



Special lubricants for metallurgical processes



Lubricants for the steel industry

Save costs, environment and machine elements through lubrication awareness

The continuous strive for better performing technical equipment has steadily increased the demands on modern steels and consequentially the involved lubricants as well.

The steel manufacturing process is challenged by tribological* obstacles e.g. high process temperatures, corrosive cooling liquids, abrasive dust, devastating shock-loads etc. Additionally; the high costs associated to process interruptions must carefully be considered. Protecting, high-quality lubricants that enable robust running during unfavourable operating conditions is part of the core competence that makes CARL BECHEM GMBH special. It has been proven that BECHEM's high-performance lubricants have the power to extend the technical life of heavy equipment with trailing positive environmental benefits. BECHEM's market leading lubricants are designed to passivate entraining process fluids, protect the surfaces against tribo-corrosion, supply a protective film with high separation power and maintain lubrication also during high operating temperatures – among others.

* Tribology: the science of lubrication, friction and wear



In close collaboration with equipment manufacturers, industrial- and academic partners we continue since decades to improve the recipes of our products in order to excel in challenging applications and at the same time fulfil or surpass the strict environmental legislations imposed on us and our customers.

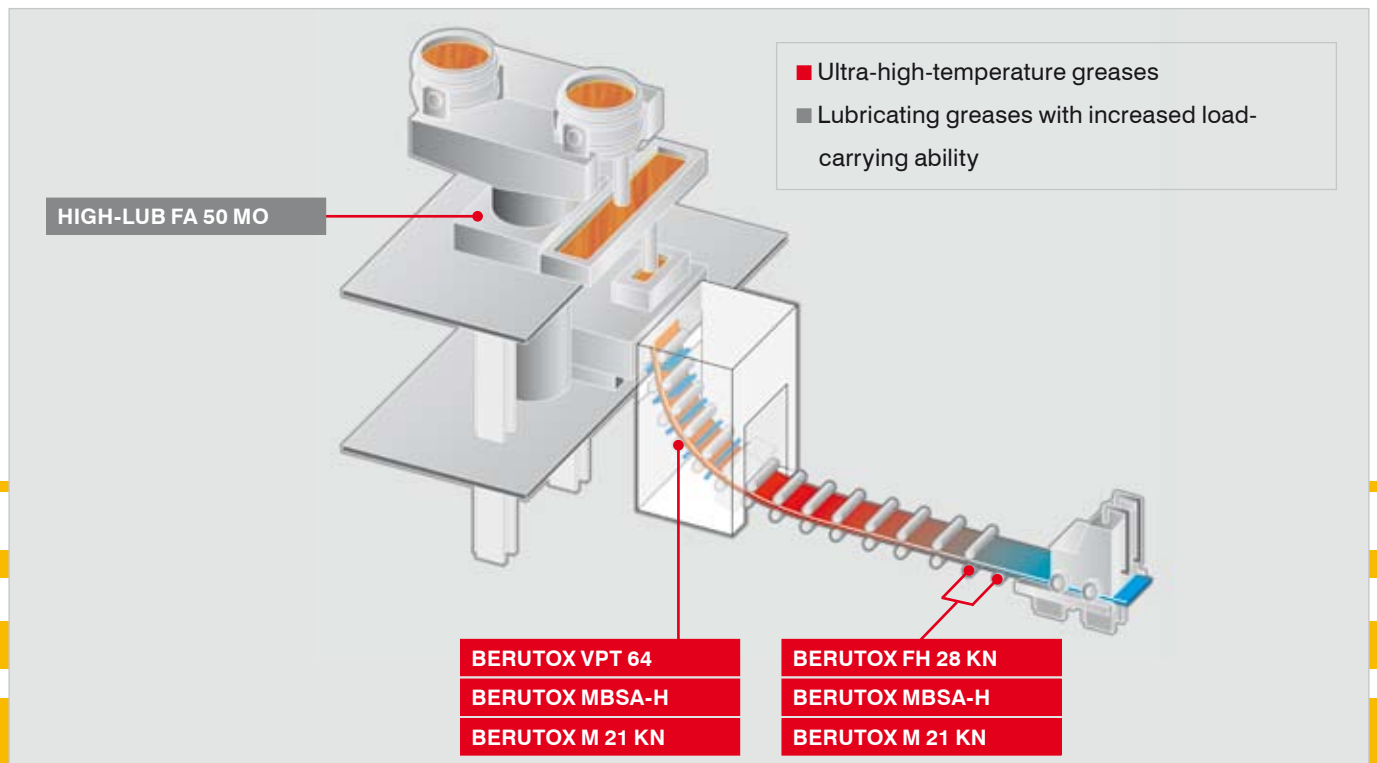
Backed up with additional system understanding, know-how and products from BECHEM; the customer defeats the challenging lubrication problems as a team.

Continuous caster unit

The operational environment in the continuous caster unit is characterised by slow rotation, high temperatures and corrosive process water ingress.

Being market leader in the technology of large molecular polyurea products, BECHEM has developed the BERUTOX M 21 KN with this challenging application in mind. This product is a sealing grease with high capability of keeping water and abrasive foreign particles out of the contact, thus maintaining the intended technical life of the bearings. The combination of high surface affinity (inherent to the molecular structure of the thickener-matrix) with well-balanced additivation and thick base oil viscosity offers a lubricant designed for long-time lubrication and high performance in a thermally stressed operating environment.

For system-critical applications (as the ladle turret, straightener units or converter bearings) special lubrication solutions with e.g. solid lubricant particles and high base oil viscosity can be offered at various qualities and properties.

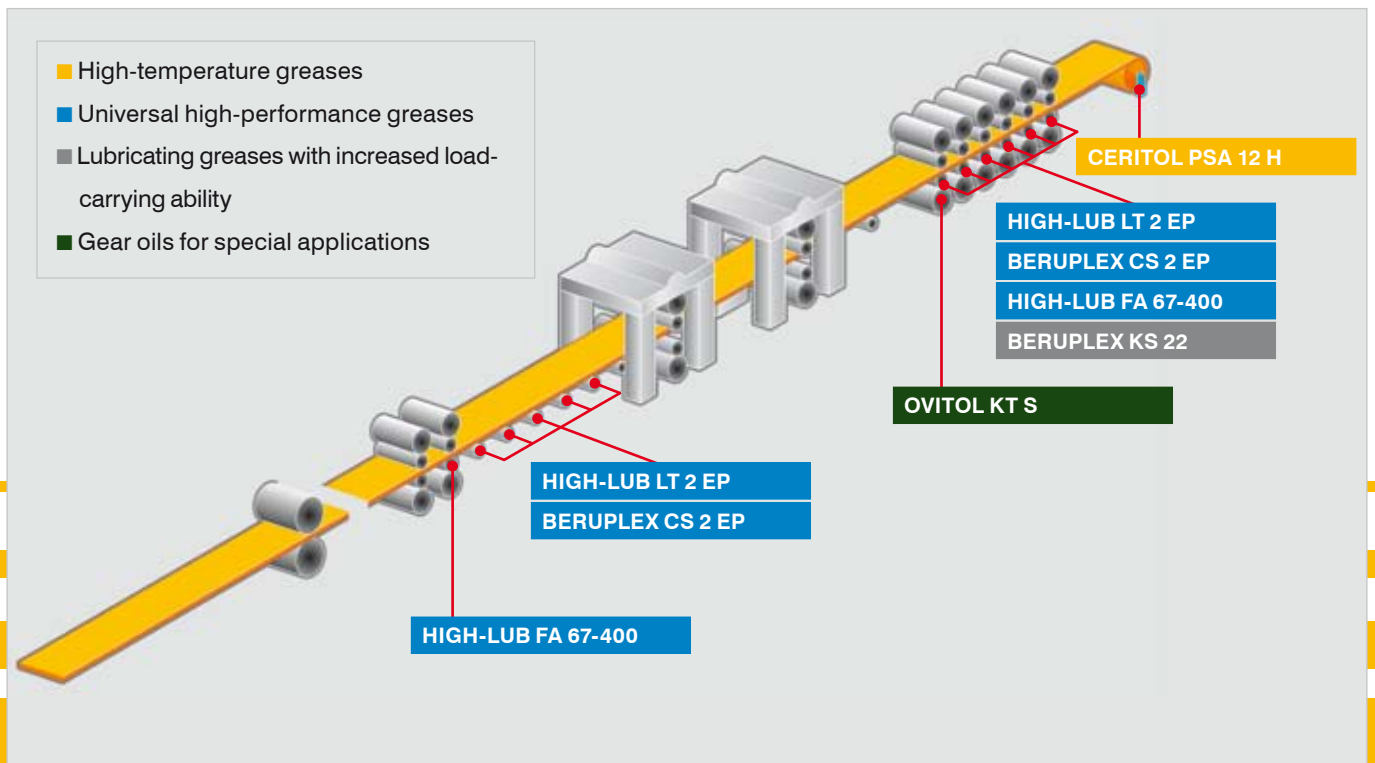


Hot strip mill

Alike with the continuous caster, the operation of a hot strip mill is characterized by high temperatures and process water ingress, however; the hot strip mill operates generally with higher rotational speeds and higher occurrence of chock loads.

Tailor-made lubricants with enhanced surface separating capability, corrosion protection and sealing ability help customers to optimize performance and up-time of their plants. The flagship in hot strip mill lubrication, HIGH-LUB FA 67-400, has been developed together with German steel industry and academia for optimum lubrication of the rolling element bearings in this challenging application.

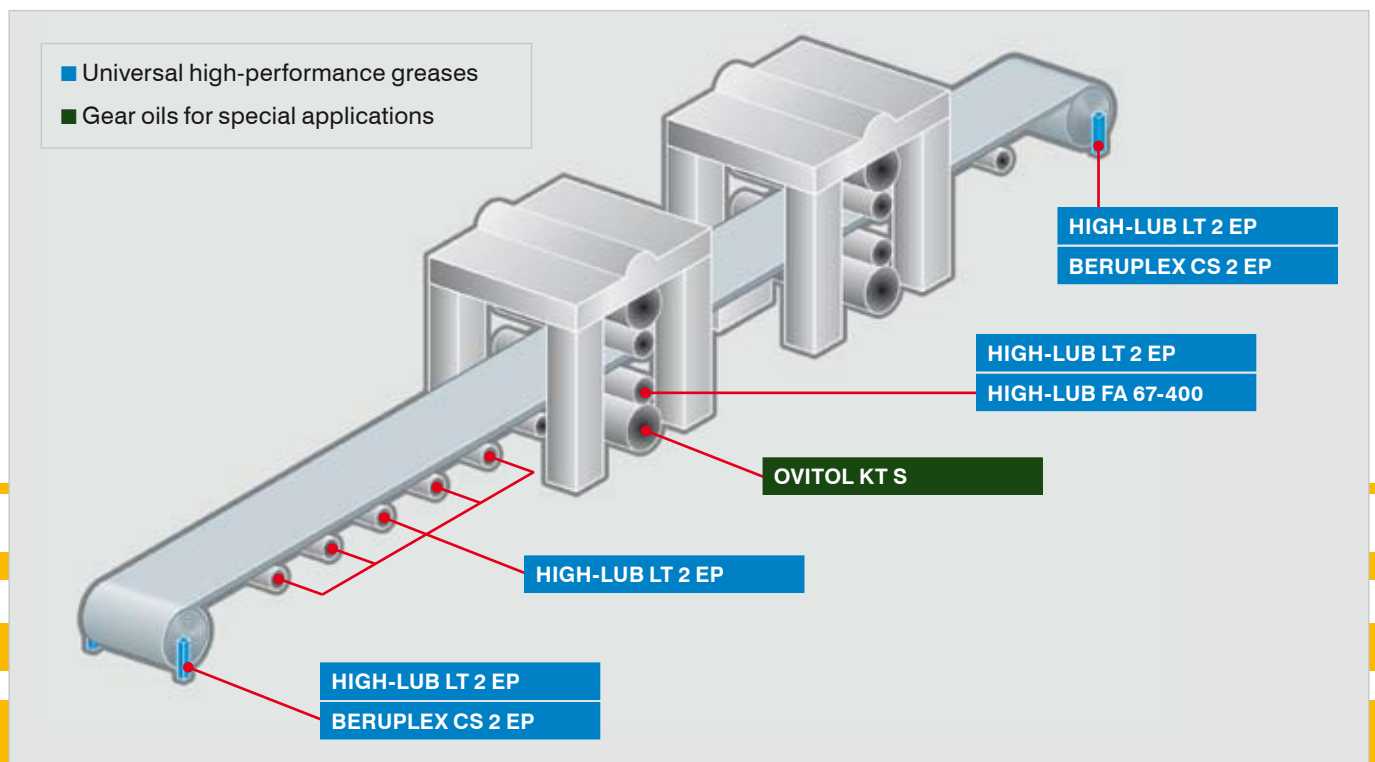
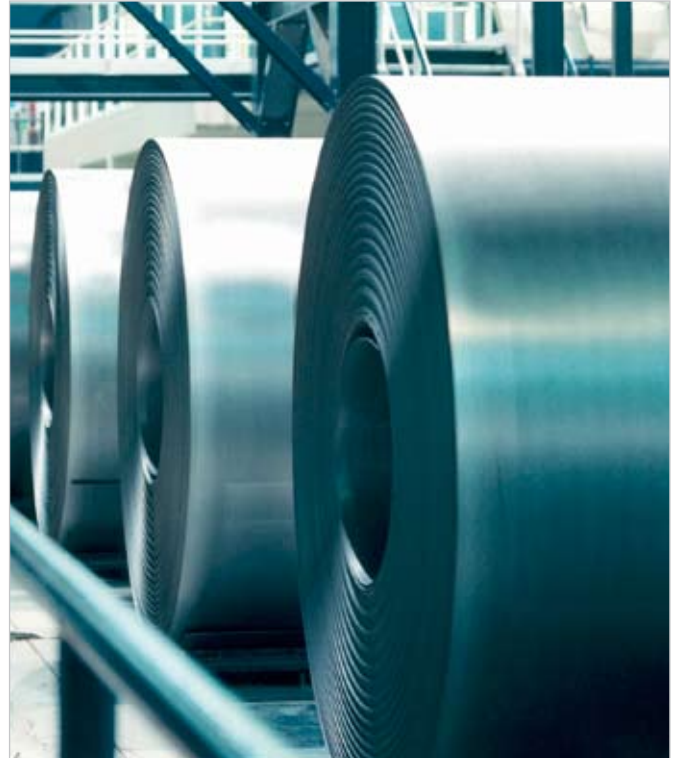
Also the newest addition to the product portfolio; HIGH-LUB LT 2 EP has already earned an internationally good reputation due to its remarkable performance. It has been developed by »steel people« for »steel applications« and additionally fulfils or exceeds the German steel norm (SEB). The introduction of BECHEM high-performance lubricants has in some cases reduced the lubrication quantity by sensational 50–75%.



Cold rolling mill

In cold rolling mills, the equipment is running at significantly higher speeds and the cooling liquid is replaced by a chemically more active rolling mill emulsion. Chemical inertness and a high sealing power are all playing active roles in – from the lubricant's side – keeping the operation running. Due to the imminent risk of overheating (increased hydrodynamic losses caused by the higher operational speeds) the oil composition and viscosity must be carefully chosen in order to minimise the temperature increase and pre-mature lubricant degradation.

Extensive tests with international partners have proved that BECHEM products have the ability to lubricate most existing equipment with a visible return of investment. Viable solutions for rolling of other materials e.g. Aluminium or Copper also exist.



Lubricants for special applications

In an integrated steel plant, the steel-processing units represent only a small part of the total operation. Sinter plants, coke plants, blast furnaces, various transmissions and transportation systems are also expensive equipment with high demands on lubricants and lubrication. The BERUTOX, HIGH-LUB and BERUPLEX lubricant families have therefore been developed in order to meet or surpass the demands in virtually all applications in an integrated steel plant. BERUTOX FH 28 KN is an excellent example of a successful product deployed in steel industry worldwide. This fully synthetic, high-temperature product is capable of sustaining an approximately 7 times longer life in the FAG FE9 roller bearing test apparatus in comparison to commercially available mineral-based equivalents. This is an attractive lubricant feature that significantly reduces the required consumption and environmental impact whilst increasing life at BECHEM-customers' equipment.

For slowly moving slewing-type bearings (always operating during mixed- or boundary lubrication conditions) the HIGH-LUB FA 50 MO is often applied. This product is composed of high viscosity mineral base oil dispersed in an adhesive Lithium/Calcium thickener and additionally enriched with solid lubricant

particles. High corrosion protection-, surface separation- and load carrying abilities are trademarks of this special BECHEM innovation.

Moving over to gear transmissions, BECHEM has developed a synthetic product family (for operation above +90°C) and a mineral based alike for high-performance operation during more commonly occurring temperatures.

Tests at customers have indicated up to 5% reduction of tribological losses and approximately 4 times longer life with BECHEM synthetic gear oils in comparison to standard mineral products on the market. Striving to always provide the best solutions; BECHEM scientists have exercised great caution to consider all aspects of chemistry in order to optimise performance, for example:

- polarity features (for surface wetting and protection)
- additives for formation of tribological layers (in order to protect against corrosion, minimise wear and rapidly maximise the contact area of the gear flanks)
- seal compatibility (to maintain good protection against foreign particle ingress in dusty environments)



Service concept

Spanning from inspections and technical support to advanced failure-mode analysis and recommendations for improvements, the BECHEM service concept is highly diversified. By forming a strong team with CARL BECHEM GMBH the customers will not only benefit from first class products but also from competent help in the following disciplines:

- Problem definition and tests
- Technical- and chemical expertise
- Customer adapted training
- Lubrication advice
- Optimisation of re-lubrication intervals
- Inspections
- Sampling and analysis of lubricants
- Failure investigations and suggestions for remedies
- Customer-specific lubricant developments

Thanks to our global competence net; skilled help from well-trained technicians worldwide is never out of reach.

This makes BECHEM truly special!



Lubricating greases, gear oils and some special fluids

Ultra-high-temperature greases

BERUTOX VPT 64	Fully synthetic, high-temperature lubricant for bearings subjected to extreme thermal load (up to 260°C); hot air fans, strand guides and ovens etc.
BERUTOX FH 28 KN	Fully synthetic, high-temperature grease sustaining operation also in chemically active environments up to 180°C; continuous caster segments, conveyors, hot air fans, cooling beds etc.
BERUTOX MBSA-H	Special urea-based lubricant for applications challenged by high radiation heat up to 180°C; discharge tables and ovens etc.
BERUTOX M 21 KN	Large molecular urea-based grease with exceptional long grease life. The product is applicable in continuous caster segments, cooling beds, conveyor systems etc. up to 180°C.

High-temperature greases/Synthetic high-temperature oils

CERITOL PSA 12 H	Specially developed polyurea thickener (for continuous operation up to 160°C) that will not clog central lubrication lines even at radiation heat in excess of +280°C. Additionally offering superb corrosion protection this product is suitable for lubrication of down-coiler mandrels, foot- and guide rolls, ovens etc.
BERUPLEX CMA 21	Calcium complex-based grease for heavily loaded applications under heavy process water ingress up to 160°C; sinter plants, blast furnaces, ladle turrets etc.
BERUSYNTH EP	Synthetic polyglycol-based CLP gear oil. Product is suitable for high-temperature operation up to 180°C in closed transmission systems – available in ISO VG 68 to 1000.
BERUSYNTH GP	PAO-based CLP gear oil suitable for operation up to 180°C, available in ISO VG 68 to 1000.

Universal high-performance greases/high-performance gear oils

HIGH-LUB LT 2 EP	Multi-purpose grease with high load-carrying ability. High sealing capability and exceptional corrosion protection makes this product suitable for applications (in the medium temperature region) in continuous casters as well as in both hot strip mills and cold rolling mills.
BERUPLEX CS 2 EP	Multi-purpose grease with high inherited (via the chemical structure) corrosion-protection ability. Suitable for lubrication of nearly all highly- and dynamically loaded rolling element bearings (in the normal temperature range) appearing in steel industry.
HIGH-LUB FA 67-400	Lithium/Calcium-based lubricant with unprecedented sealing capability and high corrosion protection. The product is widely used in e.g. work roll bearings in cold rolling- and hot strip mills all around the world.
BERUGEAR GS BM	Special gear oil with plastic deformation (PD) additives, suitable for an improved run-in process or continuous operation in heavily loaded or damaged gears. Available in ISO VG 100 to 1500.
STAROIL G	Standard mineral-based CLP gear oil; available in ISO VG 68–1000.

Lubricating greases with increased load-carrying ability

HIGH-LUB FA 50 MO	Special grease containing a highly viscous base oil and solid lubricant particles. Especially developed for highly loaded and slowly moving contacts e.g. converter bearings, ladle turrets, pivot bearings, sliding bushings etc.
BERUPLEX KS 22	Highly stable special calcium complex-type thickener for highly loaded contacts during significant influence of process fluids. Typical applications: ladle turrets, work roll bearings in hot strip mills, sinter plants and blast furnaces etc.

Special applications

BERULIT IKP	Graphite-containing chain oil with extreme pressure (EP) additivation. Suitable for application in conveyor- and loading systems operating in dusty atmosphere.
OVITOL KT S	Special lubricating oil for hydrodynamic- and hydrostatic bearings. The lubricant is especially enhanced in aspects of water demulsification, oxidation stability, air separation as well as steel and brass corrosion. Available viscosity classes range from ISO VG 100 to 680.
BECHEM SEILSTAR	Water- and dust repellent anti-corrosion agent for conservation purposes of machine elements.

That'Special!

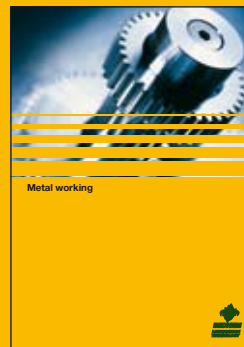
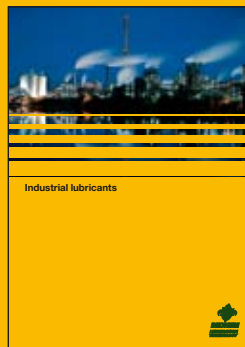
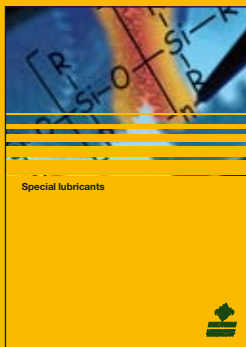
A tradition we are proud of since 1834. This is still today demonstrated by our trademark: the Rhus Flower. After permanent development, BECHEM is today a »Global Player«.

BECHEM special lubricants, industrial lubricants, metal working fluids and solutions for forming technology are based on our extensive experience in the development of special chemistry and on the latest tribologic knowledge. Our know-how with regard to friction, wear and lubrication always takes account of our customers' requirements for economical and ecological optimisation. We feel obliged to tradition and progress. That'Special!

Besides the headquarter in Hagen, BECHEM has two other production sites in Germany – in Mieste and Kierspe. In addition to that, our worldwide distribution network allows us to develop markets all over the world. With daughter companies in France, India, Switzerland and North East China, as well as Joint Ventures in the USA, South Africa, Sweden, Russia and South China, BECHEM shows its international presence.

It is our target to supply our customers with high-quality products and to simultaneously meet the corresponding international standards. The quality of our products is confirmed by certification according to the automotive standard ISO/TS 16949. The requirement to our standard is guaranteed by regular internal audits and inspections by the RWTÜV at all sites, as well as by audits carried out by our customers.

Further information material is available either direct from us or at www.bechem.com



Special lubricants

- Low and high temperature lubricants
- Plastic lubrication
- Electrical contact lubricants
- Food grade lubricants
- Valve lubricants
- Anti-Friction Coatings

Industrial lubricants

- High performance multipurpose greases
- Heavy duty and high temperature lubricants
- Hydraulic oils
- Gear lubricants
- »Green« lubricants

Metal working

- Deep drawing/punching oils
- Coolant lubricants
- Cutting and grinding oils
- Deep drilling oils
- Corrosion protection oils
- Cleaning agents

Forming technology

- Wire drawing lubricants
- Cold forging oils
- Semi hot/hot forging
- Tube drawing lubricants
- Cold massive forming oils



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