



Special lubricants  
for the mining industry



**BECHEM**  
LUBRICATION  
TECHNOLOGY



# Special lubricants for the mining industry

## BECHEM – Lubrication solutions for industry

As the oldest German manufacturer of industrial lubricants, BECHEM today is one of the leading producers of high-quality special lubricants and metal working fluids.

BECHEM products convince by innovative formulations in the most diverse of industrial applications – in machining and forming metal working processes, in coating technology and as for-life lubricants in various technical components.

A strong network of distributors and several national and international production sites ensure that BECHEM products are readily available worldwide.

**Tomorrow's technologies. Today.**

## PICTOGRAMS

### APPLICATIONS

- Roller bearings 
- Plain bearings 
- Open gears 
- Closed gears 
- Chains 
- Wire ropes 

### PROPERTIES

- High loads 
- Low temperatures 
- High temperatures 
- High speeds 
- Noise damping 
- Resistant to water 
- Biodegradable 
- Good pumpability 
- Corrosion protection 

# High safety in deep mining

In mining, heavy-duty and high-temperature lubricants, hydraulic fluids and multifunctional oils have to resist high mechanical and thermal loads as well as the rough ambient conditions. BECHEM offers special solutions for the lubrication of roller and plain bearings, for gear lubrication and the operation of hydraulic equipment. These meet all requirements regarding specific performance and extended lifetime and, of course, economic efficiency combined with environmental compatibility.

To comply with special standards and safety regulations in deep mining, BECHEM has developed special fire-resistant hydraulic fluids. High-performance lubricating greases and oils for heavy-duty and high-temperature applications meet the relevant safety standards and guarantee the best performance. For the mining industry, BECHEM offers specialities, such as chain and rope lubricants and maintenance products that excel in the highest quality, optimised performance and best economy.



Hydraulic shield support with integrated chain conveyor and shearer



Continuous heading machine for tunnelling

» An optimal hydraulic fluid is essential for mining plants. «

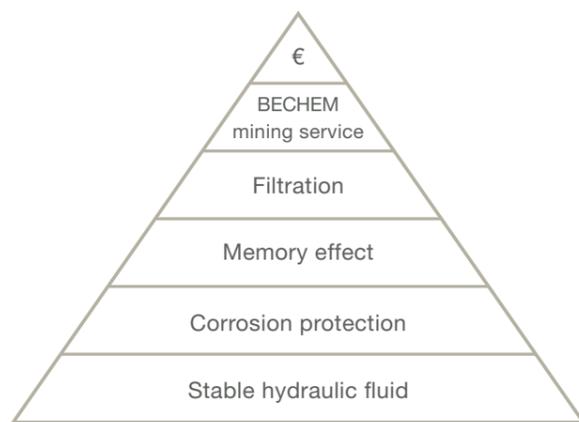
# For effective and long-lasting protection –

Hydraulic face support is the heart of a coal mine. The water hydraulics used differ from oil hydraulics in components of stainless steel or compound material. Compared to oil, water offers hardly any wear protection, has a very low viscosity and leads to corrosion. In order to protect the components, BECHEM developed **BECHEM Fimitol P 87 AF**. The fire-resistant and water-miscible hydraulic fluid of the complex concentrate **BECHEM Fimitol P 87 AF** forms a protective oil film on the component surface. The tailor-made use of **BECHEM Fimitol P 87 AF** leads to a considerable reduction in maintenance costs of hydraulic equipment in face support.

Even a slightly extended service life of the hydraulics leads to a considerable reduction of operational costs. Preventive measures resulting in a reduction of maintenance and repair costs of a face are e.g.:

- Lab analysis of the water and service fluid
- Providing support for the preparation of hydraulic fluid
- Monitoring of the plant condition and consumption of hydraulic fluid during operation
- Monitoring of filtration costs

## HFA pyramid – factors for trouble-free water hydraulic

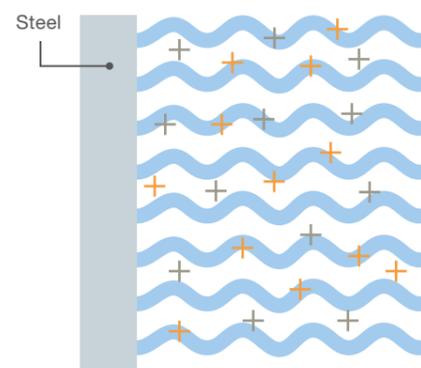
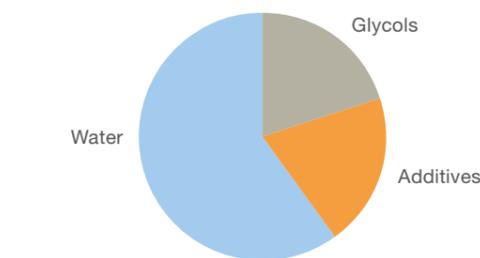


The stability of the hydraulic fluid forms the basis for an economic operation of the plant. It depends on the water quality, the concentrate and contaminations in the system. Without a stable fluid, long-term corrosion protection will not be possible.

Service and maintenance costs can be considerably reduced by combining the special features of **BECHEM Fimitol P 87 AF** (Thinking Additive Design, memory effect) with the systematic control of the equipment.

## Synthetic concentrate

60% water / 20% additive / 20% glycol



**Solution**  
Hydraulic fluid of synthetic concentrate  
Concentrate uniformly dissolves in water

● Water    + Mineral oil  
+ Glycol    + Additives

# BECHEM Fimitol P 87 AF

In mining, hydraulic fluids differentiate between emulsions (HFA-E) and solutions (HFA-S). Solutions are more stable than emulsions; however, they can form residues that might lead to the valves sticking. Under certain conditions, emulsions can demulsify. Based on a special emulsifier, **BECHEM Fimitol P 87 AF** forms a stable emulsion even in harder waters. Thanks to the use of “intelligent additives” (Thinking Additive Design), the hydraulic concentrate is almost free from water and contains 100% active ingredients.

With an oil content of 80%, the concentrate forms the basis for approximately 20% of anticorrosion additives, defoamers, polar lubricants, biocides and emulsifiers dis-

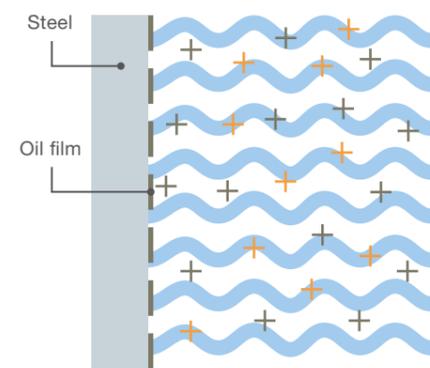
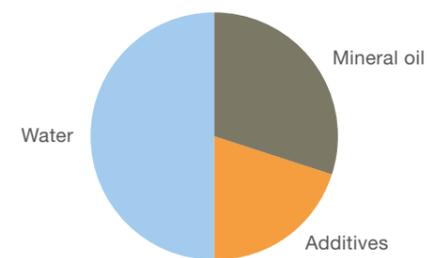
solved in oil. The special structure of **BECHEM Fimitol P 87 AF** offers efficient protection of the seals, valves and surfaces of the entire hydraulic system.

By forming a protective film which is similar to the original formulation (memory effect), it even tolerates short-term insufficient concentration caused by personnel or logistic bottlenecks.

The drawings symbolise the differences of the emulsion of **BECHEM Fimitol P 87 AF**, as well as the semi-synthetic micro-emulsion and a solution in which the additives are dissolved in water instead of oil.

## Semi-synthetic concentrate

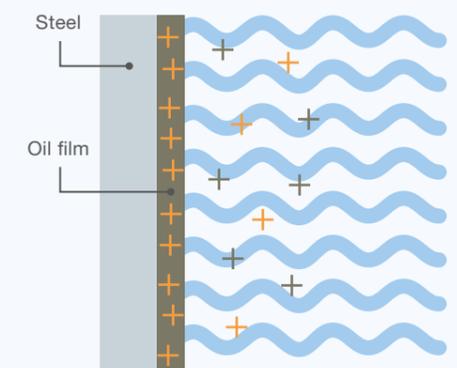
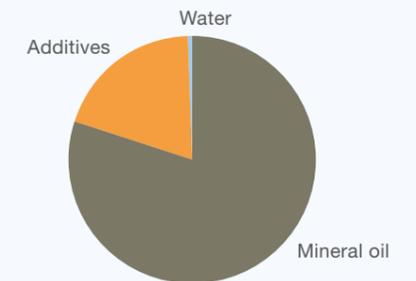
50% water / 30% mineral oil / 20% additive



**Micro emulsion**  
Hydraulic fluid of semi-synthetic concentrate  
Concentrate uniformly disperses in water

## BECHEM Fimitol P 87 AF concentrate

80% mineral oil / 19.5% additive / 0.5% water



**Conventional emulsion**  
Hydraulic fluid of **BECHEM Fimitol P 87 AF**  
Concentrate guarantees effective surface protection and emergency running properties

# Full power in mining

Very good wear and corrosion protection as well as excellent mechanical stability of the BECHEM lubricating greases allow for coping with high specific loads. Even at extended re-lubrication intervals, there will be hardly any negative influence caused by dust and humidity.

Based on the use of innovative high-performance additives and their physico-chemical reaction with the metal surfaces, the greases of the **BECHEM High-Lub FA-series** guarantee a reduced friction value and wear. For example, the use of the lubricating grease **BECHEM High-Lub FA 50** contributed to a considerably extended lifetime of slew ring bearings in hydraulic excavators. Some lubricating greases have a special combination of solid lubricants for use in bearings with very high contact pressures and/or shock loads. These are also the benefits of the **Berulit GA-series**, which are successfully applied all over the world for open gears, e.g. of ball, rod and SAG mills or for slew ring bearings of excavators.

For closed gears, BECHEM has developed high-quality gear oils. For more detailed information, please have a look at our brochure "Special lubricants for the cement industry, open cast mining and mineral processing".



PRODUCTS	Mining industry		Open cast mining/quarry				Crusher	Conveyor belts		Grinding technology	Mixing technology	Rotary kiln / rotary dryer	Chain grate kiln					
	Machinery in deep mining	Ventilation system	Excavator, bucket wheel excavator, dragline	Multi-bucket excavator	Crusher	Bearing technology	Stackers	Grinding technology	Mixing technology	Rotary kiln / rotary dryer	Chain grate kiln							
	Central lubricating grease for mining vehicles and dumpers	Slew ring bearings	Bearings rotating tower	Ropes	Chains	Central lubricating grease	Chain links	Main bearings of hammer mills or roller crushers	Chains	Ropes	Plain rollers	Guide rollers	Open gear of ball, rod and autogenous mills	Main bearing of roller mills	Open gear of roller presses	Open gear of mixing drums	Floating tyres	Sealing grease for slideways and housings
<b>Berulit 443</b> 🛢️🔧🔧🔧			⑤⑥									⑤⑥	⑤⑥	⑤⑥				
<b>Berulit EL 420</b> 🛢️🔧🔧			④⑦									④⑦	④⑦	④⑦				
<b>Berulit GA 400 → 2500</b> 🛢️🔧🔧🔧🔧			④⑧	⑤⑧				⑤⑧				④⑧	④⑧	④⑧				
<b>Berulit GA 800 → 2500 Fluid</b> 🛢️🔧🔧🔧			②③⑧									②③⑧	②③⑧	②③⑧				
<b>Berulit Gear Spray</b> 🔧🔧🔧			⑤⑧	⑤⑧				⑤⑧				⑤⑧	⑤⑧	⑤⑧				
<b>Berulit GA 2500 Spray</b> 🛢️🔧🔧🔧🔧			⑤⑧	⑤⑧				⑤⑧				⑤⑧	⑤⑧	⑤⑧				
<b>Berugear HV 20</b> 🛢️🔧🔧			④⑧									④⑧	④⑧	④⑧				
<b>Berugear UWS FG 34-00</b> 🔧🔧🔧			④⑧									④⑧	④⑧	④⑧				
<b>Berulit IKP</b> 🛢️🔧🔧					⑤⑧			⑤⑧										
<b>Berulub VPN 13 Ringlub</b> 🔧🔧🔧																	⑤⑧	
<b>BECHEM High-Lub FA 67-400</b> 🛢️🔧🔧🔧	①⑤⑧						①⑤⑧			⑤⑧								
<b>BECHEM High-Lub FA 50 MO</b> 🛢️🔧🔧🔧	①⑤⑧			①⑤⑧								①⑤⑧						
<b>BECHEM High-Lub L 2 MO</b> 🔧🔧🔧			①⑧				①⑧			⑤⑧								
<b>BECHEM High-Lub LM 2 EP</b> 🔧🔧🔧			①⑧				①⑧			⑤⑧								
<b>BECHEM High-Lub LM 0 EP</b> 🔧🔧🔧			①⑧				①⑧			⑤⑧								
<b>BECHEM High-Lub LM 00 EPW</b> 🔧🔧🔧			①⑧				①⑧											
<b>BECHEM High-Lub LT 2 EP</b> 🔧🔧🔧	①⑤⑧																	
<b>BECHEM High-Lub LFB 2000</b> 🔧🔧🔧	①⑤⑧		①⑧				①⑧											
<b>BECHEM High-Lub SW 2</b> 🔧🔧🔧	①⑤⑧							①⑧										
<b>Beruplex PMC 40 F</b> 🔧🔧🔧							①⑧											
<b>Beruplex PMC 42 F</b> 🔧🔧🔧				①⑤⑧								①⑤⑧						
<b>Beruplex CS 2 EP</b> 🔧🔧🔧			①⑧				①⑧			⑤⑧								①⑧
<b>Berutox FB 22</b> 🔧🔧🔧			⑤⑧															
<b>Berutox M 21 KN</b> 🔧🔧🔧	①⑤⑧																	①⑧

- ① Central lubrication system
- ② Gravity
- ③ Immersion bath
- ④ Spray lubrication
- ⑤ Manual
- ⑥ Prime lubrication
- ⑦ Running-in lubrication
- ⑧ Service lubrication

# Reliable in open cast mining

High ambient temperatures may lead to increased oil temperatures in gears resulting in a considerable acceleration of oil ageing. Even more critical, however, is the low-temperature behaviour of lubricants in areas with very cold winters. These climatic conditions are a great challenge for the lubricating performance of greases, but also for their pumping characteristics. For lubricating greases in conveyor systems and large equipment such as excavators, dumpers and large bucket wheel excavators, the low temperatures are often the decisive practical test.

In addition to excellent wear and corrosion protection, **Beruplex CF 2**, **BECHEM High-Lub L 2 MO** and **BECHEM High-Lub LM 2 EP** offer outstanding pumping characteristics in the sometimes very long pipelines of central lubrication systems. In case of extremely low temperatures of  $-40\text{ }^{\circ}\text{C}$ , the use of **BECHEM High-Lub LM 0 EP** or **BECHEM High-Lub LM 00 EPW** is recommended.

The reliable and cost efficient lubrication under extreme conditions requires not only the use of high-performance lubricants, but also expert knowledge with regard to their appropriate application. The BECHEM specialists have extensive knowledge, and with the BECHEM rheometer curve, the required expertise to individually advise our customers and assess the pumping characteristics of lubricating greases in central lubrication systems.



» Open-cast mining equipment requires specific high-performance lubricants. «

# Lubrication Solutions for Industry



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