WEAR CHECK
Condition Monitoring Specialists
THE MONITOR
ISSUE 91

TRANSFORMER HEALTH: ESTER OILS AND MORE

WearCheck offers crucial services in monitoring transformer health to prevent catastrophic failures and optimise efficiency. Power transformers are vital in electrical systems, and their reliability is paramount. Understanding their condition helps to avoid costly emergency component replacements and boosts uptime.

WearCheck's transformer laboratories conduct extensive diagnostic tests, considering factors like oil type, which significantly impacts diagnosis accuracy. This article focuses on ester oils used in transformers.

Natural ester oils, derived from vegetable oils like rapeseed/canola, offer advantages over mineral oil:

1. Safety: They are less flammable, making them suitable for fire-risk areas.
2. Eco-Friendly: Natural ester oils are biodegradable.
3. Dielectric Strength: They can withstand higher voltages without breaking down.
4. Temperature Stability: They remain stable across various climates.
5. Moisture Tolerance: They have superior moisture resistance.
6. Non-Corrosive: They lack corrosive sulphur.

Synthetic ester oils excel in free-breathing transformers due to their remarkable dielectric strength, thermal stability, and oxidation resistance. They maintain performance in varying conditions, enhancing reliability.

In contrast, natural ester oils shine in sealed transformers, providing stability in confined spaces. They are biodegradable, aligning with sustainability goals.

WearCheck notes a shift toward ester oil transformers, monitoring 418 retrofilled transformers in 2022, reflecting industry recognition of ester oil advantages.

Effective communication between clients and testing labs is crucial. While testing procedures for ester oils resemble those for mineral oils, analysing each oil type separately is best practice. For newly built transformers, the diagnostic approach is similar to mineral oil. However, retrofill transformers can exhibit elevated ethane and ethylene levels due to ester oils' higher viscosity, stabilising over time.

In conclusion, understanding the distinction between synthetic and natural ester oils is vital in transformer technology. The industry embraces these oils for their role in enhancing efficiency and durability. Effective utilisation hinges on clear communication, precise testing, and a profound understanding of ester oils' distinct characteristics in transformers. To read more on ester oils click here.

WEARCHECK KATHU LAB TURNS ONE

In June, our lab in Kathu hit a milestone as it officially celebrated its 1st birthday.

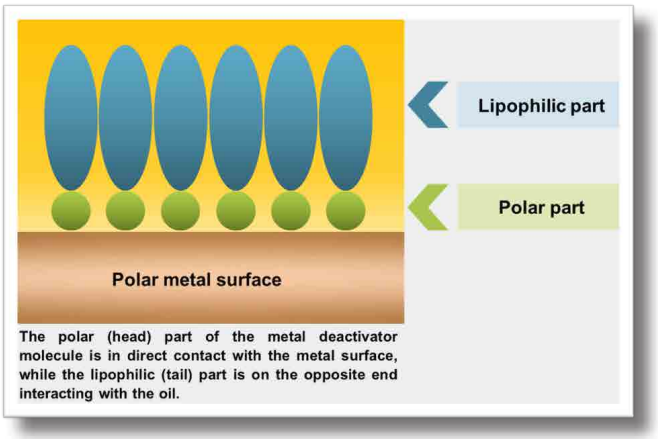
WearCheck MD, Neil Robinson, couldn't be prouder. 'Our Kathu team has really made a mark in the region, providing superior oil-testing and analysis services to regional mines, businesses and industry. Although we have had an office operating in Kathu for some years now, it is great to see that our investment in a state-of-the-art laboratory in the Northern Cape has been so well received and supported. A big thank you must go out to the local community and businesses who have contributed to WearCheck's success in the area.'

Congratulations to the Kathu team! They are, from left to right: Lucky Morapedi, Koketso Sekwenyane, Esethu Mgoqi, Werner Buys, and Jenny-Lee Bouwer

TECHNICAL TIP: LUBE SERIES
Metal deactivators – oiling the wheels of corrosion control

BY STEVEN LUMLEY, TECHNICAL MANAGER

What are metal deactivators?	Organic complexes containing nitrogen or sulphur, amines, sulphides and phosphites
What do they do?	Reduce catalytic effect of metals on oxidation rate
How do they do it?	Form an inactive film on metal surfaces by complexing with metallic ions



The polar (head) part of the metal deactivator molecule is in direct contact with the metal surface, while the lipophilic (tail) part is on the opposite end interacting with the oil.

Metal deactivators are another important additive in lubricating oil formulations, especially with the growing use of nonferrous metals, notably copper- and aluminium-containing alloys, that can be prone to the negative effects of staining and corrosion. These metals (or more specifically their ions) are also catalytically active, and act as reaction sites that can trigger lubricant degradation through oxidation of the base oil.

Metal deactivators belong to the corrosion-inhibitor class of additives, and they work their magic on metal surfaces, especially nonferrous metals, but also do their thing with wear particles that are dissolved or suspended in the oil.

These specialised additives contain surface-active molecules that adsorb on metal surfaces. The best-understood mechanism for how they function involves the formation of an inactive barrier film that inhibits cathodic and/or anodic reactions that can accelerate oxidation and cause corrosion.

Metal deactivators are typically organic compounds that contain nitrogen or sulphur atoms. These atoms have a high affinity for metal ions and can form strong, stable bonds with them. This allows the additives to neutralise or deactivate these metal ions in the oil, which reduces their negative effects.

Lubricant blenders add metal deactivators to oils, primarily to protect copper and yellow metals in most automotive and industrial lubricants, including greases and metal-working fluids.

But wait - there's more! The protective film that metal deactivators form on a metal surface is also thermally stable, water insoluble and chemically bonded.
Be sure to catch the next instalment of the Lube Series in the WearCheck *Monitor*, where we will delve into the world of rust inhibitors.

AGENTS EXTEND WEARCHECK'S REACH

WearCheck's Africa-wide footprint includes 16 world-class laboratories and offices, as well as appointed agents in various countries, who serve as conduits for receiving and forwarding oil samples and other items which will be processed and analysed by WearCheck.

We will be featuring a different agent in each issue of *Monitor*. This time round, it is our agent in Botswana - Sound Principles.

About Sound Principles
Sound Principles, a 100% female-owned company, transports samples to WearCheck and also conducts on site sampling and training, and provides customised handling and management of hydrocarbons.

The company also supplies mechanical equipment, fuel storage and handling equipment, building materials and other industrial equipment.

Samples for analysis by WearCheck can be delivered to Sound Principles, who can be contacted as follows:

Address: Plot 54014, Phase 4, Gaborone West, Botswana
Telephone: +267 3116829
Email: bakang@soundprinciples.online or gosiame@soundprinciples.online

WearCheck agents in Botswana, from left to right Emmanuel, Gosiame and Bakang, of Sound Principles in Gaborone

GREASE KIT

With nearly 90 percent of all bearings being lubricated with grease, routine grease analysis is a vital part of your predictive maintenance strategy.

WearCheck's grease analysis programme is effectively used for a broad range of grease-lubricated systems operating in a wide variety of applications, including wind turbines, industrial bearings, grease-lubricated gearboxes and hubs.

Monitoring grease condition is a vital part of maintaining and tracking equipment reliability. It can detect lubricant break-down and aid in identifying potential problems before serious mechanical damage occurs. Corrective action can be taken before other signs of deterioration begin to show, such as increases in operating temperatures, noise, and vibrations.

Monitoring the condition of your grease can also provide important information on the quality of the grease, how it is performing, as well as help adjust relubrication intervals.

Our grease analysis programme is designed to monitor the health of the lubricant, the health of the machine and levels of contamination through a series of chemical and physical tests.

With routine monitoring, effective grease analysis can minimise unplanned repairs and downtime, while extending the life of your machinery.

WearCheck's grease testing programme includes the following tests:

Elemental analysis
An elemental analysis of the grease is performed using ICP (Inductively Coupled Plasma) spectroscopy. The spectrometer measures the concentration of wear metals such as iron, lubricant additives like phosphorus, thickeners like lithium and contaminants such as silicon, in the grease.

PQ (Particle Quantifier) Index
The PQ gives a measure of the total ferrous content of the grease sample and, from this measurement, the total amount of ferrous (iron) debris can be determined irrespective of the size of the particles.

FTIR (Fourier Transform Infrared)
The FTIR produces an infrared spectrum that is often referred to as the 'fingerprint' of the lubricant as it contains specific features of the chemical composition of the grease. The spectrum can be used to identify types of additives and trend oxidation by-products that could form as a result of high operating temperatures and thermal degradation.

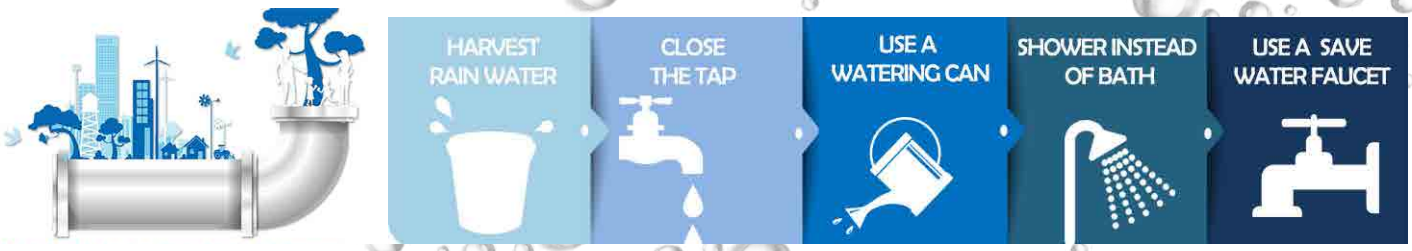
Karl Fischer Moisture
Water contamination is detrimental to any lubricant and can shorten the service life of a bearing by accelerating wear. The Karl Fisher method for determining moisture content is recommended, as even small amounts of water contamination can cause corrosion, base oil degradation and additive depletion in grease.

MPE (Microscopic Particle Examination)
An MPE is performed by filtering the grease through a membrane patch of a known micron rating and examining any debris present under a microscope. The membrane patch is examined for wear, contamination and colour. An MPE can provide clues to the source of the debris and the potential severity of a problem that may be causing it.

WORLD OF WATER

Sustainable water management refers to strategies that ensure that there's enough clean, fresh drinking water to meet the needs of the current and future generations, as well as the domestic, farming, industrial, and other sector uses.

Sustainable water management



Water management strategies govern the control and movement of water resources to minimise damage to life and property, while on the other hand, increasing the beneficial use of water.

Population, household size and growth affect the amount of water used. Factors such as climate change increase the pressure on natural water resources.

Some tools to promote the best water-management practices include engineering solutions, data-driven solutions, and enforcement of the environmental policies, which all work together to find solutions to water problems.

The management practices can be performed at many levels, which include government, public, private businesses, non-governmental organisations (NGOs), nature conservation groups, households and individuals.

Government - construction of dams, reservoirs and wetlands for irrigation as well as development of projects to encourage reuse of water, such as treatment of wastewater (grey water) and rainwater harvesting.

Private and public business - as part of their social corporate responsibility programme, businesses may set up water-conservation projects such as installation of water meters to monitor the water usage as well as leak-detection technologies.

NGOs and conservation groups - can assist by conducting research into water-treatment techniques, organising awareness drives to educate the public on water conservation, recycling and contamination.

Households and individuals - these include the steps that individuals can take in their daily water usage, such as limiting the duration of shower time, recycling grey water, fixing leaky pipes, using water-saving appliances and installing water-saving fixtures.

As fresh water is becoming increasingly scarce, water resources management and sustainability are vital to maintaining the quality of life and economic development in communities and around the world.

WearCheck Water provides a wide range of water-analysis techniques to determine water quality for various sectors, including mining, agriculture, domestic use and the healthcare industry. Please visit https://www.wearcheck.co.za/services/testing-analysis/water.html

WearCheck @Windergy Expo, India

Our Chennai team will be exhibiting at Windergy, taking place in Chennai from the 4-6 October. You will find us at stand B206a.

Valued Partnerships

We value the partnerships we have with our suppliers. In particular, Aramex, who keeps our samples moving! Above is the Aramex team with WearCheck staffers, Sibusiso Manala (far right) and Charmaine Thumbiran (2nd right).

PROMOTIONS

Prudence Mahlalela was promoted to snr lab technician at WearCheck's Specialist Laboratory in Johannesburg

Juliané Strydom was promoted to national sales manager, based at WearCheck's Johannesburg offices

Lynette Pillay was promoted to transformer laboratory manager at WearCheck's Durban laboratory

Yamkela Maganga was promoted to laboratory technician at WearCheck's Cape Town laboratory

Loshini Govender was promoted to transformer diagnostician in the Johannesburg.laboratory

LONG SERVICE VALUED

The biggest assets of successful companies are their employees. At WearCheck, we sincerely appreciate our loyal staff members - thank you to those of you who recently celebrated a milestone number of years as part of the WearCheck family - your dedication is valued.

Jannie Louw
Senior Inspector

Nelisiwe Thabethe
Lab Assistant (KZN)

Princess Latha
Jnr Lab Assistant (KZN)

Elizabeth Mbamco
Cleaner (KZN)

Lorato Hotane, quality manager - water (JHB)

CONGRATS, MELISSA!

Melissa van Aardt recently earned her BCom degree in marketing management, this while she successfully held down her full-time job as customer support supervisor in the sales team at WearCheck's Johannesburg branch. Onwards and upwards, Melissa, we are very proud of you!

CONGRATS, SHASHAY!

Shashay Rampersad recently completed his National Diploma: Industrial Engineering. This was no easy feat whilst still maintaining his responsibilities at work. This qualification covers the effective flow of systems, processes and operations, in particular it integrates people, money, knowledge, information and equipment. Well done Shash!

WELCOME TO WEARCHECK

The WearCheck family has gained some new members, adding new technical skills to the team. We extend a warm welcome to our new team members, best of luck in your new roles.

Devashnee Chetty - customer support assistant

Devashnee Chetty joined WearCheck Cape Town as customer support assistant. Devashnee, a certified pastel accountant with a certification in bookkeeping, is also an animal lover and adventure seeker. When not at her desk, she enjoys walking her fur babies, cooking, painting, swimming, yoga, and getting on an adrenaline high with racing and drifting.

Adel Pillay - transformer laboratory technician

Adel Pillay joined WearCheck as a laboratory technician – transformers, based in Durban. Adele holds a diploma in analytical chemistry, and is responsible for the analysis of transformer oil.

In her spare time, Adel, a dog lover, also enjoys baking, cooking and reading.

Mike du Preez - Eastern Cape area agent

Mike Du Preez joined WearCheck as the area agent for the Eastern Cape region, based in East London. Mike spent many years working in the earthmoving field with several big-name OEMs, including Bell, Caterpillar and Volvo – often in tandem with the WearCheck teams. He gained extensive experience doing maintenance in the mining industry, which saw him living in Botswana and Zambia for nearly 20 years. Mike is enjoying expanding his skills to incorporate WearCheck's newer technologies, including water analysis, asset reliability care (ARC) and advanced field services (AFS).

In his (rather limited!) spare time, Mike enjoys spending time with his family on the beach in East London.

Ryno Farmer - Admin Assistant

Ryno Farmer joined the WearCheck team in the role of Admin Assistant/Driver, based in our Namibia office.

His main resposibilities will include all office admin, maintaining stock, customer quesries and alocations as well as deliveries and collections.

Ryno is married with two children. His hobbies include hunting, dancing and walking.

MEET THE TEAM!

Introducing our exceptional team of diagnosticians, boasting an astounding collective experience of over 200 years! With their unwavering commitment to excellence and unparalleled expertise, they are our tribo-warriors and one of the driving forces behind revolutionising oil analysis practices at WearCheck.

Our seasoned diagnosticians have been at the forefront of the oil analysis world, meticulously analysing and interpreting oil analysis data to unlock critical insights that boost our customer's machine reliability, optimise performance and reduce unexpected mechanical failures.

Left to right: Shashay Rampersad, Trevor Pillay, Steven Lumley, Wayne Moodley, Shane Goslin, Bhupendra Jadhav, Quinton Verster, Lea Bodenstein, Ravi Chetty, John Evans

UNTIL WE MEET AGAIN

DEME DEPARTS AFTER A DECADE

Deme Gounder has relocated after spending ten years with the WearCheck family as a transformer laboratory technician in the Westville lab. We wish Deme and her new husband all the best as they embark on married life together

AU REVOIR, ANEESA!

Aneesa Ally, who spent seven years with WearCheck in the debtors' team as a credit controller, recently bid us farewell as she emigrated with her family. We wish Aneesa the best of luck and success as she begins this new chapter in New Zealand.

FAREWELL MELANIE

The WearCheck family was sad to learn of the passing in April of much-loved Melanie Hynd, or, as she was fondly known in the Durban office, "Aunty Mel".

Melanie retired from WearCheck in 2014 after spending more than 24 years as a key member of the WearCheck family, particularly in the early years when the company was founded by Lesley and Wally Crawford and Gary Brown.

When Mel retired, she was WearCheck's quality administrator. R.I.P Aunty Mel.

FAREWELL PHILIP

We are still reeling from the devastating news of the sudden passing of Phillip Croucamp, in a tragic traffic accident.

Phillip joined WearCheck in 2017 as a technical support consultant and was soon promoted to national sales manager. Phillip's vast technical experience enabled him to add value on the technical side, particularly in helping customers sort out breakdowns. He was a popular and respected leader of the Africa-wide sales team, and his presence is sorely missed. We send our sincere condolences to his wife, Abby and his two sons. R.I.P Phillip.

OUT AND ABOUT

Providing an Africa-wide customer base with great customer service as well as world-class training opportunities, means WearCheck's trainers and technical staff must travel to various regions, to provide additional support to the company's extensive international network of laboratories and offices.

Many industrial operations and mines request WearCheck's highly qualified oil analysis and Mobius trainers to conduct on-site courses. Some of the recent training sessions which were conducted are these:

TRAINING IN ZAMBIA

WearCheck Zambia (in Kitwe) conducted a study tour of the laboratory to final-year Mechanical Engineering students from Copperbelt University. Hosting the group is WearCheck Zambia's Boniface Yuwama (centre, grey shirt and jacket). On his left is the students' lecturer, Dr Ffloyd Banda

Boniface Yuwama of WearCheck Zambia (4th from left) conducted sampling training for the BHL Group in Solwezi, Zambia for workshop personnel. With him are the course delegates, including supervisor Chisenga Musonda (3rd from left)

TRAINING IN GHANA

Lubrication and oil analysis training was conducted for Adamus Resources at Nzema Gold Mine in Ghana by Daniel Kwame (2nd from left)

MINING EXPO IN NAMIBIA

WearCheck recently participated in the Mining Expo 23 In Windhoek, Namibia. From left to right: Marcel Schoeman, Johann Reiners, and Jaco Willer

WearCheck Walkers

Yolende Budhal, creditors assistant in WearCheck's Durban office, successfully completed the 5km Spar Women's Challenge walk in June, along with her four-year-old daughter, Akira.

Akira proves to us that you are never to young to promote healthy living by getting out in the open air.

We are so proud of you, ladies, especialy little Akira!

UPSKILL YOUR WORKFORCE

The value of training

"Education is the movement from darkness to light"

Allan Bloom

The return on investment for training maintenance staff is extremely favourable – staff who know how to take samples correctly, interpret reports from diagnosticians and take swift maintenance action where necessary are key to boosting the efficiency of a condition monitoring programme.

WearCheck's professional trainers run a selection of training courses across a range of condition monitoring and reliability solutions sectors. Many of these courses attract sought-after CPD (continuing professional development) points for delegates.

Customer training courses run by WearCheck, and the duration:

Course	Days
Precision Shaft Alignment	2, incl. practical
Precision Balancing	2
Vibration Analysis ISO CAT I	5, incl. exam
Vibration Analysis ISO CAT II	5, incl. exam
Vibration Analysis ISO CAT III	5, incl. exam
Asset Reliability Practitioner - advocate (ARP-A)	3, incl. exam
Asset Reliability Practitioner - engineer (ARP-E)	5, incl. exam
Asset Reliability Practitioner - leader (ARP-L)	5, incl. exam
Oil Analysis 1	2
Oil Analysis 2	1
WearCheck Customised	2

Oil Analysis & Wind Turbine courses

Courses offered onsite and online.

	Oil Analysis 1: Understanding oil and its analysis (2 CPD points)	Oil Analysis 2: Report interpretation (1 CPD point)
Location	**Two day workshop**	**One day workshop**
Kathu	October 17, 18	October 19
Nelspruit	November 14,15	November 16

	Wind Turbine Oil Analysis : 2 day workshop
Location:	**Two day workshop**
Cape Town	November 8-9

All the public courses listed in the WearCheck training schedule can be presented at the customer's site of preference in South Africa or abroad.

We have the pleasure of offering customised training content to suit your requirements, your dates and your locaton. Customised training on offer includes sampling of lubricating and transformer oils, lubricant storage and handling, introducton to oils and concise oil analysis for workshop technicians.

For more details on course content and prices, click here: https://www.wearcheck.co.za/training.html.

To book the above courses, please contact Michelle van Dyk on training@wearcheck.co.za or call +27 31 700 5460 or +27 82 381 3321

MOBIUS TRAINING

Public / Online Mobius courses*

Course	CPD points	Dates
Vibration Analysis – CAT 2	5	09-13 Oct
Vibration Analysis – CAT 3	5	13-17 Nov
Precision Maintenance - Balancing		04-05 Dec
Precision Maintenance - Alignment		06-08 Dec

WearCheck has been an accredited training partner for the internationally acclaimed Mobius Institute since 2015, and all the Mobius courses can be attended online or in person. All Mobius courses are presented at various venues throughout Africa, and many of them have an online option.

For more information or to book a Mobius training course, please contact Louis Peacock on +27 71 680 2967 or louisp@wearcheck.co.za.

Please note that Precision Balancing and Shaft Alignment courses can not be conducted online.

LUBE TIP

Kinematic viscosity is a measure of a fluid's internal resistance to flow under gravitational forces. It is determined by measuring the time in seconds, required for a fixed volume of fluid to flow a known distance by gravity through a capillary within a calibrated viscometer at a closely controlled temperature.

UPCOMING EXPOS

Windergy India: 4 - 6 October 2023

There will be a WearCheck representative at **WINDaba**: 3 – 5 October 2023, Cape Town ICC.

HIGHLIGHT YOUR SUCCESS

If oil analysis has helped prevent a major failure or saved your company money, we would like to feature this in *Monitor*. Our writer will contact you for the details and will write the article for your approval. Simply email marketing@wearcheck.co.za and we will contact you.

TECHNICAL BULLETIN TOPICS?

Is there a particular subject you would like to see featured in a *Technical Bulletin*? Simply email your suggestion to marketing@wearcheck.co.za. Before you do this, why not check out the more than 60 titles already available on the web site: www.wearcheck.co.za

Planet-friendly option

WearCheck no longer prints hard copies of our *Monitor* and *Technical Bulletin* publications. Should you wish to be included on our digital mailing list please scan the QR code or e-mail a subscribe request to: marketing@wearcheck.co.za.

Head Office KwaZulu-Natal
No. 4 The Terrace,
Westway Office Park,
Westville, KZN, 3610
PO Box 15108,
Westmead, KZN, 3608
t +27 31 700 5460
e support@wearcheck.co.za

Gauteng Office
55 Angus Crescent, Long
Meadow Business Estate ext.1
Edenvale, Gauteng, 1609
t +27 11 392 6322
e support@wearcheck.co.za

WEAR CHECK®
Condition Monitoring Specialists

www.wearcheck.co.za

South African Branches

Bloemfontein	+27 51 101 0930
Eastern Cape	+27 41 360 1535
Klerksdorp	+27 83 281 6896
Middelburg/Witbank	+27 13 246 2966
Northern Cape	+27 66 474 8628
Rustenburg	+27 83 938 1410
Western Cape	+27 21 001 2100

International Branches

Botswana (Agent)	+267 311 6829
DRC	+260 977 622 287
Ghana (Tarkwa)	+233 54 431 6512
Ghana (Kumasi)	+233 54 229 8912
India	+91 44 4557 5039
Mauritius	+230 483 5660
Mozambique	+258 857 92 7933
Namibia	+264 81 129 6078
Pakistan (Agent)	+92 32 3425 7278
UAE	+971 6 740 1700
Uganda (Agent)	+256 78 529 6994
Zambia	+260 212 210 161
Zimbabwe	+263 24 244 6369