



Increase uptime,  
reduce Total Cost of Ownership  
How to achieve these goals with Total Productive Management

**KLÜBER**  
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your global specialist

### A brief summary

Achieving the highest possible level of efficiency - both in terms of production and in terms of maintenance processes and the availability of the systems - is a goal that unites all industries. Total Productive Management (TPM) is an approach that helps to achieve this. The following flyer explains what TPM specifically means and includes. Furthermore, it clarifies the possibilities of high-quality services to achieve the goals of efficiency as well as sustainability.

The TPM portfolio of Klüber Lubrication addresses and reduces the main cost drivers of production processes: energy, spare parts, operating materials and labor. At the same time, it increases the uptime of production systems. This also contributes significantly to the achievement of sustainability goals for instance by minimising waste through longer lubricant change intervals.

## The core piece – The EfficiencyManager

A key component is the EfficiencyManager, the digital platform for Klüber Lubrication's TPM service portfolio and the central portal for the management of all machines with their lubrication points. The EfficiencyManager is a web application which brings together the data of all equipment relevant to maintenance along with the measured values and analyses of the lubrication points, monitoring the status of each individual lubrication point. Thus, all relevant information is documented in one place and displayed in a very transparent and comprehensive way.

The digital platform also provides an overview of the associated lubrication tasks and data and compiles the details of upcoming maintenance tasks. It captures completed actions and processes, clearly understandable for all employees concerned and in line with the legal regulations for documentation and audits.



## Modular Structure

The modular architecture of the EfficiencyManager allows to activate or deactivate so called modules individually, such as the ones for Maintenance Management, Lubricant Condition Analysis and more. Hence it can be tight to users' needs while keeping a very lean interface.

Via gateways, sensors e.g. for measuring oil temperature can be connected to the EfficiencyManager and thresholds for automatic notification can be set as part of the sensor module. Such thresholds are also the basis for so called triggered analysis. This means that the EfficiencyManager tells its users when there is need for manual inspection, taking lubricant samples or any other action of this kind.

## Feeding the EfficiencyManager

The TPM journey always starts with gathering data. First a structure tree naming all assets and machines is built up along with their lube points. This is the basis for reducing sorts of lubricants, reducing specific energy consumption of machines and also for maximising the service life of lubricants. Exploiting the service life to the limit is usually accompanied by regular lubricant condition analysis in order to ensure that machines always run with proper lubrication. For continuous monitoring, especially of oils, there is also the possibility to equip machines with sensors. They provide a seamless track of operating conditions of machines and components.

## The Benefits

High-performance lubricants can help to reduce the specific energy consumption of machines and increase lubricant change intervals. Lubricant condition analysis and sensors make it possible to push the change intervals to the limit.

All measures implemented help you:

- to maintain your equipment precisely when it is necessary
- to determine the status of your machines and lubricants
- to provide you with valuable data to continuously improve your maintenance activities
- to prevent failures before they occur
- to reduce the amount of lubricant that have to be disposed of
- to reduce CO<sub>2</sub> emissions through higher energy efficiency

This leads to higher efficiency of your facilities as well as of your maintenance activities and helps you to reduce your Total Cost of Ownership (TCO).

## Your needs – our expertise

There are many options of how TPM can be implemented. It makes sense to seek contact with us in order to plan and implement specific steps. Depending on the industry and company, other aspects come into play, for example the topics of sustainability, security, audits, certification, or special requirements such as kosher and halal.

In cooperation with you, we adopt our solutions to your specific needs. You benefit from the interpretation of lubrication data in combination with the tribological know-how of our experts.

## Total Productive Management: Our digital services around the lube point

### Predictive Maintenance (under development)

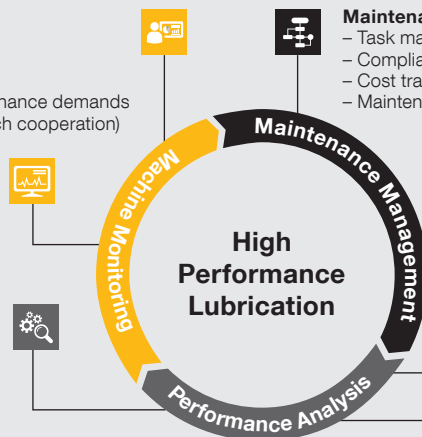
- Identified error patterns
- Automated pattern detection
- Transparency on future maintenance demands (only for OEMs within a research cooperation)

### Condition Monitoring (under development)

- Event based Inspections
- Thresholds and alarms
- Real time indication of status
- Preventive maintenance

### Component Inspection

- Independent inspections
- Experts from various fields
- Digital expert dial in (MS Hololense 2 Industrial)
- Digital inspection reports



### Maintenance Management

- Task management
- Compliance support
- Cost transparency on tasks and lubrications
- Maintenance knowledge transfer

### Energy Efficiency

- Energy savings
- Transparency on energy costs and savings
- Sustainability contribution

### Lube Condition Analysis

- High quality oil and grease analysis
- Transparency on lube status
- Expert recommendations
- Individual trend and history reports
- Data lake for further research

## Example from the Cement industry

### Gearbox and floodgate filter of a cement mill

#### Challenge:

Oil loss in the floodgate filter and auxiliary machinery of the cement mill



#### Action Steps:

- Implementation of Maintenance Management and Component Inspection
- Exchange of the previously used oil to Klübersynth BEM 44-4600 with a higher viscosity
- Verification of the tightness of the components

#### Benefits:

- Oil leaks in the gearbox have been eliminated 100 percent
- Annual saving of 61 percent in the cost of lubrication
- Elimination of oil contamination to the environment
- Greater reliability and safety in the operation of the machine
- Savings of 98 percent in the maintenance hours of the equipment

## Example from the Food industry

### Gearbox and Crankcase of milk homogenisers in a large dairy plant



#### Challenge/Objective:

- Increase Energy Efficiency with lubricants on gearbox and crankcase of milk homogenisers
- Extend service lifetime of oil



#### Action Steps:

The aim was to reduce the specific energy consumption of the homogenisers and extend service lifetime of the oil. Higher efficiency was gained by draining the previously used mineral oil (crankcase, gearbox, hydraulics) and replacing it with a selected, high performance synthetic oil.

Savings have been verified by measuring the reduction of specific energy consumption over a period of several thousand operating hours. This was accompanied by regular lubricant condition analyses to ensure that the lubricant was in proper condition.

#### Benefits:

- Increased Energy efficiency of the gearbox and the crankcase
- 77 MWh saved/year
- Oil service life doubled
- Maintenance costs halved
- Disposal costs reduced

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