



**Special Lubricants
and Noise Damping
for the Automotive Industry**



Knowing the Requirements

There are various requirements in the automotive industry. With each new generation of automobiles come enormous innovations regarding comfort, security and environmental compatibility. Technically optimised motors always achieve better performance. Moreover, the construction details of modern vehicles are getting more and more complex because of the electrical and electronic components.

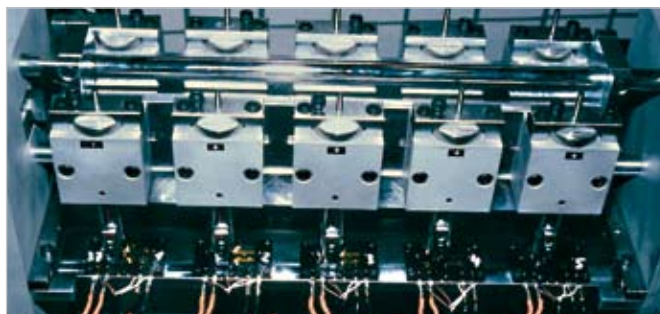
The permanent pressure to keep costs down and make savings in weight requires the selection of new materials and smaller system components with improved quality and functional reliability. BECHEM's strategy is to offer automobile customers a global partnership in the field of lubricant development and to ensure production tailored to the latest requirements. That's Special.

Practical Development

The testing machines used by BECHEM can simulate real conditions, such as vibrational strain and unfavourable environmental conditions, and this makes a substantial contribution to shorter development cycles for our customers in the automotive industry. By means of these test procedures we develop intelligent lubricants, which are more resistant to high and low temperatures, to heavy loads, to climatic conditions, substances, and which offer a longer service life. Our quality management system guarantees that the properties of the BECHEM lubricants meet customer requirements.



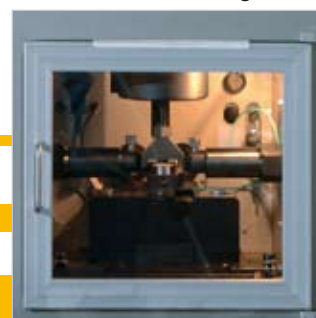
Test of electrical contacts in model switches



Anti-squeak test rig



Vibrational wear test rig



Material Compatibility and Noise Damping

Aside from the wide range of applications, it is the compatibility of our lubricants with plastics and elastomers that is one of the most innovative solutions in automotive technology. In order to find the most suitable lubricant for the various elastomers, numerous tests are required, e.g. with regard to swelling, tensile strength, elongation, compression strain and shore hardness A and D. As construction elements, the BECHEM lubricants tested comply with the above requirements and have proved very successful in components of the automotive industry.

In addition, our products offer improved haptic feedback, and a specially selected product system (Noise Damping Lubricants) avoids undesirable noise in the vehicle, today one of the most important quality features.



Tailored to Application

An important advantage of our R&D is the testing of model switches, original construction parts and original materials. This saves our partners in the automotive industry considerable time for their own developmental work.

In the mechatronic field, the requirements for contact reliability, material compatibility and durability under different climatic conditions are extremely high. Model switches offer the possibility of easily determining measurable variables other than in serial contact arrangements.

The importance of simulating practical test conditions is demonstrated by the successful development of our special lubricants for drive shafts. By means of our modern CV-joint test bench we are in a position to optimise our products with regard to reducing friction, increasing efficiency and durability, and reducing noise.

The same applies to drive and brake systems, variable and drive motors, where we develop tribologic solutions in close cooperation with our clients' R&D departments.

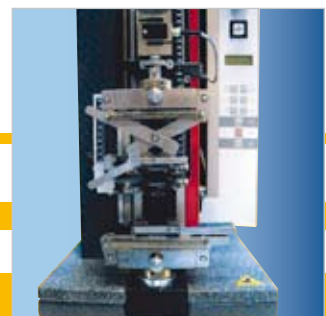
*BECHEM CV-joint test bench,
Hagen*



*Computer-controlled
test rig*



*Permanent production
control guarantees
consistent quality*



Special lubricants for automotive systems and system components

- Noise Damping Lubricants
- Plastic Lubrication
- Electrical Contact Greases
- Chassis Lubrication
- Special Components

door and window seals

- BERULUB® ND-DISPERSIONS
- BERULUB® ND-FLUIDS
- BERUCOAT FX-SERIES (AF COATINGS)

door trim

- BECEM VPG 34
- BERUCOAT AK-SERIES (AF COATINGS)

window regulator

- BECEM-RHUS LH 2
- BERULUB® FR 16
- BERULUB® XP-SERIES

steering column

- BERULUB® FR 43
- BERULUB® FB 48/1

dual-mass flywheels

- BERUSIL FO 42

motor management

- BERULUB® FZ 1 E 3

belt tensioning systems

- BERUSIL FO 36-2

headlight control device

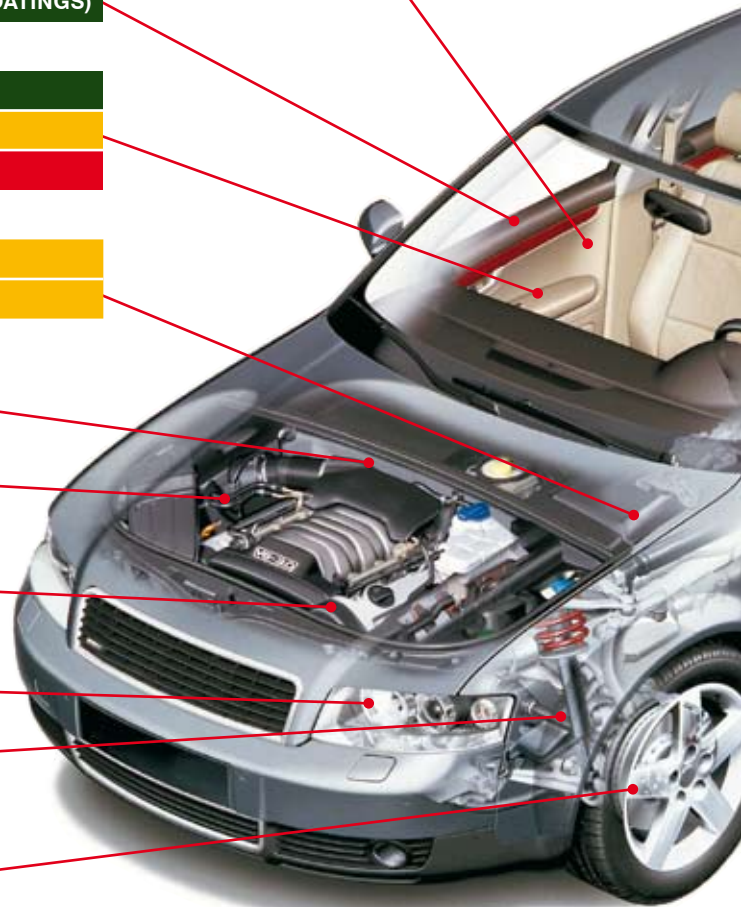
- BERULUB® FR 66

CV joints

- BECEM-HTBJ
- BERULUB® GGF 1001

brake cylinder

- BERULUB® FE 16



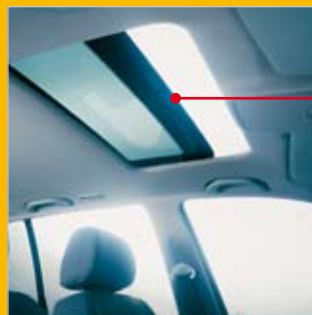
ashtray/ cup holder

- BERUSOFT-SERIES
- BERULUB® FR 16
- BERULUB® FR 43



air flaps

- BERULUB® ND-DISPERSIONS



sunroofs

- BERULUB® FR 16
- BERULUB® FR 43
- BERUSOFT-SERIES
- BECEM VPG 34

electrical contacts

BERULUB® FK 30
BERULUB® FK 35 B
BERULUB® FK 97 E
BERULUB® FK 122
BERUTOX® VPT 64 DISPERSIONS
BERULUB® KRYOTOX EL 2

headrests, sun visors, sunroofs, jalousies, cup holder

BERULUB® FR 16
BERUSIL FO 22 F
BERULUB® FR 43

seat systems

BERUTOX® VPT 64-2
BERULUB® XP 3000

supporting and guide elements

BERULUB® FW 3

locking systems/central locking systems

BERULUB® FR 16 (B)
BERULUB® FB 48/1
BERULUB® XP 746
BERULUB® ND-FLUIDS
BERUCOAT AF-SERIES (AF COATINGS)

mirror adjustment

BERULUB® FR 16
BERULUB® FR 43
BERUSOFT-SERIES

belt systems

BERULUB® XP-SERIES

seat recliner, seat adjustment

BERULUB® FR 16
BERULUB® FR 43
BERULUB® XP 719

seat runner

BERULUB® XP SERIES

check arm

CERITOL PK 1
BERUTOX® M 21 EPK-A
BERULUB® XP 719
BERULUB® XP 2400

panels

BERULUB® ND-FLUIDS
BERUTOX® VPT 64-2
BERULUB® ND-DISPERSIONS
BERUSOFT-SERIES
BERUCOAT AK-SERIES (AF COATINGS)

multifunction steering- wheel/flat cables

CERITOL PK 1 SOFT

handbrake cable

BERULUB® FR 43
BERUTOX® VPT 64-2
BERULUB® XP-746

HVAC units

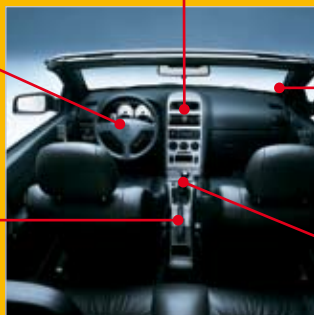
BERULUB® FR 16
BERULUB® FR 43
BERULUB® ND-FLUIDS
BERUSOFT-SERIES

gear shift mechanism

BERULUB® 52142
BERULUB® FR 16
BERUSIL FO 22 F

seat adjustment with memory function

BERULUB® FR 16
BERULUB® FK 97 E
BERULUB® FH 57



Plastic Lubricants

Product	Application	Characteristics	References/Approvals
BERULUB® FR 16 (B) BERULUB® FR 43	locking systems sunroofs step motors linear motors wiper motors interior systems	Independently of the challenges BECHEM is facing, we are always eager to develop new lubricants for individual requirements. These specially developed lubricants for material pairings metal/plastics or plastics/plastics have proved successful all over the world under all climatic conditions. One example for the automotive industry is the lubricant tailored to use with flat cables in multifunctional steering wheels.	VW/AUDI/Škoda/Seat TL 778 A/TL 778 B Ford WSD M1C 234 A2 WSD M1C 160 D2 Opel B 040 0858/B 040 1135 B 040 0084/B 040 0571 B 040 1132 BMW Group N 60058.0 Part 3 PSA Group GM 9986248 9986237 DaimlerChrysler Brose 002-63501-4 Gruppe 3 563501-110 Gruppe 53 563501 Gruppe 55 Kostal Kiekert AG Valeo Delphi Automotive
BERULUB® FH 57	jalousies interior systems		
BERULUB® FB 48/1	locking systems		
CERITOL PK 1 SOFT	clockspring		
BERUSIL FO 22 F	gear shift mechanism Bowden cables Push-Pull cables		

Noise Damping Lubricants

Product	Application	Characteristics	References/Approvals
BERULUB® ND-DISPERSIONS BERULUB® ND-FLUID 160	interior systems HVAC units leather components	In view of the increasing demand for comfort, the question of noise damping (avoidance of impact sound) is of the utmost importance for the automotive and supplier industry. Minimisation of rattling and squeaking noises inside the vehicle caused by vibration is our top target. BECHEM has developed a complete product range of special lubricants that decisively contribute to noise damping inside the vehicle and thus considerably enhance the driving experience.	Ford WSS M1C 253 A WSS M1C 253 A2 Jaguar BMW Group VW/AUDI/Škoda/Seat TL 52141 Delphi Automotive Johnson Controls Inc. Lear Corporation Visteon Corporation Intier Automotive Faurecia Edscha AG Fico Cables SAIA-Burgess TRW KSR Automotive Fischer Automotive Brose 563501-109
BERUTOX® VPT 64-2	interior systems seat systems door modules		
BERUSOFT 15/20/30	interior systems door modules switches		
BERULUB® XP 746 BERULUB® XP 719 BERULUB® XP 3000	interior/exterior systems locking systems window regulator door modules pairings/metal/ metal components		

Electrical Contact Greases

Product	Application	Characteristics	References/Approvals
BERULUB® FK 30	steering-column switch	The functionality, security and durability of electrical contact systems are governed by the lubricant. Contact materials, plastics, environmental influences and the lubricant must be considered together and be compatible with each other. BECHEM electrical contact lubricants offer tailor-made solutions for switches with different currents, from 0.1 mA up to 35 A.	Opel B 040 0084 Brose 002-63501-4 Kostal Valeo Delphi Automotive TRW Bosch HELAG SAIA-Burgess Siber Busch-Jaeger
BERULUB® FK 35 B	steering-column jacket module steering-column switch light switch		
BERULUB® FK 97 E BERULUB® FK 122	mirror adjustment switch steering-column jacket module micro switch		
BERUTOX® VPT 64 DISPERSIONS	micro switch printed circuit board		
BERULUB® FK 64	various switches with PC		
BERULUB® KRYOTOX EL 2	ignition switch plug connector		

Chassis Lubrication

Product	Application	Characteristics	References/Approvals
BERULUB® FW 3	supporting and guiding CV joints	BECHEM lubricants meet the requirements for supporting, guiding and CV joints; lifetime lubrication, compatibility with plastics, low friction values at oscillating movements, slight increase in adjustment moments at low temperatures, protection against corrosion and tribocorrosion.	VW/AUDI/Škoda/Seat TL 778/TL 52133 PSA Group S 71.3100 Opel B 040 1137 Lemförder 000 060 034055 Ind. C Bosch VS 18340-F1 Muhr und Bender AZ 000 725 Edscha AG 59385
BERULUB® GGF 1001	CV joints grease for normal-temperature application		
BECHEM HTBJ	high-temperature grease for CV joints		

Special Components

Product	Application	Characteristics	References/Approvals
BERUSIL FO 36-2	manual gear shifts belt tensioning systems	It is BECHEM's strength to always react to the various and latest requirements in the automotive industry. Here it is of the utmost importance to be aware of construction details and conditions of application. Thus, we are in a position to always offer a special lubricant tailored to specific requirements.	Ford WSS M1C 238 A ESF M1C43 A2 VW/AUDI/Škoda/Seat TL 767 X TL 52142 Muhr und Bender Linde & Wiemann
BERULUB® 52142	manual gear shifts parking brakes folding tops		
BERUCOAT AF, AK, FX	anti-friction and anti-squeak coatings for locking systems, elastomer seals and interior components		
BERUTOX® M 21 EPK (A)	check arms		

That'Special!

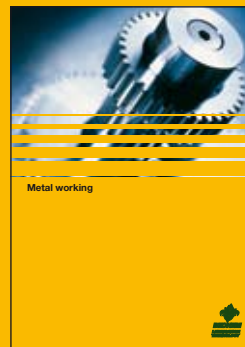
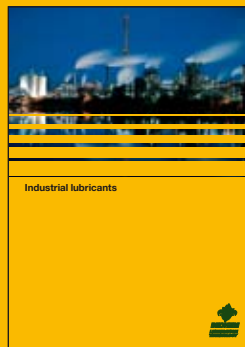
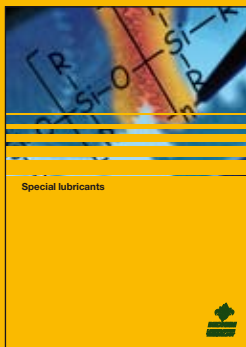
A tradition we are proud of since 1834. This is still today demonstrated by our trademark: the Rhus Flower. After permanent development, BECHEM is today a »Global Player«.

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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