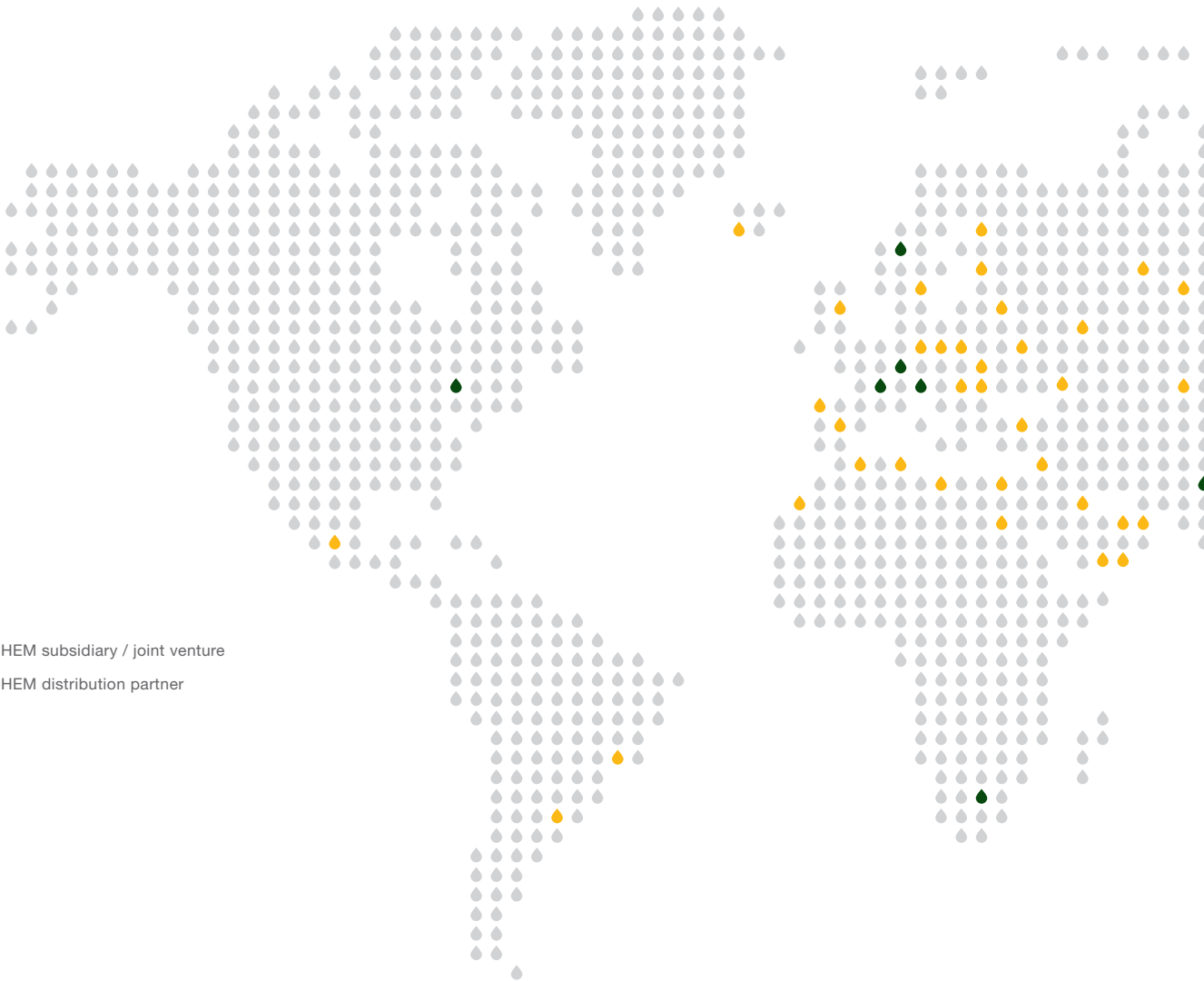


LUBRICATION SOLUTIONS FOR INDUSTRY



Products and services at a glance

BECHEM – reliable partner for the industry all over the world



CARL BECHEM GMBH is certified according to DIN ISO / TS 16949, DIN EN ISO 9001.





BECHEM is one of the leading manufacturers of high-quality special lubricants and metal working fluids.

BECHEM is development partner of the industry with high competence for tailor-made solutions, regardless of whether for the development of for-life lubricants for the automotive industry, machinery and plant engineering, or process optimisation in forming or machining operations.

Close cooperation with research institutes, industry partners and product users as well as the knowledge, skills and major commitment of our staff are guarantees for new and innovative high-performance lubricants. With the extended lifetime of components, machines and tools they considerably contribute to the success of our customers. A powerful network of distributors and several national and international production sites guarantee permanent technical support and ensure that our products are readily available worldwide.



since **1834**



Tomorrow's technologies. Today.

Examples for our principle "Tomorrow's Technologies. Today." are the following product concepts Beruforge 150, Berucoat MC, Berufluid and BECHEM Unopol AL.



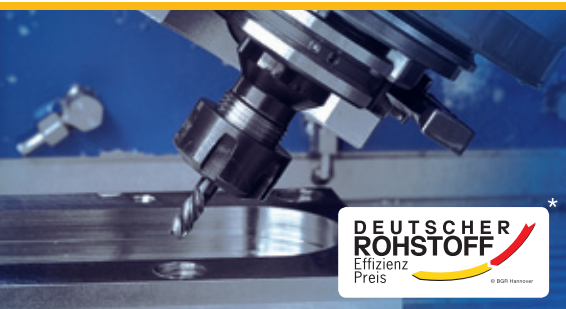
Phosphate-free wire coating

With the coating lubricants of the **Beruforge 150** series, BECHEM offers a real alternative to phosphatisation in wire coating. The reduction of production steps results in a more environmentally friendly, energy-efficient and cost-saving manufacture.



Fluid lubricants allow efficient dry lubrication

Berucoat MC – With their anti-friction coatings based on microcapsule technology BECHEM offers coating systems which exceed by far the lifetime of conventional anti-friction coatings on MoS₂ basis.



Viscous water replaces oil as a coolant

With the water-based, mineral-oil free **Berufuid*** coolant concept, BECHEM has created a completely new, high-quality coolant category besides the conventional water-miscible and non water-miscible metal working fluids, which allows sustainable and more energy-efficient production.



Emulsion technology in aluminium wire drawing

In aluminium wire drawing, **BECHEM Unopol AL** has introduced a new era and allows the use of emulsions even in rod wire drawing. The product convinces by superior finished products and cleaner working areas.

* Berufuid – has been awarded the German Raw Material Efficiency Prize, a joint project of BECHEM, Fraunhofer Institute for Process Engineering and Packaging, and Institute of Machine Tools and Production Engineering (TU Braunschweig); © BGR Hannover



Tank system, BECHEM production facility in Mieste

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Products



For most demanding applications in automotive technology, machine and plant engineering, aeronautics or the rough conditions in the heavy industry, BECHEM offers the user a wide range of high-performance lubricants to solve various tribological problems. This range includes lubricating greases and pastes, lubricating oils, anti-friction coatings as well as process media which cover the entire field of metal working operations.



Lubricating greases for

Roller and plain bearings

Multipurpose and long-life greases, lubricating greases for all temperatures and speeds as well as high loads



Open and closed gears

Priming, running-in, service lubricants and adhesive greases for open gears, mineral-oil based and synthetic high-performance lubricants for closed gears, semi-fluid gear greases



Chassis and brake systems

Long-life lubricating greases for heavy duty supporting, ball and constant velocity joints, for components of braking, steering and clutch systems as well as for wheel bearings and sealing elements



Plastic lubrication

Lubricating greases for low and high temperatures, noise damping greases and greases for shock loads for various material combinations and requirements in roller, plain bearings and small gears



Fittings

For-life lubrication of hot and cold water taps in household and industrial appliances, high and low temperature lubricants for gas taps, gas supply lines and gas distribution units, for sealing and construction elements of elastomer materials

Electrical contacts

Contact greases, damping greases, products for corrosion and wear protection



Rail applications

Lubricating greases for rail, wheel flange, buffer plate and switch plate lubricants



Lubricating oils

Hydraulic fluids

Mineral-oil based hydraulic oils (HLP, HLPD and HVLP), fire-resistant HFAE, HFAS, HFC and HFDU hydraulic fluids, biodegradable hydraulic fluids (HEES, HETG)



Gear and circulation oils

Mineral-oil based and fully synthetic gear and circulating oils on polyalphaolefin or polyglycol basis and ester-based biodegradable products



Chain oils

High-temperature, low-temperature chain oils, chain oils for the food processing and pharmaceutical industry



Oils for compressors and pneumatic tools

Compressor oils, pneumatic oils



Silicone oils

Products with low and high base oil viscosity to be used as lubricating and antiseize agent, for surface treatment and for the lubrication of low-duty bearings and gears





Pastes and sprays

Pastes

Multi-purpose lubricating and assembly pastes, high-temperature and antiseize pastes, adhesive pastes, heat sink pastes



Sprays

Wire rope lubricant, brake cleaner, anti-friction coating spray, lubricating, antiseize and assembly agents, high-temperature and antiseize spray, chain spray, anti-corrosion agent, rust and grease solvent, lubricants for open gears, live rings, gear racks, etc.



Anti-friction coatings

Air-drying and heat-curing long-life coatings for metal and plastic material combinations, elastomers, leather and foils using different lubricating and anti-wear additives as well as nano and microcapsule technologies



Environmentally compatible lubricants and additives

Environmentally compatible lubricating oils

Hydraulic, gear, pneumatic, chain saw oils, etc.



Environmentally compatible lubricating greases

Lubricating greases for roller and plain bearings, open gears, sliding surfaces and seals, semi-fluid greases for central lubrication systems, etc.



Environmentally compatible rail lubricants

Lubricating greases for rail, wheel flange, buffer plate lubrication and switchplate lubricating greases



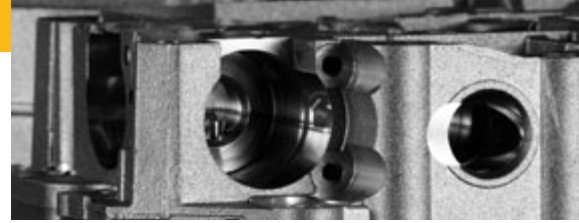
Greases and oils for the food and pharmaceutical industry

Lubricating greases and oils for different technical applications with NSF-H1 approval; in addition, many products are certified as Halal and Kosher

Process media for metal removal operations

Water soluble, mineral oil free coolants

Transparent, clear solutions for all grinding and cutting operations of steel materials



Water miscible coolants for aluminium processing

Emulsifiable coolants for machining of different aluminium materials such as die cast alloys, forging alloys, machining materials and hypereutectic alloys



Water miscible coolants for steel processing

Emulsifiable and water soluble coolants, boron and amine containing, boron and amine free, or boron free and amine containing depending on the requirements of different machining operations



Process media for high-performance machining operations

Special emulsions, solutions and non water miscible products for demanding deep drilling and broaching operations



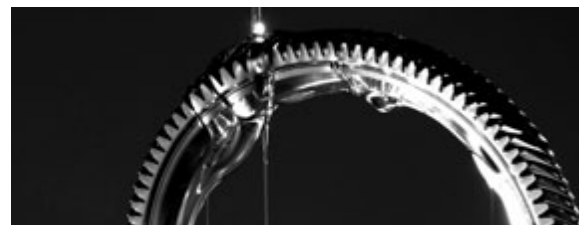
Viscous, water-based coolants (Berufluid)

Completely mineral oil free, water-based products; viscosity can be adjusted to the corresponding machining process; suitable for cutting operations with defined and undefined cutting edges, as well as for forming processes; either amine containing or amine free



Non water miscible coolants

Multifunctional oils, coolants for grinding and finishing operations, easy to medium as well as demanding machining and deep drilling operations and most demanding applications such as broaching



Minimal quantity lubricants

Synthetic and mineral oil free process media based on high-performance additives for all MQL suitable processes

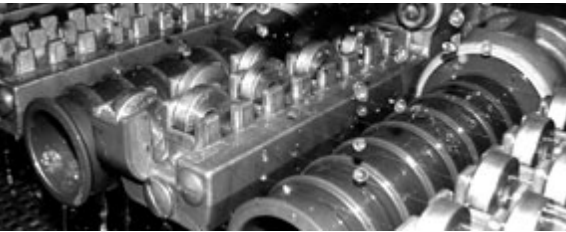




Process media for forming technology

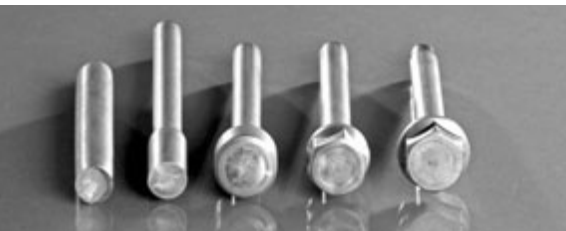
Sheet forming

Volatilizing punching oils, stainless forming of aluminium, emulsifiable punching and deep drawing lubricants, non water miscible punching and deep drawing lubricants, forming pastes



Wire drawing

Emulsions and drawing solutions for copper and copper alloys, drawing oils for aluminium and aluminium alloys, additives



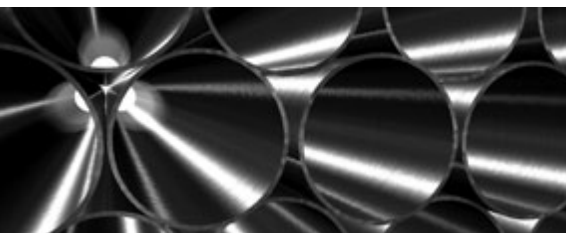
Cold forming oils

Cold forming oils for different applications, from easy and medium forming processes up to demanding multiple-stage forming operations of high-tensile and high-alloy materials, multifunctional oils, additives and forming additives



Massive forming

Coating lubricants for cold massive forming, semi-hot and hot forming, lubricants with low or high graphite content for die forging, products for phosphate-free wire coating



Tube drawing

Drawing oils for copper and aluminium tube production, concentrates and drawing oils for steel tube production, drawing oils and drawing emulsions for profile drawing



Corrosion protection and cleaners

Dewatering fluids, corrosion protection oils, cleaners based on synthetic hydrocarbons, concentrate for aqueous cleaners



The BECHEM brochure

Detailed specifications of our branded products and interesting information about lubricants can be found in our catalogue "Lubrication Solutions for Industry".

Please ask for the BECHEM catalogue either by email bechem@bechem.de or by phone +49 2331 935-0.



Partner with customised service

Customisation

Tailored to your requirements

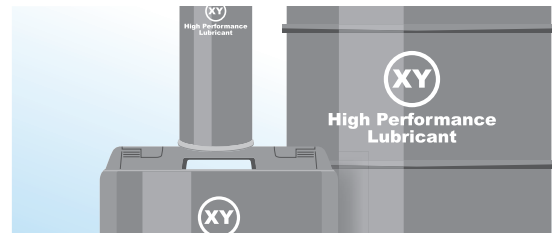
Decades of experience in all fields of lubrication, latest tribological knowledge, profound comprehension of technologies and production processes, as well as our extensive development know-how form the basis for offering our customers unique solutions.

Depending on the customers' requirements, the formulations of well approved lubricants are modified, or completely new products are developed in our competence centres for special lubricants, metal working, forming technology, biodegradable lubricants and heavy industry. These tailor-made products allow our customers to realise significant process optimisations and cost savings.



Tailored to your brand – Private Label

Various BECHEM lubricant products prove successful in different private brands, service and maintenance products of well-known lubricant manufacturers and directly or indirectly contribute to our customers' success as an after-sales product.



Services

Technical support

BECHEM's competent application engineers offer their customers quick technical support. In addition to lubricant analysis, construction parts, materials or process fluids are tested by means of modern chemical-physical appliances in our laboratory within a short period of time.



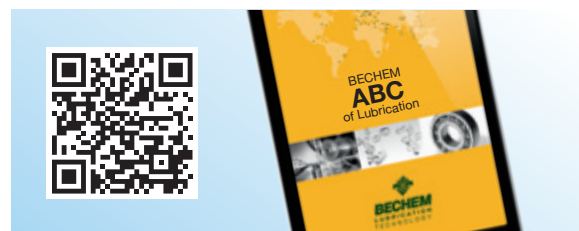
Symposia and customer seminars

BECHEM does not only offer solutions to application related problems, we also communicate our lubricant know-how according to the latest tribological knowledge on the occasion of various symposia and customer seminars. This is an important contribution to knowledge transfer between research and practice.



Tribological know-how – always readily available

The BECHEM ABC of Lubrication, available as app, allows all technically interested and professional users mobile access to more than 400 alphabetically arranged definitions pertaining to the subject of lubricants.



BECHEM – Your partner for research and development

Analytics for our customers

Environmental compatibility and occupational safety, minimisation of friction and wear, increase in efficiency and lifetime are only a few keywords which refer to the permanently growing demands on lubricants. Through continuous improvement of our products and innovative new developments, BECHEM is one step ahead.

Systematic innovation management, intensive research and development work as well as modern test equipment are the prerequisites. In the BECHEM laboratories, latest physicochemical testing and analytical systems are available to characterise lubricants, to control their application, to analyse customer specific problems and, last but not least, to find the suitable lubricant solution.

In many application and construction parts, lubricants and lubricant systems are already an integrated component and can no longer be considered separately. The product success depends on how the lubricant is tailored to the specifications. In this context, a high-performance analysis is of utmost importance.

When developing liquid and consistent lubricants, important factors are of course the flow properties in the service temperature range. To measure these rheological characteristics of our products, most modern rheometers and viscosimeters are used. Due to continuously increasing service temperatures, the requirements with regard to the temperature stability of lubricants have grown over the past years.





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An end of this trend is not yet foreseeable. In the BECHEM laboratories, modern analytical methods such as thermogravimetry and differential scanning calorimetry are applied for quick and efficient analysis of products and raw materials in the high temperature range.

Another focus is the characterisation of dispersions which are nowadays required for various lubricant applications. A defined particle size distribution is an especially important quality aspect for solid lubricants and microcapsule containing lubricants and coatings. Besides different microscopes, laser diffraction is also applied for this purpose.



3

For the manifold surface examinations of construction parts, semi-finished products and raw materials microscopic analyses are essential today. In their analysis, BECHEM uses the highly suitable method of infrared microscopy in addition to the photo-optical microscopes.

Beyond the classical lubrication of metal materials, the use of lubricants is of growing importance in case of contact with plastics. In this regard, the compatibility between lubricant and polymer material is an important requirement. In our BECHEM laboratories, a variety of test rigs to confirm this material compatibility is available.



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- 1 High-performance rheometer to characterise the flow properties
- 2 Hardness test of polymer materials
- 3 Penetrometer to determine consistency of greases
- 4 Fully automatic titration system for chemical analysis
- 5 Laser diffraction equipment to determine the particle size distribution

BECHEM – Your partner for research and development

Optimal climate for innovations – The BECHEM technical centre

In addition to lubricant analysis, the testing of our customers' construction parts, or even complete construction groups, is of growing importance within the lubricant development.

The long-term effects of realistic impacts, e.g. climatic conditions such as humidity and temperature, which influence the lubricant or construction group, have to be determined within a short period of time.

In our BECHEM technical centre we have the modern test equipment for this purpose. In our test facilities we can simulate a variety of operating conditions for lubricants used worldwide.





- 1 Constant velocity joint test rig
- 2 Preparation of flow pressure measurement
- 3 Torque test rig
- 4 Salt spray chamber
- 5 Turbine oil oxidation stability test
- 6 Infrared microscope
- 7 Translatory oscillation test rig (SRV)

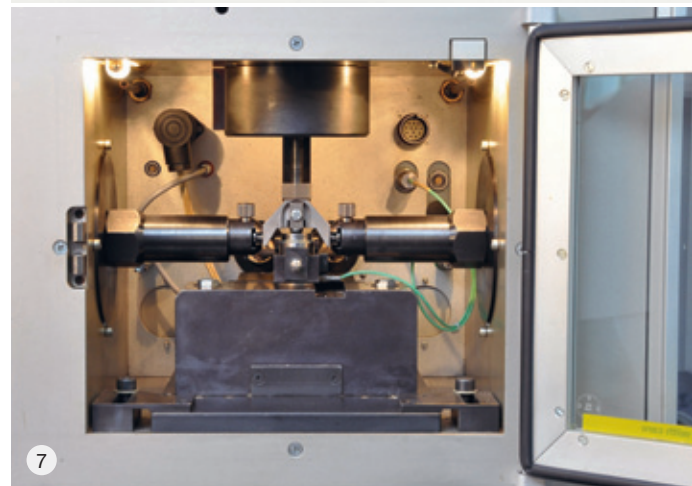
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In cooperation with our customers and partners, various test systems have been developed in research projects over the past few years. The integration of our customers in the development of lubricants is an essential part for future problem solving. For developing comprehensive concepts we – and thus our customers – are supported by competent partners.

In addition to cooperation with universities and academies, BECHEM has excellent contacts to industrial partner companies in the field of dosing and feeding technology, measurement and control technology, process and coating technology.

Comprehensive know-how to find the solution to your problems!





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