LubAnac off-road

Diagnostic system for optimized OFF-ROAD machine fleet management

LubAnac OFF-ROAD is a diagnostic system for engines, transmissions and hydraulic systems, based on the scientific interpretation of in-service oil analysis, which allows the fleet manager to reduce the maintenance costs of his machine park.

LubAnac OFF-ROAD has been specially developed for tracking off-road fleets. The measured physico-chemical characteristics in combination with the advanced interpretation rules allow a personalized diagnosis for each machine.

LubAnac OFF-ROAD is recommended for:

- ✓ A systematic follow-up of the behavior of the wear of the mechanical parts and the lubricant.
- ✓ Prevention of breakdowns.
- ✓ Reinforcement of the longevity and the reliability of the material.
- ✓ Maintenance optimization for a better control of costs.

Measured characteristics

Wear of mechanical parts :
Emission spectrometry (ICP) of elements: Fe, Pb, Cu, Sn, Cr, Al, Ni (ppmc)
Ferrous Debris Monitor: Measurement of large ferromagnetic particles (Fe + Ni) for all non-engine components (gearbox, transfer case, differentials, rotation/translation gears, final drives...)

Lubricant contamination:
Silicium (ppm), Water (%) on all applications
Soot (%), Cooling liquid (presence), Fuel (%), Copper passivation only for engine oil analysis

Lubricant characteristics:
Kinematic viscosity (mm^2/s) at 100°C, Oxidation (IR),
Kinematic viscosity(mm^2/s) at 40 °C and Acid Number on Hydraulic Applications

Options :
Additive elements Ca, Zn, P, Mg, Mo, Ba, V, Na, B, Ag
Calculated sulphated ash

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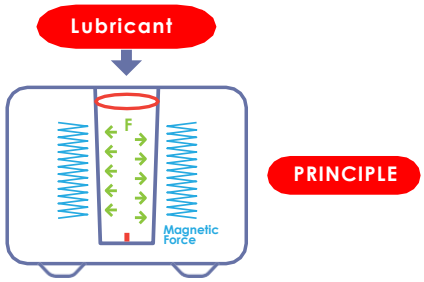
New functionalities

- **Oxidation (IR) :** This measurement on engine-oils confirms the adequacy between the lubricant and the severity of the service and thus validates the correct drain interval. This parameter is essential in the event of optimizing the drain intervals
- **Copper Passivation :** Linking and identifying the phenomenon with our engine database for specific monitoring of this phenomenon.
- **Wear Metals:** Diagnosis customized by make and type of machines, taking into account the manufacturers information, the LubAnac data and the return of customer information.
- **Ferrous Debris Monitor (FDM):** Measurement of the content of large particles of iron (Fe) and integration in the diagnosis of non-engine parts (gearbox, transfer case, differentials, rotation/translation gears, final drives ...) allow a better definition of the type of wear of the parts.
- **Acid number:** This parameter controls the oxidative degradation of hydraulic oil, essential in the context of extended drain intervals.
- **Graphs :** Representation of measured characteristics as graphs for a more direct and quicker reading.
- **Call-Back :** Better understanding of your results : on the website lubanac.totalenergies.com, a simple click on the Call-Back button and our technicians will contact you as soon as possible

Did you know?

The presence of large ferromagnetic particles (Size> 5µm) often indicates a major part dysfunction.

FDM (Ferrous Debris Monitor) allows to measure the content of these large particles in the oil.
Associated with the small particles of Fe measured with ICP (<5µm), the large particles allow a better diagnosis on the state of the parts subjected to high shocks and loads.



EXPERTISE LEVEL: Options

Some non-engine applications such as hydraulic circuits or transmissions require additional information either to find fault or simply when the manufacturers impose levels of ownership. Options are then available to determine: pollution level, non-metallic elements, cleanliness index etc ...

- LubAnac FOCUS: Microscopic examination of particles present in the lubricant (transmissions).
- LubAnac PARTIC LNF: Particle counting according to NAS 1638 and ISO 4406 standards (hydraulic).

Diagnosis and comments

The diagnosis and comments are generated by the LubAnac OFF-ROAD system which is based on:

- More than 45 years of experience and supply of the LubAnac database, more than 8,5 million analyses on more than 1 000 000 monitored parts.
- More than 1000 analyses per day
- Customer feedback on successful corrective actions.
- A comparison between the measured values and the wear references thanks to algorithms excluding variable parameters such as oil replenishments or excessive drain intervals
- A network of more than 30 laboratories all around the world feeding the database.

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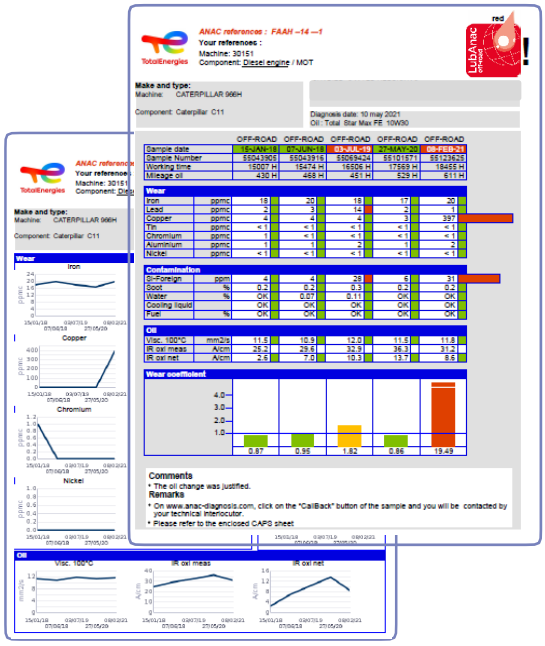
Presentation of results

The results of the diagnosis are available 2 days after reception date for 90% of the samples (+24h for Hydraulics).

- Pre-data entry on the website
- Sending results by mail
- Online posting of results on the secure website lubanac.totalenergies.com (compatible with smartphone and tablet).

ENGINE

The history of the last 5 diagnoses is recalled on the report.



- Color code : green, orange, red
- Customer, machine, part and sample data
- Wear elements and color code
- Contamination elements and color code
- Physico-chemical characteristics: viscosity, sulphated ash, oxidation.
- General Wear Coefficient : assesses the state of wear of each type of engine compared to identical engines in the LubAnac database in 1 figure
- Comments and recommendations taking into account the phenomenon of Copper Passivation

Graph Visualization

Satisfying diagnostic

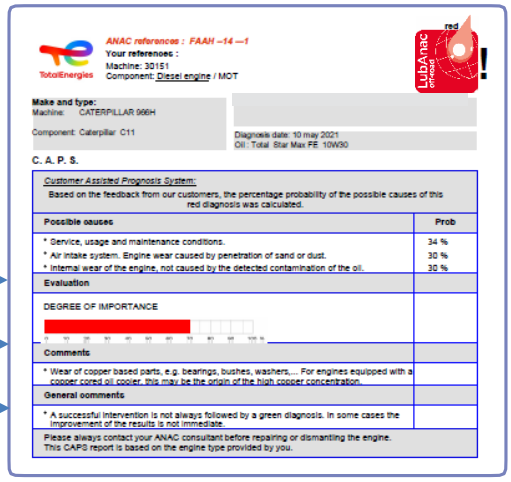
Slight deviations

Anomaly found

Dangerous situation

CAPS (Customer Assisted Prognosis System) :

Only in case of red diagnosis. Relies on feedback from customers.



- Possible causes and recommended interventions are indicated by percentages of probability.
- The degree of urgency assesses the necessity of the intervention to be carried out.
- The displayed comments focus on the peculiarities of this type of part.

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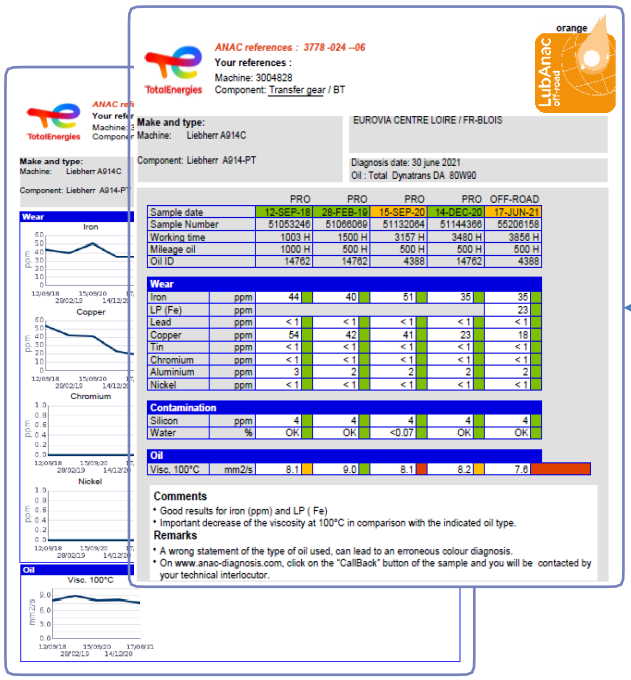
Non-Engine parts

(Transmission example)



Graph Visualization

Integration of the content of large iron particles (Fe) and interpretation in the diagnosis.

Control and diagnosis of the wear elements according to the make, the type and the part.

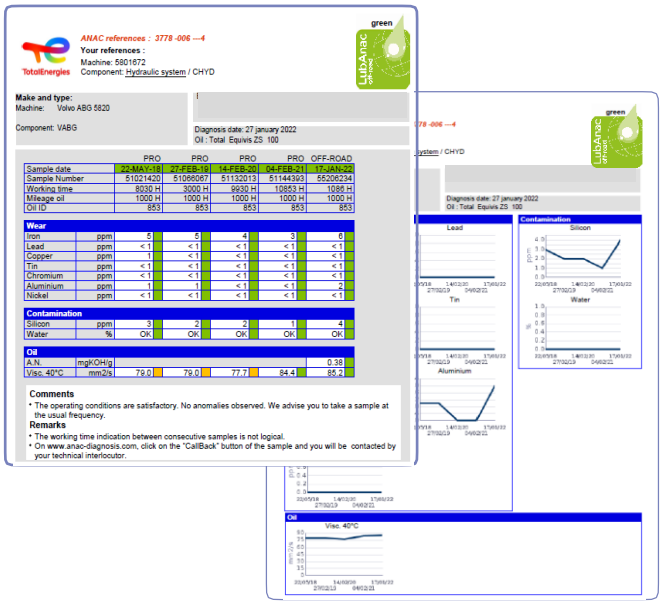
Hydraulic Parts

For hydraulic systems and hydrostatic transmissions.

Contaminants

Acid Number (ASTM D664)

Kinematic viscosity at 40°C



Graph Visualization

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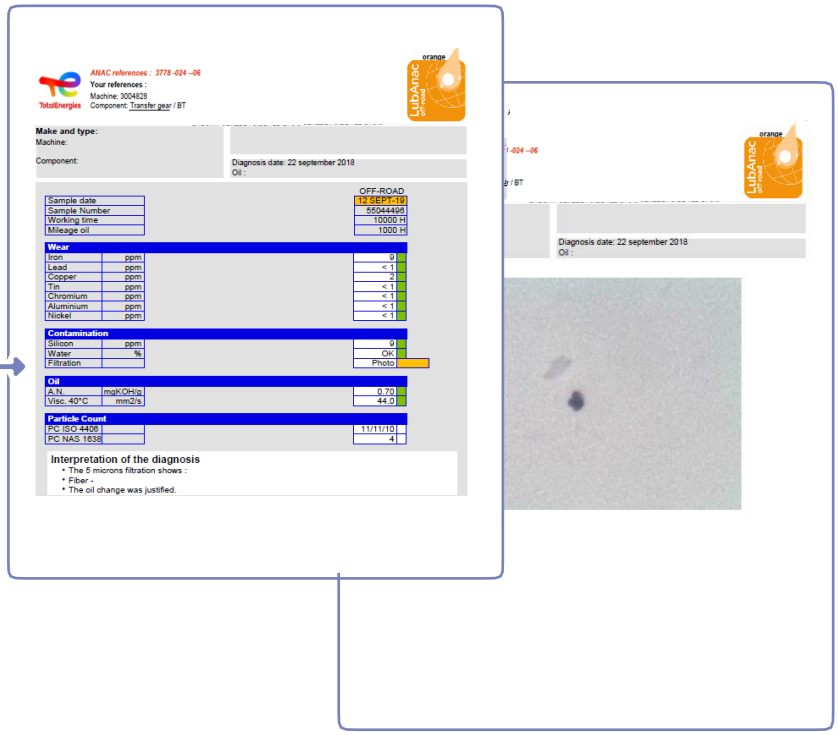
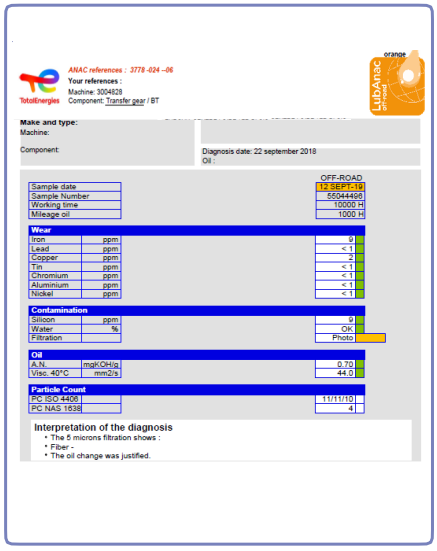
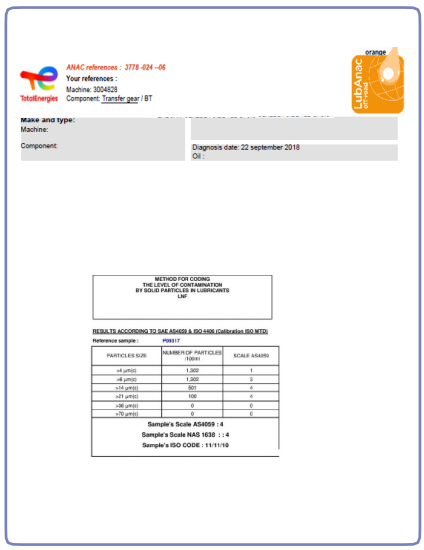
(With option LubAnac FOCUS)

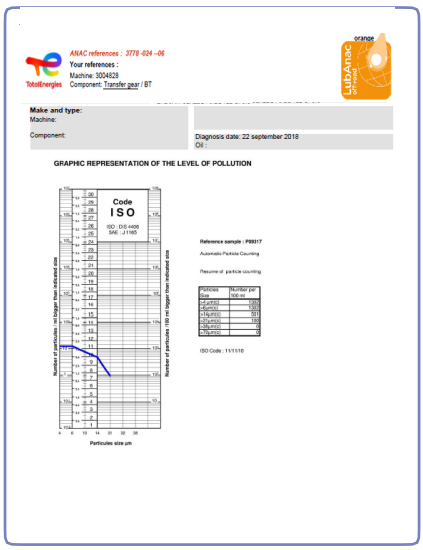
Review of the microscopic study



(With Option LubAnac PARTIC LNF)







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