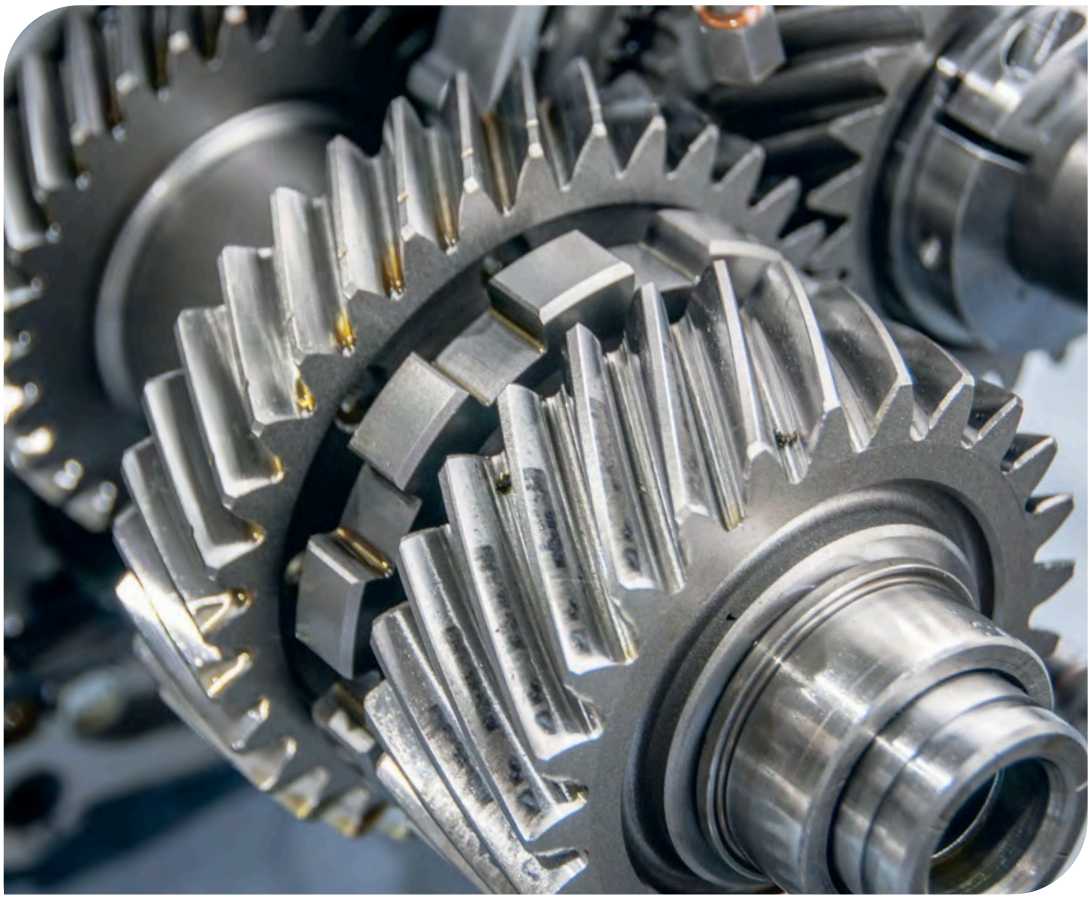
REWITEC™

Industry Applications



Repair and protection technology for gearboxes, bearings and heavy machinery


Make your equipment **last longer** and be **more efficient** with **REWITEC™ products.**

Technology for improved performance

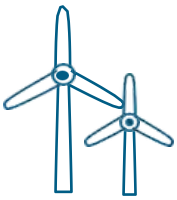
Moving machinery poses many challenges to engineers everywhere: How to improve durability, longevity and reduce frictional losses? Frictional losses can significantly increase costs associated with downtime, repair and replacement of components, as well as reduce energy efficiency.

REWITEC™ product technology helps to address these challenges, protecting investments against wear and premature failure. REWITEC products improve the service life of lubricated moving machinery across a range of applications including heavy industry, manufacturing, wind turbines, marine, automotive and more.

Industry

REWITEC products offer long-term investment protection for engines, transmissions and bearings, leading to reduced downtime for maintenance.

GEARBOXES • GENERATORS • COMPRESSORS • BEARINGS



Wind Energy

Manufacturers and operators of wind turbines rely on smooth and continuous operation.

REWITEC lubricants offer innovative ingredients for the wind industry that are able to prolong asset life and improve operational safety.

MAIN GEARS • MAIN BEARINGS • GENERATOR BEARINGS • PITCH AND AZIMUTH GEARS/BEARINGS

Marine

Low sulfur fuels can have a negative impact on marine 2-stroke engines. REWITEC products can improve operational reliability in these challenging conditions, as well as in auxiliary 4-stroke engines and other lubricated moving machinery.

MAIN ENGINES & AUXILIARY DIESELS • WINCHES • SEPARATORS

Automotive

REWITEC products provides a multitude of benefits for automotive applications. The mechanism of action of REWITEC products allows for improved energy efficiency as well as reduced vibrations, noise and torque. REWITEC products are also suitable for construction and performance racing vehicles, having outstanding effects.

ENGINES • GEARBOXES • BEARINGS • DIFFERENTIALS

REWITEC™ Product Technology

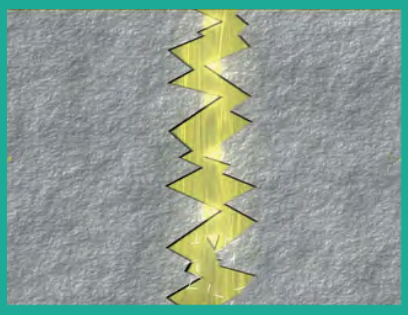
Wear, abrasion and raised temperatures can arise wherever metal surfaces come into contact during operation, causing undesirable effects.

Damage to gearboxes or bearings must be addressed before it leads to downtime and high costs for owners and operators.

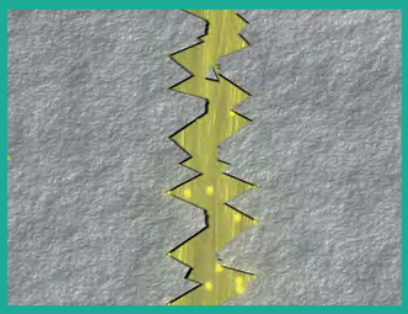
REWITEC™ products can be used not only to repair existing damage, but also preventively, at an early stage, to protect running components from surface damage.

The unique mode of action of the technology is shown in the schematic below.

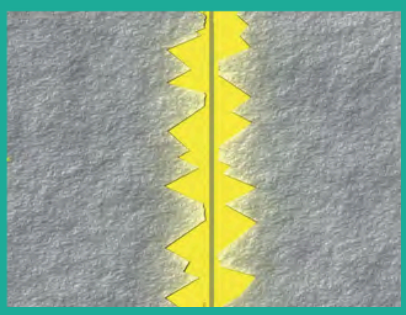
How it works



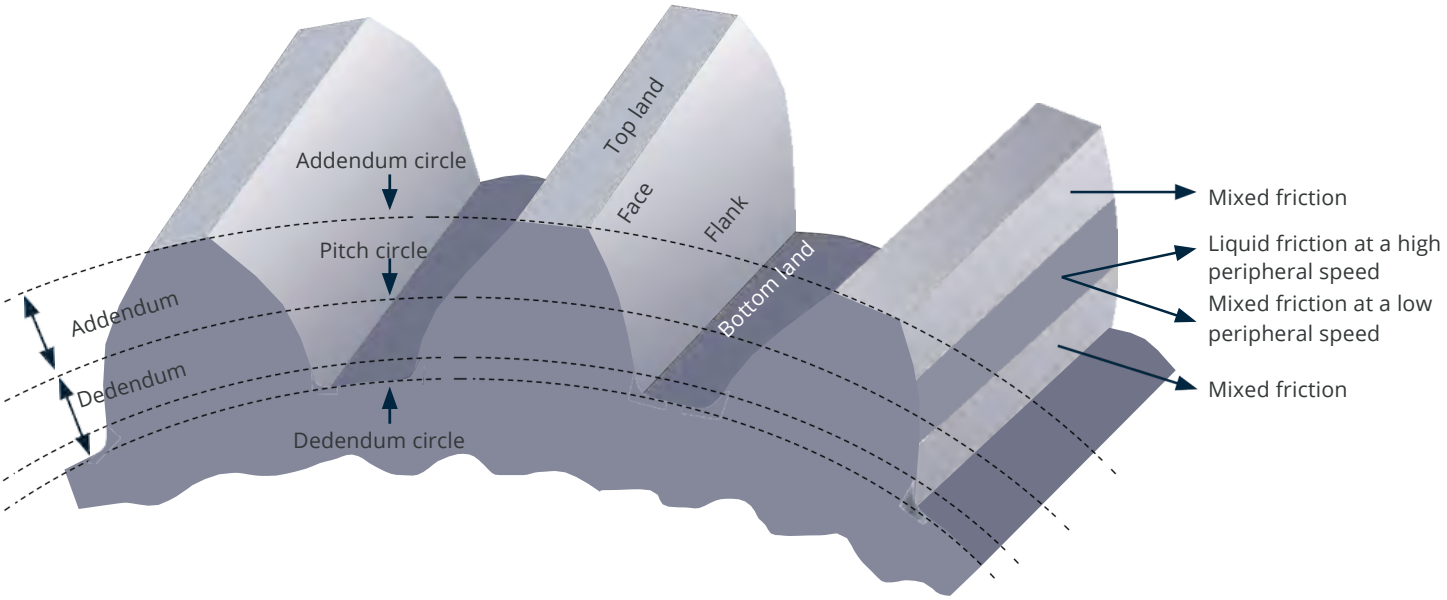
1. The existing lubricant is used as a carrier to deliver REWITEC product to the mixed friction areas within the lubricated component.



2. The REWITEC product particles react to the increased temperatures produced in the mixed friction zones, forming a protective and reparative layer.



3. The modified surfaces provide a more even load distribution and friction, wear and temperatures become significantly reduced. The properties of the existing lubricant remain unchanged.



Common damage and failure modes in gears and bearings

There are many factors that can lead to wear and damage within gear and bearing components - including poor lubrication systems, as well as environmental factors including rain and salt ingress during operation. The schematic below shows some of the main damage and failure modes that can occur within these important components.

Micropitting/grey staining
Degradation of gear tooth working surfaces under lubrication conditions where the film is too thin for the load. It appears under magnification as dense patches of micropits or microcracks.

False brinelling
When a stationary component moves very slightly, it rocks against another. It pushes out the grease and can create indentations in the bearing and eventually parts can weil together.

Fretting corrosion
Surface damage caused by repeated small movements of one contacting surface over another with the formation of fine reddish/ brown oxide particles.

White etching areas/cracks (WEAs)
Structural changes in the metal that form below the surface - subject to continuous debate as to their source

Macropitting
Visible pits which are formed when small cracks get larger to the point where material is broken off.

Smearing and scuffing
Caused by roller/raceway sliding under boundary/mixed lubrication. localised heating due to poor lubrication.

Chemical corrosion
Surface degradation caused by chemical attack.

Electic arc damage
Caused by poor earthing, insulation or by induction effects allow electrical discharge through the bearing. Can melt surfaces and create small craters in the metal. Also causes fluting, where the bearing can give a washboard appearance which causes vibration.

Scientific Studies

The REWITEC™ team has been working closely with universities and research institutes for many years to not only ensure the quality of its products, but also continuously develop them.

The technology is patented and scientifically proven by many different tests on test rigs, like the 2-disc test, FE8 test and MTM test.

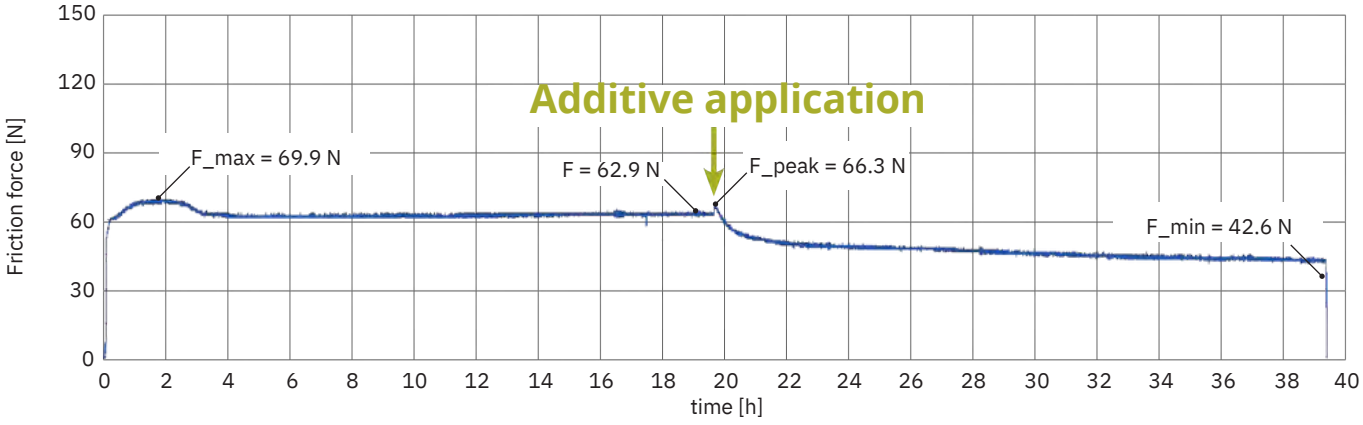
2-Disc Assembly Rolling Wear Test – Gear Oils

2-Disc Test: The 2-Disc Test bench simulates the gearbox and bearing behavior under load in mixed lubrication regime. The results are a lower friction and lower surface roughness due to the REWITEC™ product refinement process.

Test procedure and results

Stress value:	1 GPa (normal force 2150 N)
Rotatig speed:	424 rpm / 339 rpm, slip 20%
Test-duration:	39,3 h
Temperature:	oil inlet temperature 60° C
Friction coefficient:	μ=normal force/friction force

Oil	Friction reduction	Roughness reduction
ISO320 Gear Oil 1 ISO320	33%	41%
Gear Oil 2 ISO320 Gear Oil 3	35%	44%
ISO320 Gear Oil 4 ISO320	40%	54%
Gear Oil 5 ISO320 Gear Oil 6	36%	50%
ISO320 Gear Oil 7	46%	18%
Automotive racing gear oil 1	42%	25%
Automotive racing gear oil 2	55%	40%
	41%	35%
	55%	40%



ISO320 Gear Oil 1

FE8 Test

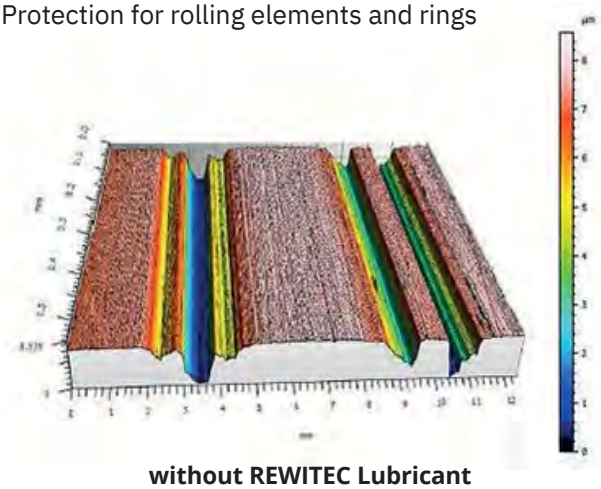
The FE8 rolling bearing test rig is used to investigate bearing- and lubricant-specific influences on the wear and friction behavior of rolling bearings. During the tests, bearing frictional torque and bearing temperature are continuously recorded.

FE8 Roller Bearing Test

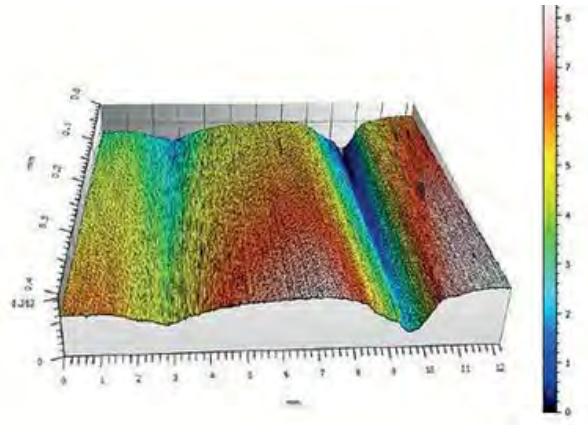
Speed:	7.5 rpm
Test-duration:	80 h
Temperature:	80° C
Load:	80 kN

Advantage with REWITEC™ Products

- 17% less wear
- Smoother surface
- Better load distribution
- Protection for rolling elements and rings



without REWITEC Lubricant

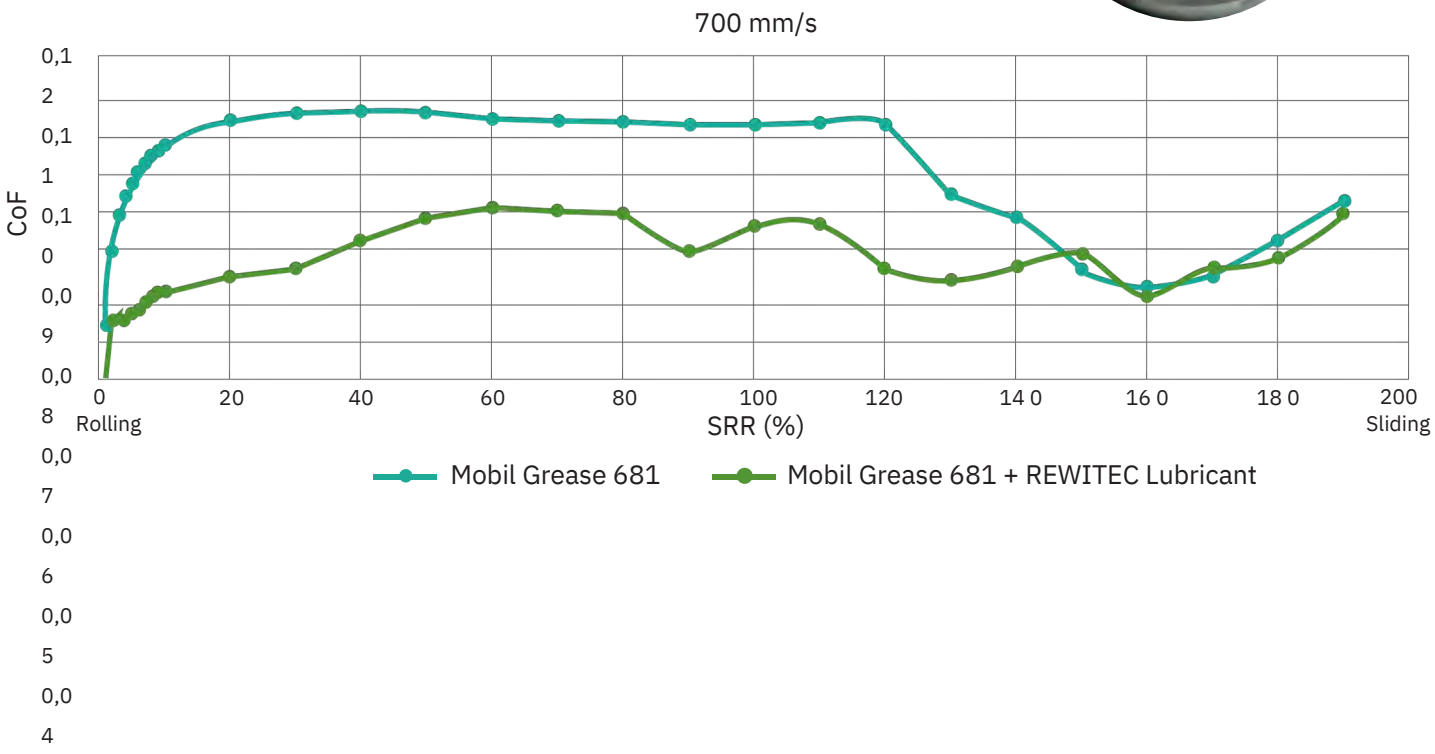


with REWITEC Lubricant

MTM Test Bench – Grease Test

The MTM2 test rig is a ball-on-disc test rig that is used to investigate the friction of lubricated and non-lubricated rolling element pairings.

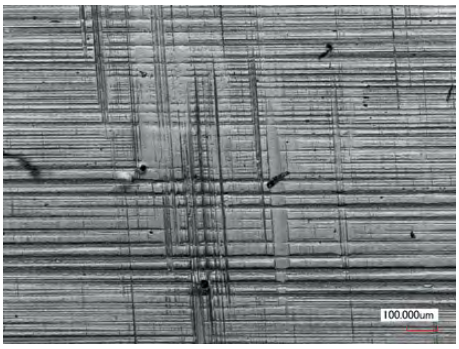
Load:	70 N
Temperature:	23° C
Time:	172 s



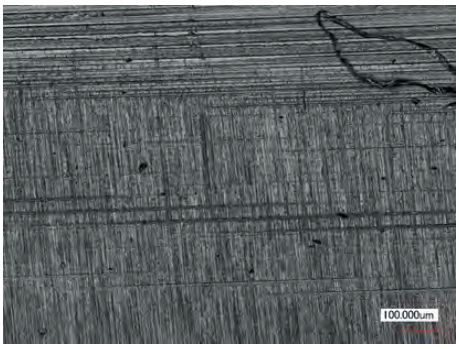
Examples of REWITEC™ Lubricant Applications

Gearbox example:

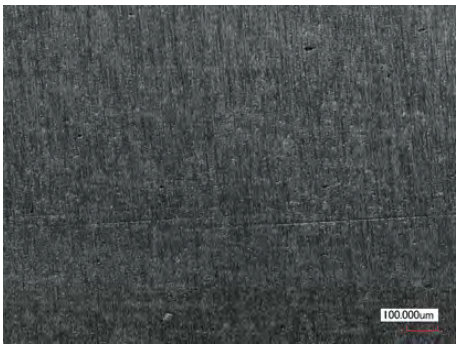
Wear development on a gear tooth over a period of two years.



Before REWITEC™ products application



6 weeks after REWITEC™ products application



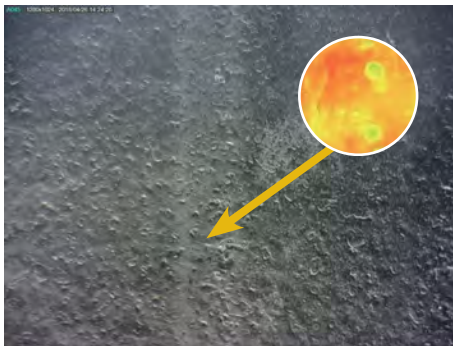
2 years after REWITEC™ products application

Run through marks on the tooth flank after 6 weeks and 2 years:

- Reduction of the surface roughness and friction force
- Improved load carrying capacity
- Less stress for the tooth flank

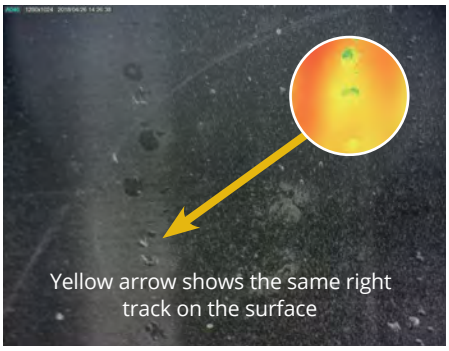
Bearing example:

Coating and analysis of a main bearing



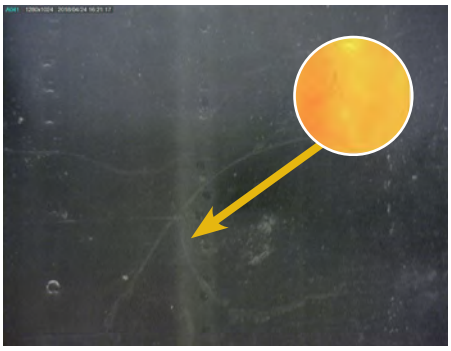
Before REWITEC™ products application

Ra = 0.556 µm (within the track)



5 months after REWITEC™ products application

Ra = 0.403 µm (within the track)



12 months after REWITEC™ products application

Ra = 0.225 µm (within the track)

REWITEC™ products

REWITEC™ products PowerShot™ product range

The PowerShot™ products can be used in various versions in several areas, including cars, trucks, buses, ships, construction machinery, CHP/ powerplants, rail vehicles, motorbikes or motorboats.

• Extended lifetime of engines • Optimized performance • Reduction of engine oil consumption • Reduction of emissions of particles and

exhaust gases
• Reduction in fuel consumption

REWITEC™ products DuraGear™ product range

A surface repair concentrate for gears

• Reduction in friction of up to 55%*
• Reduction in roughness on metal surfaces

up to 60%*
• Decrease in temperature of up to 20%*
• Significant optimization of primary material properties
• Reduction in wear and abrasion, as well as reconditioning of frictional metal surfaces
• Surface finishing during operating (without downtime)
• Recommended to use 1 liter per 100 liters of engine oil

*Tested at the Competence Centre of Tribology at the University of Mannheim, Germany using a 2-disc test rig.

REWITEC™ products GR400 (+5, +10) product range

A high-performance concentrate for grease for bearings, incorporating REWITEC's patented additive technology to repair previous damage and optimize metal surfaces

- Reduction in friction in bearings
- Prevention of pitting and grey staining
- Reduces operating temperatures
- Reduction in roughness of metal surfaces
- Significant optimization of primary material properties
- Very good adhesion and water resistance
- Reduction in wear and abrasion
- Surface finishing during operation (without downtime)
- 1:1 grease replacement
- Top treatment for 5 kg/ 10 kg grease with GR400 +5/ +10

Benefits with REWITEC™ products

- Less stress and wear for gearboxes and bearings
- Higher reliability and availability, no downtime
- Significant lifetime improvement
- Higher efficiency
- Less stress and longer life for lubricants
- Repairing and protection effect
- Cost savings, higher earnings

Who are we?

The technology company, founded in 2003, is dedicated to promoting the longevity and energy efficiency of plants, machines, and gearboxes. With the development of nano- and microparticle-based lubricant additives, REWITEC® aims to enhance the sustainable lifespan of treated engines and gearboxes, thereby contributing significantly to energy efficiency.

With the goals of protecting investments from wear and excessive energy consumption, as well as achieving system safety and ease of repair, the medium-sized lubricant specialist REWITEC® markets its solutions worldwide.

For its own development, however, the independent company places great importance on high-quality manufacturing in Germany. For this reason, all research, development, and production take place at its headquarters in Lahnau.

Further information

For further information or guidance please contact us:
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