

# Specialty Lubricants for Precious Metal Mining



**LUBRITECH**  
Special Application Lubricants

# LUBRICANTS. TECHNOLOGY. PEOPLE.

## FUCHS LUBRITECH – Special Application Lubricants

Within the FUCHS Group, we at FUCHS LUBRITECH are the experts for highly specialised applications. We develop, produce and distribute the world's leading branded products of our own. Our employees are committed to solving your challenges. We are there, with you and for you.



## **LUBRITECH**

### *Special Application Lubricants*

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#### **Facts and figures**

**Company:** FUCHS LUBRITECH GmbH, part of the FUCHS Group, based in Kaiserslautern, Germany

**LUBRITECH:** the Special Application Lubricants Division of the FUCHS Group

**Product range:** LUBRITECH GROUP offers a full range of more than 1,000 special products, including food grade lubricants, adhesive lubricants, lubricating fluids and greases, pastes, solid film lubricants, concrete release agents, aerosols and metal-forming lubricants

**Certifications:** ISO 9001: 2008, ISO 21469, Halal, Kosher

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**FUCHS** has developed, produced, and sold lubricants and related specialties for more than 80 years – for virtually all applications and sectors. With over 100,000 customers and 50 companies worldwide, the FUCHS Group is the world's leading independent lubricant supplier.

Within the FUCHS Group, **FUCHS LUBRITECH** is the expert for Special Application Lubricants. A team of more than 500 specialists around the world work to meet your needs. However demanding the application, we offer a specialised solution. Service is a crucial and fundamental component of our offering. Our experts offer on-site technical consultation to assure performance, efficiency and process reliability.

**FUCHS LUBRITECH** special lubricants stand for the highest performance and sustainability, safety and reliability as well as efficiency and cost savings. They represent a promise: **technology that pays back.**

## **HIGH-PERFORMANCE LUBRICANTS FOR OPTIMUM SAFETY AND PERFORMANCE IN PRECIOUS METAL MINING**

Where people and machinery do heavy work under the harshest environmental conditions, our specialised lubricants make a significant contribution to smoother, safer – and thus trouble-free – operation. After all, we have worked closely with gear and machinery manufacturers for many years to develop application-specific products that help increase maintenance intervals more effectively than conventional lubricants.



Our high-performance lubricants are specifically designed to meet – and exceed – the lubricant requirements of the mining industry.

Brand names like CEPLATTYN®, GEARMASTER®, LAGERMEISTER®, GLEITMO®, URETHYN® and STABYL® have a proven track record of success and stand for the highest quality.

FUCHS LUBRITECH specialised products are available internationally and are approved by many major OEMs, like FLSmidth, Metso Minerals, Outotec, Citic, Thyssen-Krupp Industrial Solutions and KHD.

Our trained engineers look back on many years of considerable expertise. Working together with operators, they ensure the proper selection and application of the lubricants through on-site technical consultations and undertake an extensive range of services.



## **SPECIAL LUBRICANTS FOR RELIABLE LUBRICATION AND MAINTENANCE OF MINING EQUIPMENT**

**Mining has been a human activity since prehistoric times. Finding, extracting and processing raw materials, such as precious-metal mining, is still crucial in our modern society.**

The process of mining, from discovery through extraction of minerals and finally to processing the materials, consists of several distinct steps – each of which requires reliable lubricants to ensure the efficient flow of operations. FUCHS LUBRITECH is your first choice.

## Quarry equipment

As a producer of specialty lubricants we concentrate on the critical application of lubricants in the field of quarry equipment. We do all we can to ensure the reliability of your machines, even under the harshest environmental conditions.



### Hydraulic hammer

**MEISELPASTE** is a copper-coloured mineral oil-based paste containing an aluminium complex soap and solid lubricants. It is a special paste for chisels and bushings of hydraulic and pneumatic hammers manufactured by such companies as Krupp, Montabert, Rammer, Indeco, etc., with hammer weights between 75 and 6,000 kg. It is suitable for use at a wide temperature range (-20/+1,100 °C), significantly reduces wear, shows very good resistance to water, and offers good corrosion protection.



### Bucket wheel excavator

**CEPLATTYN ECO S PLUS** is a black, consistent lubricating grease with a biodegradable base oil and an inorganic thickener. It is suitable for the lubrication and preservation of wire ropes, e.g. in open cast mining, as well as for crane systems, floater cranes and dockside diggers.

**CEPLATTYN KG 10 HMF** is based on a high-quality base oil, thickened with aluminium complex soap. It is suitable for the lubrication of open gear drives, large chains and heavily loaded sliding guides in rough operating conditions in the mining industry.

## Processing – raw material preparation and milling

Especially in raw material preparation and milling, FUCHS LUBRITECH offers high-performance lubricants which are able to cope with the extraordinary strains and conditions of these environments, such as extreme vibration loads and elevated temperatures.



### Crusher

**URETHYN MP 2** is suitable for the lubrication of plain and roller bearings at high temperatures and extraordinary loads. It is a mineral oil-based polyurea grease and especially suitable for the lubrication of crusher bearings which are exposed to high vibrations. As such, it can significantly contribute to the durability of the bearings.



### Gyrotory crusher

**LAGERMEISTER HDG 00** is a high-performance EP semi-fluid grease with white solid lubricants. It is a special calcium grease based on mineral oil and contains friction- and wear-reducing white solid lubricants. It is used for lubricating machine elements in the mixed friction area, such as roller and sliding bearings subjected to high pressure, intermittent loads and vibrating and oscillating movements. It has also proved itself extremely well suited to the lubrication of upper bearings on rotary crushers.



Image: ThyssenKrupp Polysius AG

### Roller press

**STABYL HD** is a heavy-duty lithium soap grease containing a highly viscous base oil, wear-reducing EP additives and solid lubricants. It is primarily used to lubricate large, low-speed roller bearings (self-aligning roller bearings) in roller mills and presses, and plain bearings subject to high surface pressures and vibrations.



Image: ThyssenKrupp Industrials Solutions AG

### Mills

Lubrication of mills with the **CEPLATTYN** range of products fully meets the tough tribotechnical requirements. The CEPLATTYN range was developed in the early 60s as the first sprayable non-asphaltic adhesive lubricants. The brand name is a synonym for high-quality and reliable adhesive lubricants. The CEPLATTYN range includes more than 20 different products and is approved by all major gear and machine manufacturers in the raw materials industry.

## Maintenance lubricants

At numerous points of application, lubricants for assembling and maintenance are needed. They protect expensive equipment, reduce the cleaning effort and contribute to longer maintenance intervals and, as such, to higher plant efficiency.



### Gearbox

The oils of the **GEARMASTER CLP** range significantly reduce friction. For this reason, the temperature levels of the gears can be lowered, the operating time with the oil can be extended, and maintenance intervals prolonged. **GEARMASTER CLP** oils are modern high-performance gear oils based on specially selected base oils showing excellent thermal stability, good ageing stability and extraordinary wear protection properties.

**GEARMASTER SYN** Oils are fully synthetic poly-alpha-olefin gear oils. In comparison to mineral-based gear oils, **GEARMASTER SYN** oils have a far better temperature viscosity and better ageing stability. They are used in gears, circulating systems and bearings subject to high or largely varying temperatures. Owing to the high performance level, a much longer interval of oil change can be reached, leading to reductions in operating and disposal costs.

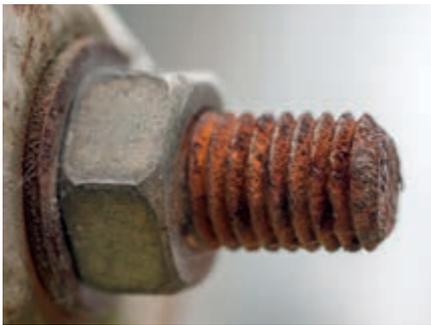


### Wire rope lubricants

**CEDRACON** is a low-viscosity wire rope lubricant and preservative for all kinds of wire ropes containing graphite. It is always used for the lubrication of wire ropes subjected to extreme mechanical loads and chemical influences.

**CEPLATTYN ECO S PLUS** is a black, consistent lubricating grease with a biodegradable base oil and an inorganic thickener and provides excellent corrosion protection and wear properties. It is suitable for the ecological lubrication and preservation of wire ropes. It closes strand gaps reliably, thus preventing the penetration of water and aggressive substances into the wire rope's interior. Sliding surfaces of any kind in environmentally sensitive areas can also be lubricated using **CEPLATTYN ECO S PLUS**.

**CEPLATTYN KG 10 HMF** is based on a high-quality base oil, thickened with aluminium complex soap. The product contains colloidal graphite of the highest purity and fineness as well as a carefully determined additive package. It is suitable for the lubrication of Open Gear drives, chains and heavily loaded sliding guides in rough operating conditions in the mining industry.



#### Rust loosener

**FERROFORM SUPER 7** is a special rust loosener with solid lubricants. It is a new type of mixture made from particularly powerful resin- and acid-free penetrating oils in combination with highly effective solid lubricants. This composition enables the extremely rapid release of corroded connections, the effective displacement of moisture and the immediate formation of a wafer-thin surface layer, which on the one hand takes care of direct re-lubrication and on the other ensures immediate protection against the formation of further corrosion.



#### Bearing lubricants

**LAGERMEISTER XXL** is a new type of all-round, long-term grease based on a specially selected mineral oil in combination with a special thickener. LAGERMEISTER XXL provides excellent pressure resistance and ageing stability for the grease. Compared with standard lubricating greases, the relubrication intervals can be increased and the number of different lubricants reduced.

**URETHYN MP 2** is a yellowish-brown mineral oil-based grease with a homogenous and soft structure. It is suitable for the lubrication of plain and roller bearings at high temperatures and extraordinary charges. URETHYN MP 2 can be applied manually or via centralised lubrication systems. It is easily pumpable, even through very long supply lines.



#### Assembly paste

**GLEITMO 100** is a smooth assembly paste with an extremely wide range of applications. It is used for the running-in lubrication of highly loaded plain bearings, slideways and guideways, gears and threaded spindles, as well as for the lubrication of screw and threaded connections. For the mounting and pressing-in of bearings and disks, wheels and bolts. And for the lubrication of adjusting mechanisms as well as for drifting, bending, punching, pressing and stamping.

**PBC** is a gold-coloured paste that combines high-performance solid lubricants, high molecular polymers and soft non-ferrous metallic powder. It is suitable for use as a non-melting high-pressure lubricant between slow-running surfaces and as a grease at temperatures up to 150 °C. Beyond this temperature the carrier oil gradually evaporates, forming a dry lubricating film that is effective up to +1,200 °C. PBC is a friction-reducing lubricant and seizing protection agent for preloaded screws, bolts and threaded components. As a protective grease it has a sealing effect and thus prevents the penetration of water.

## OPEN GEAR LUBRICATION

**Open Gears transmit extreme forces. Their efficiency and service life are subject to several factors, one of them being the lubricants used.**

This is particularly true for the mining industry, where high torque is transmitted. FUCHS LUBRITECH offers the ideal lubricant range for this heavy-duty application. With increasing size, the demands on the lubrication of Open Gears also increase. Wherever high transmission of forces at low sliding speeds is required, we help you to reduce the wear on your technology to a minimum, thus maximising the reliability and safety of your equipment. Together with gear and machinery manufacturers, we develop innovative adhesive lubricants for Open Gears in kilns and mills. We always strive for the most application-specific solutions – and thus achieve running times of 40 years and more.



Image: ThyssenKrupp Industrials Solutions AG



#### SAG mills and ball mills

**CEPLATTYN GT** is based on a synthetic base oil, new types of additives, and a combination of white, reaction-effective solid lubricants.

Lubricants in the GT range include flame-retardant substances to reduce the danger of ignition, offer a good sealing effect for leakage endangered drives and are usable for all kinds of open gears on SAG and ball mills. All CEPLATTYN lubricants in the GT range consist of primer, running-in and operating lubricants. They are used in spray, bath and circulating lubrication.

#### Open Gears

**CEPLATTYN KG 10 HMF** is based on a high-quality base oil thickened with aluminium complex soap. It is usable on all kinds of open gears and shows extremely high pressure resistance, and excellent protection against wear and corrosion.

**CEPLATTYN SF** is a high-viscosity adhesive lubricant and is based on a synthetic base oil. It is free of bitumen and solvents. CEPLATTYN SF has been specially formulated for high-speed SAG mills. It boasts very good lubrication film stability at minimum consumption and guarantees maximum equipment availability.

## **TAILOR-MADE SERVICE AND MAINTENANCE – WORLDWIDE**

**You can rely on the strength of our technical and service excellence, and our global network of specialists in all key mining locations.**

With our range of services, we ensure that our lubricants perform at the highest level and allow for your machine to run reliably and efficiently. Our expertise in this field contributes to longer maintenance intervals, reduced consumption, longer lifetimes of machines and, as such, to the sustainability and environmental strategies of mining operators.

Our local experts contribute to the performance, efficiency and process reliability of your entire application through their broad process-spanning expertise and on-site technical consultation. Whether you want specialist advice with a view to reducing your number of lubricants, longer lubrication intervals or the perfect Open Gear services, we provide you with precisely the support you need to further optimise your use of lubricants.

#### **Running-in of new open gears**

Working together with operators, they ensure the proper selection and application of the lubricants through on-site technical consultations and undertake an extensive range of services, including:

- Running-in and repairs of Open Gears
- Condition monitoring of gear drive bearings and other highly loaded parts
- Grease and oil analysis
- Extensive online reporting
- Further services, such as the checking of lube systems, temperatures vibrations, and load patterns with infrared images and videos

Specially trained service engineers assist with the commissioning and running-in of new open gears. They ensure that the drive is run-in optimally according to the principle of the LUBRITECH MULTI-PHASE LUBRICATION (M-P L) with accurately defined application quantities of the appropriate CEPLATTYN adhesive lubricant.

#### **FUCHS LUBRITECH Open Gear inspection procedure**

- Visual check of Open Gear and surrounding conditions
- Pinion and girth gear check
- Vibrations on the pinion bearings
- Temperature conditions on the pinion bearings
- Temperature conditions on the mill/kiln shell
- Check of the spray system
- Inspection of spray and pump equipment
- Temperature conditions across the surfaces of the pinion and girth gears
- Quantity determination of the lubricant
- Documentation of the result in the FLT INSPECTOR online system

## Service – inspection and repair

### Regular inspection of Open Gears

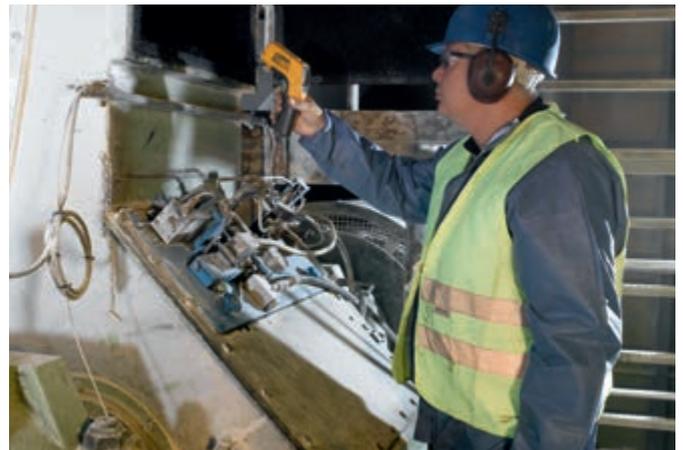
For drive units that are lubricated with CEPLATTYN, our service engineers carry out regular inspections over the entire service life. They make written notes of the general operational status, ascertain the amount of wear on the load-carrying tooth flanks, check the spray lubrication and,

if necessary, reset it. In addition, the service engineer takes extensive measurements (oscillation speed, flank temperature, etc.), which are recorded in the FLT INSPECTOR, a modern documentation system, and are always available to our customers.

### Measuring vibrations of the pinion bearing



### Measuring the tooth flank temperature



### Dynamic check of the contact pattern with a stroboscope



### Dynamic check by infrared video thermography



### Repair service

The repair of damaged tooth flanks on Open Gear drives is part of the extended service offered by FUCHS LUBRITECH. Such repair work is primarily a matter of the mechanical treatment of the working tooth flanks by grinding pittings or larger breakages, smoothing scuffings, forced

running-in and assistance with alignment of the transmission gears. On heavily worn-out or damaged tooth flanks FUCHS LUBRITECH can provide complete reprofiling of the entire gear set.

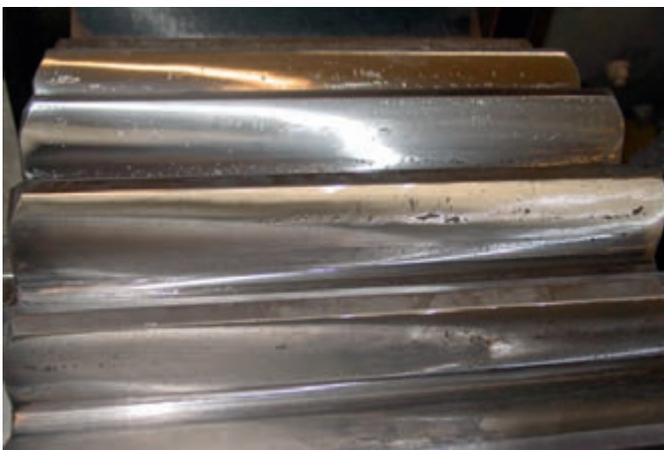
### Tooth flanks before grinding



### During grinding process



### Tooth flanks after grinding



### Older pitting and reworked pitting



## Tooth flank damage and its causes in Open Gears

Gears in a wide variety of designs provide movement throughout the industry. If a gear wheel suddenly stops, the causes can differ considerably. Statistically speaking, damaged tooth flanks account for about 60 per cent of gear drive defects.

The correct lubricant eliminates many damage causes. It does not matter whether a light oil or an adhesive lubricant is under consideration. Nor does it matter whether it is a high-speed vehicle gearing or a low-speed Open Gear drive: whenever teeth mesh the appropriate lubricant is one of the most important factors for smooth operation. Scuffings and abrasive wear, for example, can

be influenced to a large extent by the lubricant. A poor-quality lubricant also has a direct adverse effect on the occurrence of fretting corrosion, scoring and scuffings. The consequences of a lack of lubricant usually include increased wear or deformations such as the development of rippling and hot or cold flow. The chart below gives a basic overview of the problems that can be experienced.

### Cracks



### Pittings/seizure



### Deformations



### Tooth breakages



### The causes of tooth flank damage in Open Gears

		Cracks		Pittings			Deformations				Tooth breakage		Wear			Corrosion		Other types of damage							
		Grinding cracks	Hardness cracks	Material cracks	Fatigue cracks	Initial/destructive/fatigue pitting	Flaking	Spalling	Indentations	Rippling	Hot flow	Cold flow	Overload breakage	Fatigue breakage	Normal wear	Abrasive wear	Interference wear	Scratches	Scoring	Scuffings	Chemical corrosion	Fretting corrosion	Cavitation	Erosion	Overheating
		Cracks			Pittings				Deformations				Tooth breakage		Wear					Corrosion			Other types of damage		
Operational conditions/assembly faults	Alignment errors				■	■	■					■	■	■											
	Fixing of pinion				■	■	■					■													
	Frequent load changes					■							■												
	Overload				■	■		■	■		■	■							■	■					■
	Impact/vibration stress	■				■		■	■		■	■	■									■	■		
	Incorrect running-in					■															■				
	Speeds too low/high					■						■								■	■				
	Dust ingress								■						■	■		■	■	■				■	
	Dynamic changes				■	■		■		■		■	■												■
	Shortage of lubricant					■				■	■	■			■										
Lubrication faults	Wrong consistency					■			■					■					■		■				
	Inadequate quality					■			■					■					■		■				
	Soiling with solids/liquids								■						■		■	■	■	■		■	■		
	Incorrect application									■					■					■					

## Re-conditioning service

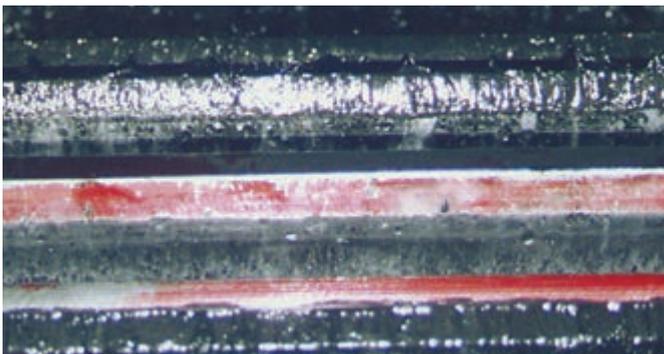
### Forced running-in with RE-CONDITIONER

In cases where normal running-in does not result in a sufficient contact pattern or the drive has to be run in at full load, a forced running-in (the quick running-in method) represents the best solution. This forced running-in procedure is also suitable for achieving an optimum load-carrying capacity and surface finish if the load-carrying surfaces show scuffings. In case a new pinion is installed in combination with an old girth gear

Re-Conditioning is used to reprofile the old girth gear with the new profile of the pinion. Forced running-in involves a service lubricant known as RE-CONDITIONER being manually applied to the working surfaces in addition to the regular CEPLATTYN RN lubricant during production. This RE-CONDITIONER effects a smoothing of the working surfaces within in a shorter time, thus tremendously reducing the running-in time.

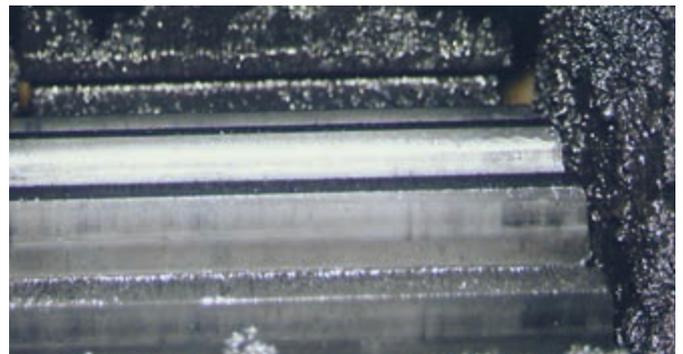
### The use of RE-CONDITIONER

#### Before



red = no contact

#### After



complete tooth contact

### Case study: smoother running after Re-Conditioning

When restarting a helical, double-pinion cement mill small deviations in axial and radial run-out of the girth gear had the effect of high vibration differences between the pinion bearings. At the run-out pinion the vibration levels were well below 2 mm/s, but they were above 8 mm/s at the run-in pinion. The operator could not accept this large difference. Even after several corrections of the trans-

mission gear no improvement was achieved. The manufacturer of the machinery therefore initiated a forced running-in. The application of RE-CONDITIONER for nine hours resulted in a carefully controlled redistribution of the load: the vibrations of both bearings were eventually below 2 mm/s. Result: a smooth operation.

**The material removal generated through using the RE-CONDITIONER requires specialised technical knowledge. Forced running-in is only carried out by FUCHS LUBRITECH Service Engineers. For gears under warranty the machine or gear manufacturer must agree to this procedure being conducted prior to the start of the procedure.**

### Vibration monitoring



■ run-in pinion ■ run-out pinion

Extract from permanent vibration monitoring at the plant.  
Reduction of vibrations during forced running-in.

## FLT INSPECTOR – online documentation

With the FLT INSPECTOR, FUCHS LUBRITECH is making a unique online documentation database with an integrated, graphical trend analysis available that enables the customer to retrieve all relevant information on their system and the lubricants used at any time.



The open gear service, combined with the online provision of inspection reports, is a further step towards being able to operate open running drives reliably.

### Your benefits with the FLT INSPECTOR

- Availability of all reports at a glance
- Online access at any time
- Instant check via a traffic light system
- Graphical trend analysis for temperatures and vibrations
- Rapid transmission of data and reports
- Individual access hierarchy
- Optional extra information (attachments) for each inspection report
- App solution for mobile devices

Sample report from our FLT Inspector

**REPORT FOR OPEN GEAR DRIVE**

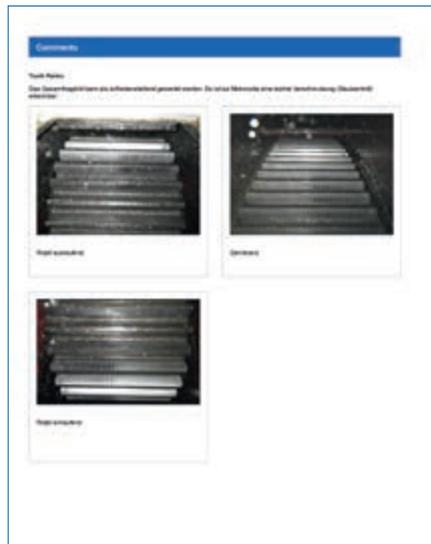
**Machine ID:** 123456789  
**Date of Inspection:** 11/05/15  
**Name of Inspector:** J. Smith

**Machine Data:**  
 Machine Name: DriveShaft 2  
 Machine Manufacturer: MaxPower  
 Manufacturing Year: 2010  
 User Company: Platinum Pty Ltd

**Gear Data:**  
 Number of Pinions: 10  
 Gear Type: Spur  
 Gear Ratio: 10:1  
 Gear Material: Steel

**Lubrication Data:**  
 Lubricant Type: SAE 68  
 Manufacturer of Lubricant: Mobil  
 Recommended Oil Grade: SAE 68  
 Current Oil Level: 100 L

**Check of Lubrication System:**  
 Lubricant Filter: ✔  
 Lubricant Pipe: ✔  
 Distribution: ✔  
 Spray Pattern: ✔  
 Lubricant Pressure: ✔  
 Air Filter: ✔  
 Air Pressure: ✔  
 Flange: ✔  
 Center Hole: ✔  
 General Comments: ✔  
 Temperature: 100 L



**Check of Vibration and Temperature**

Vibration: W, V, A	Temperature Profile	Vibration: W, V, A
20.0, 20.0, 1.0	100, 100, 100	20.0, 20.0, 1.0
10.0, 10.0, 0.5	100, 100, 100	10.0, 10.0, 0.5
10.0, 10.0, 0.5	100, 100, 100	10.0, 10.0, 0.5

**Machine:**

**Temperature:**  
 Bearing Temperature: 100, 100, 100  
 Gear Temperature: 100, 100, 100  
 Shaft Temperature: 100, 100, 100

First part of the inspection report contains customer and system data, as well as images and comments.

Measurements of values for temperatures and vibrations, including reference values relating to the previous inspection, can be found in this second part.

Tooth flank temperature run-in pinion

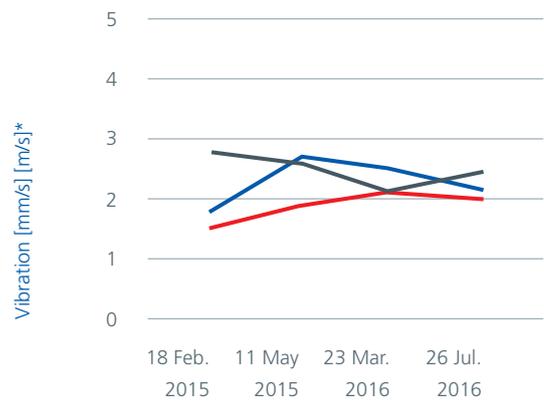


Checkpoints across the tooth width [mm]

- 18 Feb. 2015
- 11 May 2015
- 23 Mar. 2016
- 26 Jul. 2016

Graphic trend analysis enables informative display of temperatures and vibrations over time.

Vibration run-out of pinion/fixend



- Horizontal
- Vertical
- Axial

## Overview of products

Product name	Short description	Application
<b>MEISSELPASTE</b>	Chisel paste for hydraulic hammers	Using a grease gun or attached lubrication systems
<b>CEPLATTYN® ECO S PLUS</b>	Environmentally friendly lubricant for wire ropes in open cast mining	Manually using a paintbrush, other type of brush, and gloves
<b>CEPLATTYN® KG 10 HMF</b>	Rope lubricant on a mineral oil basis containing graphite, lubricant for open gears	Manual application to ropes, application to open gears using spray lubrication systems
<b>CEPLATTYN® KG 10 HMF RANGE</b>	Adhesive lubricant containing graphite for open gears	Application to Open Gears by means of spray lubrication system
<b>URETHYN® MP 2</b>	Polyurea grease on mineral oil basis for the lubrication of highly stressed roller and friction bearings, also at increased temperatures	Application using grease guns or central lubrication
<b>LAGERMEISTER® HDG 00</b>	Heavy-duty EP semi-fluid grease with white solid lubricants for the lubrication of upper bearings of gyratory crushers	Application with central lubrication system
<b>CEPLATTYN® GT RANGE</b>	Light-coloured, high-viscosity adhesive lubricant with white solid lubricants for Open Gears	Application by means of spray lubrication system or in bath and circulation lubrication
<b>CEPLATTYN® SF RANGE</b>	Light-coloured, high-viscosity adhesive lubricant for Open Gears	Application by means of spray lubrication system or in bath and circulation lubrication
<b>STABYL® 300 AL 2</b>	Temperature and pressure-resistant grease with graphite for pinion and trunion bearings on SAG and ball mills	Application using grease guns or central lubrication
<b>STABYL® HD</b>	Heavy-duty grease for highly stressed roller bearings under extreme conditions, main area of use: bearings on roller presses	Application using grease guns or central lubrication
<b>GEARMASTER® CLP</b>	High-performance gear oil on a mineral oil basis for spur, bevel and planetary gears	Bath and circulation lubrication, viscosities from 100–680 mm <sup>2</sup> /s
<b>GEARMASTER® SYN</b>	Fully synthetic high-performance gear oil for spur, bevel and planetary gears	Bath and circulation lubrication, viscosities from 100–1,000 mm <sup>2</sup> /s
<b>GLEITMO® 100</b>	Assembly paste for the assembly and running-in lubrication of friction bearings, threaded spindles and bolted connections	Manually
<b>PBC®</b>	Hot thread paste on the basis of NE metallic powder, frost protection agent for screws, bolts and threads	Manually
<b>FERROFORM SUPER 7</b>	Special rust loosener with solid lubricants for loosening rusted screws, pressed and bolted connections	Spray can
<b>LAGERMEISTER® XXL</b>	Special long-term grease with universal range of application for the lubrication of roller and friction bearings	Manually using grease gun or central lubrication system
<b>CEDRACON</b>	Low-viscosity rope lubricating and corrosion protection fluid for wire ropes	Application by brushing, immersing or spraying

Properties	Approvals/References	Symbols*
Temperature range: -20/+1100 °C Good EP properties Reduces wear	Krupp, Montabert, Rammer, Indeco, SKF (Vogel+Lincoln), BEKA	
Temperature range: -20/+120 °C Good wear and corrosion protection Good resistance to water		
Temperature range: -10/+140 °C Good wear and corrosion protection Forms an adhesive lubricating film	FLSmidth, Thyssen Krupp Industrial Solutions, KHD	
Temperature range: -5/+140 °C Good wear and corrosion protection Forms a very adhesive lubricating film resistant to high pressures	FLSmidth, Thyssen Krupp Industrial Solutions	
Temperature range: -20/+180 °C Excellent EP properties Very good corrosion protection and resistance to water	FLSmidth, Thyssen Krupp Industrial Solutions, KHD, Metso, Outotec	
Temperature range: -30/+120 °C Ideal for extreme operating conditions, e.g. vibrations Very good wear protection		
Temperature range: 0/+140 °C Extraordinary wear protection Very good lubricating film stability No self-ignition	KHD, ThyssenKrupp Industrial Solutions, FLSmidth, metso, Outotec	
Temperature range: 0/+120 °C Good wear protection Free of solvents and bitumen Causes no solid deposits in the tooth root	Ferry-Capitain/CMD, Outotec, Metso, Citic, KHD	
Temperature range: -20/+150 °C Thermal and mechanical load-carrying capacity Good EP properties	FAG, SKF, KHD, FLSmidth	
Temperature range: -10/+120 °C Excellent EP properties Good wear protection Excellent emergency running properties	Polysius, KHD, FLSmidth, Koeppern	
High load-carrying capacity High resistance to ageing Excellent wear protection	Siemens-Flender, Maag	
High resistance to ageing Very long maintenance intervals Wide temperature range	Siemens-Flender, Maag	
Temperature range: -35/+400 °C Prevents stick slip Facilitates assembly and disassembly Extremely pressure-resistant		
Temperature range: -20/+1200 °C Prevents seizure and scuffing Protects against corrosion	FLSmidth, Thyssen Krupp Industrial Solutions	
Loosens rust Creeps under water Excellent lubrication properties Removes squeaking noise		
Temperature range: -30/+160 °C High compressive strength Excellent protection against wear Very high corrosion protection	ThyssenKrupp Industrial Solutions	
Temperature range: -35/+65 °C Good corrosion protection Good wear protection		

\*A guide to the symbols used on this page, can be found on the next page.

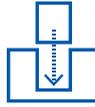
## Guide to symbols



Roller bearings



Plain bearings



Flushing



High temperature



Anti-corrosive



Water-resistant



Chains



Gear tracks



Open Gears



Eco-friendly



Extreme pressure



Wire-rope lubricants



Bolt and threaded connections



Hydraulics



Construction machinery



Slideways



Maintenance aid



## Innovative lubricants need Experienced application engineers

Every lubricant change should be preceded by expert consultation on the application in question. Only then the best lubricant system can be selected. Experienced LUBRITECH engineers will be glad to advise on products for the application in question and also on our full range of lubricants.



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