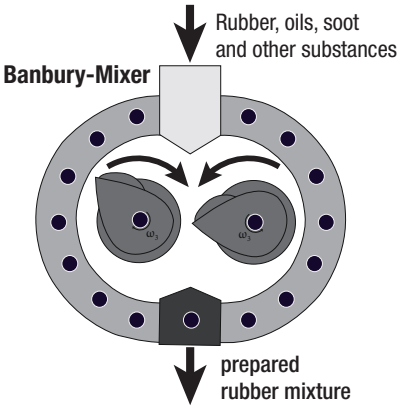
Pirelli, one of the largest tyre manufacturers in the world is active in more than 160 countries and is of course also present in the growth market of China. In the Shandong province on the eastern coast of China near the city of Yanzhou, Pirelli operates two large plants for manufacturing tyres for heavy commercial vehicles and cars. The Chinese car market is growing rapidly. Pirelli is already aiming to produce 10 million car tyres in the next few years at its Yanzhou plant alone, one of the most modern tyre factories in the world.

Production runs seven days a week, around the clock. The demands placed on the employees and production facilities are correspondingly high. To counteract machine failures and unplanned downtime, the production facilities are monitored in the interests of proactive maintenance. OELCHECK lubricant analyses are indispensable in this case. At the Yanzhou plant, they successfully prevented significant damage to a huge kneader, as well as to a hydraulic press for vulcanising tyre fabric.

From mixing the rubber to vulcanisation

The rubber mixture for a tyre is made up of around 30 different ingredients. Rubber, soot, bulking agents, oils and chemicals are kneaded together in a large Banbury mixer as if they were ingredients for dough. Both of the large rotating shafts mesh together like two large screws, producing a homogeneous mixture. The gearing system with driving power of more than 3,000 kW, which supplies both of the rotors with the energy for kneading, is put under tremendous mechanical strain when the tough block of rubber weighing over 50 kg is replaced.

After mixing, the still-hot black rubber mass is extruded and, after a period of cooling, calendered. A special roller works a textile or wire mesh into the rubber and brings it to the desired strength. After tailoring, the individual layers of fabric of the tyre



are brought together in a tyre production machine. Finally, the individual layers are joined together in a heat press. The blank tyre is then vulcanised in heating moulds at over 150 degrees celsius for several minutes depending on its size. This gives the tyre its final shape, its profile and the markings on the sides.

Monitored systematically – failure and downtime prevented

During trend analyses from over 60 mixers and presses which Pirelli carried out in April 2014, the lab report gave a red light twice! Red exclamation marks in the lab report concerning the gear oil from a stamp kneader as well as the hydraulic oil from a press prompted Pirelli Yanzhou to act.

The gear system, which is filled with 750 litres of CLP 320 industrial gear oil, powers the Banbury mixer's kneading rollers at the start of the production process. If the mixer fails, no raw materials are available to produce tyres. But almost everything was wrong with the gear oil. Even with the naked eye, large wear particles were visible. With a value of over 300, the PQ index was extremely high and warned against gear damage, because a high PQ index generally indicates severe wear processes progressing rapidly, regardless of the iron value in mg/kg. The AN (acid number) was also raised significantly, and the gear oil showed signs of being burdened and oxidised by the acids in keeping with this.

In his report, the OELCHECK diagnostic engineer recommended an inspection of the gearing and that the oil be changed immediately. The gear oil was promptly replaced by the maintenance team at the Pirelli plant in Yanzhou, but due to the favourable situation in terms of incoming orders, the Banbury mixer could not be switched off straight away. It was not until three months later during the next scheduled downtime that the gears were inspected and the damage which OELCHECK predicted was verified.

The constant overloading of the gears had taken its toll. But thanks to the early warning from the OELCHECK laboratory, the repairs could take place during regular maintenance. Sudden failure and unplanned downtime was avoided.

Tooth gear failure on Banbury mixer gears due to overloading

The mixer's gears were able to be protected from heavy damage, just like the hydraulic system of a steam-heated heat press which carried out vulcanisation of the rubber. Its 750 litres of hydraulic oil were dangerously contaminated with particles of dirt and moisture. Warned by the OELCHECK diagnostic engineers, the maintenance team quickly found the cause on site. A seal on the pressure cylinder was found to be faulty and quickly replaced. The hydraulic oil was saved too. After cleaning and bypass filtration by our partner Runce, it is now back in use.

Forming the Future – Schuler

Typical of Schuler: A tension rod design servo press with 11,000 kN of pressing force. Hydraulic oil filling quantity > 5,000 L.

Schuler – World market leader in forming technology. The company based in Göppingen in Baden-Württemberg offers a wide range of modern production facilities, efficient tools and comprehensive process expertise. Schuler presses are used by the automobile industry and their suppliers, as well as in many other sectors worldwide. In 2007, Schuler took over Müller Weingarten AG and is today owned in majority by Austrian company Andritz AG.

Optimised productivity creates added value

When it comes to Schuler production facilities, the company is also the best partner for maintaining the machines throughout their entire service life. Because the machines must always be in top form. Productivity optimised by proactive maintenance creates added value and therefore means greater margins and increased return for the operators. Regardless of where the machines are used, the same high level of service is offered around the globe.

Oil analysis is a compulsory part of the programme

In order to guarantee maximum production security, Schuler uses, among other things, OELCHECK lubricant analyses. Damage caused by poor oil quality is usually very expensive – and changing the oil in machines, often over 1,000 litres of it, entails significant costs. Regular oil analyses is the deciding factor for assessing further use of the oil. If the oil appears to be ageing at an unusually fast rate between sample intervals, Schuler can locate and remedy the causes quickly. If foreign substances or contaminants are found, their origin can be determined and filtering optimised accordingly.

The Schuler service experts have a comprehensive knowledge of the machines. OELCHECK also provides discussion and exchange of ideas on the topic of gear and hydraulic oils. You will therefore know exactly when oil analysis is necessary and be able to interpret the results according to the specific system at hand.

Tailor-made analysis for Schuler

For examining hydraulic fluids, gear oils and used grease, the analysis sets „standard“ and hydraulic „plus“, custom-made by OELCHECK and Schuler, are available as of now in the Schuler replacement parts programme. They can be obtained by operators directly from Schuler almost like a replacement part. Schuler service experts also use these sets during their on-site visits.

With the „standard“ analysis set, the presses‘ gears and hydraulic oil fillings are checked during routine inspections, for example those used in car body manufacturing in the automobile industry. The „plus“ set includes further examinations. The service experts use the „hydraulic plus“ set to investigate causes, for example if they discover an unusual black colouration to the oil, reduced air release properties, foaming or contamination of the system.

The questions included on the form which accompanies the samples are tailored to Schuler machines. The samples are examined at OELCHECK in Germany and China. Together with Schuler service experts, OELCHECK has calculated specific limit values, e.g. regarding purity for the hydraulic oils and their commentary.

Company-wide – advantages for customers

Schuler has already been using OELCHECK lubricant analyses for many years. With the introduction of the analysis sets specially tailored for Schuler, the company now offers its customers additional advantages:

- analysis coverage for Schuler machines which is consistent across the entire company
- consistent limit and warning values with rules for recommendations
- easy processing with analysis sets as a Schuler replacement part
- accurate and highly informative lab reports
- quick and easy processing across the globe
- access to OELCHECK analyses anywhere and at any time via the online portal www.lab.report and access to all associated advantages.

Looking at the bottom line, tailored Schuler lubricant analyses offer:

- oil changes when they are actually necessary
- early discovery of damages and deviations
- higher production security
- fewer unexpected downtimes
- a significant reduction of costs

Schuler service means more productivity, efficiency and operational reliability – OELCHECK lubricant analyses contribute significantly to this.

www.schulergroup.com

OELCHECKER

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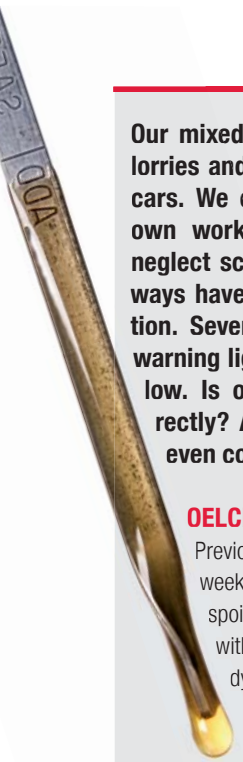
FAQ



Our mixed vehicle fleet includes large lorries and transporters but also a few cars. We carry out oil changes in our own workshop. Although we do not neglect scheduled maintenance, we always have problems with oil consumption. Several times when the oil level warning light lit up, it was dangerously low. Is our workshop working incorrectly? And why do modern engines even consume oil?

OELCHECK:

Previously, the oil level was checked weekly using a dipstick. Nowadays we are spoiled by modern long-life engine oils with their extremely long service lifes or dynamic oil change intervals which the on-board computer indicates. Many motorists do not even check their oil levels anymore. This means the burden on engine oils is growing constantly, the oil volumes are shrinking and service lives have increased. Synthetic engine oils are high-performing and long-lasting, but they are never protected against oil consumption. If the oil level in the engine decreases, it does not necessarily have anything to do with oil consumption. Oil loss is also a possibility. We have compiled a list of the most important causes for consumption and loss of engine oil.

Increased oil consumption

Usage conditions and driving behaviour

Full throttle, use which is predominantly of a „stop and go" nature, or demanding hill ascents cause temperatures and therefore loss due to evaporation to rise.

Oil level in the engine which is too high

For quantities of oil which are too great or if there is too much fuel in the oil due to constant short trips, the crankshaft will dip into the oil sump. But if too much oil is used, increased splashing and therefore more flexing work is the result. As a result, the oil temperature increases.

Incorrect oil quality

It is not without good reason that automobile manufacturers include the ACEA or API specifications of the oils in their operating manuals, or freely share their names. If the specific requirements are not adhered to, e.g. with regard to loss due to evaporation, there is a risk of increased oil consumption. If engine oils are used which are not freely shared, the limit values for exhaust emissions can often not be complied with. Engines of generations Euro V and VI with their complicated exhaust gas treatment systems are particularly affected. Their function is reduced and there is a threat of damage and significantly shorter service lives.

Unadjusted oil change intervals

If oil analyses are not carried out, the oil change intervals stated by the manufacturer or those indicated by the on-board computer should generally be adhered to. In extreme usage conditions, an analysis of the used oil can show that the intervals should be reduced.

Faults in the injection system or valve control

Moving parts of an injection system are partly lubricated via the engine's oil circuit. If internal leaks occur, oil can come into contact with fuel in the engine's combustion chamber. Even if the exhaust valves open while there is still oil on the wall of the cylinder, partly unburned oil can escape through the exhaust system. This often leads to an increased burden on the exhaust treatment systems. If the number of soot particles in the oil increases due to faults in the injection system or as a result of incorrect valve control, the additives will no longer be able to keep all of the particles in check. The anti-redeposition power of the engine oil decreases, and the danger of deposits increases. The viscosity of the engine oil will also increase, thickening and losing volume. Fail-safe lubrication can no longer be guaranteed, particularly during a cold-start. Fuel consumption rises simultaneously.

Consumption of dirt-carrying additives

All types of engine oil take on a darker colouring after a short while. Their detergent/dispersant additives prevent the formation of sludge and lacquer-like deposits which develop in the form of soot, the products of acid reactions, nitrous gases, unburned fuel residues and water. Dirt is broken down into small particles, suspended in an emulsion and transported to the filter. In this way, the oil ensures the engine is clean and ensures optimal combustion. But there will eventually come a point when the supply of these additives runs out. The anti-redeposition power of the engine oil depletes, and the danger of deposits increases. Fail-safe lubrication can no longer be guaranteed, particularly during a cold-start. Fuel consumption simultaneously rises.

Insufficient piston ring sealing

If worn or broken piston rings do not seal the cylinder piston sufficiently, or if deposits have formed around the oil scraper ring, oil consumption can increase, since the oil which is not scraped off the piston wall and into the oil sump will burn.

Oil shrinkage due to loss

Extremely increased oil pressure

If an oil leakage becomes visible on multiple seals and connection points in the oil circuit at the same time, the cause may be oil pressure which has increased severely. This is not indicated by a warning light and can be caused by deposits in pipes, filters, one-way valves and crankcase ventilation, or by a viscosity that is incorrect or too high.

Seal failure

Modern sealing materials work with the highest precision. If leaks do occur, however, it is often not a material fault, but some other kind of fault. Even a small foreign body, e.g. particles of paint, rust, or the remains of a sealant can interfere with the seal and prevent it from functioning correctly. The same applies to damaged component surfaces. If they are not flat, or are scratched or partially corroded, even the best seal cannot cancel out these defects. If the correct functioning of the seal is interfered with, coolant or engine oil could escape, depending on its position, or a component could become damaged.

Caution should be taken when using liquid or permanently elastic sealants. They can generally only be used on areas that they were designed for. Leaks can pose a threat if sealants have not been tested on the respective oil type, or if sealants are to replace common solid seals.

If you have questions about tribology or lubricant analysis, OELCHECK can answer them. Send us your questions by e-mail (info@oelcheck.de) or by fax (+49 8034-9047-47).