LUBCHECK AND COOLCHECK DIAGNOSTICS

MORE RELIABLE OPERATION - REDUCED COSTS

EVEN ONE HOUR OF DOWNTIME CAN CAUSE MILLIONS IN LOSSES

Sudden malfunctions resulting in stoppages and unplanned repairs are the nightmare of every company. The costs of unexpected downtime and repairs can cause dire financial difficulties in the life of a company, so avoiding such problems is of vital importance. **Unexpected malfunctions can be avoided!**

The lubricant and coolant as an information carrier

Vehicles and machines are in constant interaction with their lubricants and coolants, so they can also show traces of the correct or irregular operation of the engines, gears and hydraulic systems. Regular checking of the fluids allows the tracking of equipment condition and can reveal malfunctions as they start to set in, and thus prevent accumulating damage that might be expensive to repair later on.

The LubCheck and CoolCheck concept

The essence of the LubCheck and CoolCheck concepts is the decoding, interpreting and acquisition of diagnostic information in a drop of oil or coolant to support maintenance with the help of targeted testing. The metrics of a lubricant's physical and chemical properties, the intensity of changes in them, the types and quantity of contaminants entering the lubricant and the nature and proportion of wear particles together represent important information from which we can infer the correct or irregular operation of machines as well as the correct or incorrect choice of lubricant and its continued usability.

LubCheck and CoolCheck diagnostics permit

- discovery of unexpected malfunctions in their early stages
- identification of hidden failure in vehicles and machines
- reduction or elimination of downtime
- reduction of maintenance costs
- more accurate and easy-to-plan maintenance
- oil and coolant change cycle optimisation
- increased vehicle and machine reliability

We are not alone

MOL's LubCheck laboratory has been a member of WearCheck International since 1997. This professional association unites laboratories operating on four continents around the world. The regular exchange of experience and knowledge-sharing among members ensures we are always up to date.

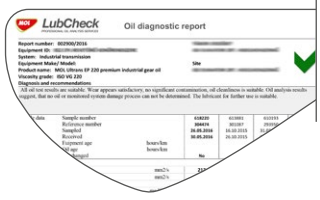
RISK FREE
COST OPTIMISATION

LubCheck and CoolCheck diagnostics help optimise costs in many different areas.

DIRECT IMPACT	INDIRECT IMPACT	IMPACT ON COSTS
Unexpected malfunctions can be recognised in their early stages, as hidden vehicle or machine damage and erratic operation becomes evident	Increase in vehicles' and machines' life spans	**Component spares and maintenance costs are reduced**
Lubricant use and oil change intervals are optimised	Oil replacement cycle extended Use of lubricant charges maximised	**Lubricant costs reduced**
Equipment condition can be surveyed without serious physical intervention; the observation of condition changes becomes possible	Increased vehicle and machine reliability Increase in vehicles' and machines' life spans	**Inspection costs reduced**
Production and maintenance processes become more predictable and controllable	Increased production scheduling efficiency Downtimes reduced; utilisation of production capacity increases	**Unplanned extra expenses reduced**
Less used oil and hazardous waste is produced	Reduced environmental impact	**Neutralisation costs decreased**

A complex procedure in four simple steps

Sampling	Forwarding samples	Analysis	Expert opinion
Please follow the process described in the attached Information booklet to ensure proper sampling!	Following sampling, please fill out the attached form, and forward the oil sample vessel to the MOL-LUB Ltd. Lubricant Laboratory Centre!	The samples received are analysed and a diagnosis is made by lubrication engineering experts.	Test results are summarised within 72 hours and the partner receives an e-mail describing any likely problems and effective preventive maintenance actions to be taken.



More than just numbers

All relevant data are included in the LubCheck report using easy-to-understand language, together with our experts' individual assessments and opinions. The diagnosis field shows a summary of professional opinions based on the test results. Changes in machinery and lubricant condition are also simple to follow because the results of the previous three tests also appear next to current one.

TESTS
AND MOST FREQUENT PROBLEMS

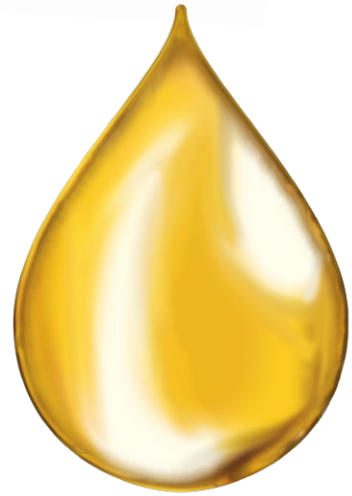
After samples arrive, they are subjected to the following standard tests. In cases where problems are complex, however, additional special tests are conducted so that no malfunction whatsoever can remain hidden.

	Diesel/petrol engine oils	Gas engine oils	Automotive gear oil	Automatic transmission fluids	Coolants	AdBlue
Viscosity	✓	✓	✓	✓		
Additives	✓	✓	✓	✓	✓	✓
Wear metals	✓	✓	✓	✓	✓	✓
Contaminants	✓	✓	✓	✓	✓	✓
Base number (BN)		✓				
Acid number (AN)		✓	✓	✓		
Flash point	✓		✓			
Ferrography	✓		✓	✓		
Gas chromatography	✓					
Oxidation products		✓				
Nitration		✓				
PQ index			✓			
ISO cleanliness			✓	✓		
Optical particle analysis			✓	✓		
Pour/boiling point					✓	
Nitrite/Nitrate content					✓	
Conductivity					✓	
Refractive index					✓	
Concentration					✓	
pH value		✓			✓	
Alkalinity reserve					✓	
Density						✓
Refraction coefficient						✓

The most frequent automotive lubricant-related problems and their solutions

Failure	Symptoms	Potential cause	Effect	Recommendation
Contamination by abrasive particles	High silicon; high particle count; high wear metals	Problem with air filter; poor storage and handling of lubricant	Increased wear (esp. bearings, piston, cylinder); potential failure	**Change oil filter, air filter and engine oil!**
Excessive wear	High wear metals (Al, Cr, Fe, Cu, Pb, Sn)	Effect of another failure type (water ingress, contamination, fuel dilution, overheating)	Shorter engine life	**Check whole system!**
Excessive soot contamination	High soot content	Problem with fuel system; incomplete combustion	Increased wear; potential failure	**Check fuel system!**
Coolant contamination	High water content (Na, K present)	Problem with cooling system	Glycol content in the coolant displacing lubricant, increased wear; potential failure	**Check cooling system!**
Fuel dilution	Low viscosity; low flash point; fuel present	Problems with fuel system (incomplete combustion)	Increased wear; potential failure	**Repair fuel system; change oil!**

NOT ONLY A SERVICE – A PARTNERSHIP



- Over 110 years of experience in lubricant production
- More than 20 years in oil and coolant diagnostics

Cooperation between those operating the equipment and engineers who deliver the service is the key to the success of the LubCheck method. Today, hundreds of satisfied customers enjoy the operational and economic benefits that LubCheck Oil and CoolCheck Coolant Diagnostics provide.

Our lubricant services:

- Lubrication technology consulting
- Training courses

YOUR PARTNER: