Special lubricants and noise damping products for the automotive industry
Special lubricants and noise damping products for the automotive 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.

Contents

04 Special lubricants for automotive systems and system components
06 Development partner for the automotive industry
08 Interior components
10 Mechatronic systems
12 Electrical contacts
14 Chassis and brake systems
16 Seating and belt systems
18 Locking systems and hinges
20 Anti-friction coatings and Perfluoropolyether (PFPE) products
22 Noise damping in automotive applications
23 Elastomer and plastic compatibility

All indications and values correspond to latest knowledge and do not represent any product specification.
Special lubricants for automotive systems and system components

Legend:
- Noise Damping
- Plastic Lubrication
- Electrical Contact Lubrication
- Chassis Lubrication
- Special Components

Motor management
- Berulub FZ 1 E 3

Belt tensioning systems
- Berulis FO 36-2

Piston
- Berucosil AF 291

Braking systems
- Berulub FE 16
- Beruplex LG 21 F

CV joints
- BECHEM GKN HTBJ
- Berulub CVH 170
- Berulub CVN 140

Ball joints
- Berulub FW 700
- Berulub SSG 46

Cup holder, ashtray
- Berusil-Series
- Berulub FR 16
- Berulub FR 43

Mirror adjustment
- Berusil-Series
- Berulub FR 16
- Berulub FR 43

Steering column
- Berulub FR 43
- Berulub FR 32-21
- Berutox FB 48-1
- Beruglide L

Multifunction steering, clock spring
- BECHEM Ceritol PK 1 Soft
- Berulub FR 82

Head-up Display
- Berulub FK 164-2 UV
- Beruglide H 50

Electrical contacts
- Berulub FK 35 B
- Berulub FK 97 E
- Berulub FK 122 UV
- Berulub KR-EL 2
- Berulub FK VPT 380
- Berulub FK 164-2 UV
- Berutox VPT 64 Dispersions

Gear shift mechanism
- Berulub 52/142
- Berulub FR 16
- Berulis FO 22 F

Headlight control device
- Berulub FR 66
- Berulub FK 164-2 UV

Air flaps
- Berulub ND-Dispersions
- Berulis TS 1

Check arm
- BECHEM Ceritol PK 1
- Berutox M 21 EPK-A
- Berulub XP 719
- Berusil 15

Door and window seals
- Berulub ND-Dispersions
- Berulub ND-Fluids
- Berucoat FX-Series
- Berucoat AK-Series
- Berutox VPT 64-2

Seat systems
- Berulub FE 16
- Beruplex LG 21 F

CV joints
- BECHEM GKN HTBJ
- Berulub CVH 170
- Berulub CVN 140

Ball joints
- Berulub FW 700
- Berulub SSG 46

Seat adjustment
- Berulub FR 16
- Berulub FK 97 E

Seat runner
- Berulub XP-Series

Seat recliner, seat adjustment
- Berulub FR 16
- Berulub FR 43
- Berulub FH 57
- Berulub FR 150-21
- Berulub XP Series

Panels
- Berucoats AK-Series
- Berulub ND-Fluids
- Berulub ND-Dispersions
- Berusil-Series

Legend
- Noise Damping
- Plastic Lubrication
- Electrical Contact Lubrication
- Chassis Lubrication
- Special Components

Sunroofs
- Berulub FR 16
- Berulub FR 43
- Beruplex LG 21 F
- Beruplex LG 1-30
- Berusil-Series

Door trim
- Berucoats AK-Series
- Berulub FR 16
- Berulub FR 43
- Berulub HFO 1

Seat systems
- Berutox VPT 64-2
- Berulub XP 3000

Power lift gates
- Berulub FR 16

Motor management
- Berulub FZ 1 E 3

Belt tensioning systems
- Berulis FO 36-2

Piston
- Berucosil AF 291

Braking systems
- Berulub FE 16
- Beruplex LG 21 F

CV joints
- BECHEM GKN HTBJ
- Berulub CVH 170
- Berulub CVN 140

Ball joints
- Berulub FW 700
- Berulub SSG 46

Cup holder, ashtray
- Berusil-Series
- Berulub FR 16
- Berulub FR 43

Mirror adjustment
- Berusil-Series
- Berulub FR 16
- Berulub FR 43

Steering column
- Berulub FR 43
- Berulub FR 32-21
- Berutox FB 48-1
- Beruglide L

Multifunction steering, clock spring
- BECHEM Ceritol PK 1 Soft
- Berulub FR 82

Head-up Display
- Berulub FK 164-2 UV
- Beruglide H 50

Electrical contacts
- Berulub FK 35 B
- Berulub FK 97 E
- Berulub FK 122 UV
- Berulub KR-EL 2
- Berulub FK VPT 380
- Berulub FK 164-2 UV
- Berutox VPT 64 Dispersions

Gear shift mechanism
- Berulub 52/142
- Berulub FR 16
- Berulis FO 22 F

Headlight control device
- Berulub FR 66
- Berulub FK 164-2 UV

Air flaps
- Berulub ND-Dispersions
- Berulis TS 1

Check arm
- BECHEM Ceritol PK 1
- Berutox M 21 EPK-A
- Berulub XP 719
- Berusil 15

Door and window seals
- Berulub ND-Dispersions
- Berulub ND-Fluids
- Berucoat FX-Series
- Berucoat AK-Series
- Berutox VPT 64-2

Seat systems
- Berulub FE 16
- Beruplex LG 21 F

CV joints
- BECHEM GKN HTBJ
- Berulub CVH 170
- Berulub CVN 140

Ball joints
- Berulub FW 700
- Berulub SSG 46

Seat adjustment
- Berulub FR 16
- Berulub FH 57
- Berulub FR 32-21
- Berulub FR 150-21
- Berulub FK 97 E

Seat runner
- Berulub XP-Series

Seat recliner, seat adjustment
- Berulub FR 16
- Berulub FR 43
- Berulub FH 57
- Berulub FR 150-21
- Berulub XP Series

Panels
- Berucoats AK-Series
- Berulub ND-Fluids
- Berulub ND-Dispersions
- Berusil-Series

Legend
- Noise Damping
- Plastic Lubrication
- Electrical Contact Lubrication
- Chassis Lubrication
- Special Components

Sunroofs
- Berulub FR 16
- Berulub FR 43
- Beruplex LG 21 F
- Beruplex LG 1-30
- Berusil-Series

Door trim
- Berucoats AK-Series
- Berulub FR 16
- Berulub FR 43
- Berulub HFO 1

Seat systems
- Berutox VPT 64-2
- Berulub XP 3000

Power lift gates
- Berulub FR 16

Motor management
- Berulub FZ 1 E 3

Belt tensioning systems
- Berulis FO 36-2

Piston
- Berucosil AF 291

Braking systems
- Berulub FE 16
- Beruplex LG 21 F

CV joints
- BECHEM GKN HTBJ
- Berulub CVH 170
- Berulub CVN 140

Ball joints
- Berulub FW 700
- Berulub SSG 46

Cup holder, ashtray
- Berusil-Series
- Berulub FR 16
- Berulub FR 43

Mirror adjustment
- Berusil-Series
- Berulub FR 16
- Berulub FR 43

Steering column
- Berulub FR 43
- Berulub FR 32-21
- Berutox FB 48-1
- Beruglide L

Multifunction steering, clock spring
- BECHEM Ceritol PK 1 Soft
- Berulub FR 82

Head-up Display
- Berulub FK 164-2 UV
- Beruglide H 50

Electrical contacts
- Berulub FK 35 B
- Berulub FK 97 E
- Berulub FK 122 UV
- Berulub KR-EL 2
- Berulub FK VPT 380
- Berulub FK 164-2 UV
- Berutox VPT 64 Dispersions

Gear shift mechanism
- Berulub 52/142
- Berulub FR 16
- Berulis FO 22 F

Headlight control device
- Berulub FR 66
- Berulub FK 164-2 UV

Air flaps
- Berulub ND-Dispersions
- Berulis TS 1

Check arm
- BECHEM Ceritol PK 1
- Berutox M 21 EPK-A
- Berulub XP 719
- Berusil 15

Door and window seals
- Berulub ND-Dispersions
- Berulub ND-Fluids
- Berucoat FX-Series
- Berucoat AK-Series
- Berutox VPT 64-2

Seat systems
- Berulub FE 16
- Beruplex LG 21 F

CV joints
- BECHEM GKN HTBJ
- Berulub CVH 170
- Berulub CVN 140

Ball joints
- Berulub FW 700
- Berulub SSG 46

Seat adjustment
- Berulub FR 16
- Berulub FH 57
- Berulub FR 32-21
- Berulub FR 150-21
- Berulub FK 97 E

Seat runner
- Berulub XP-Series

Seat recliner, seat adjustment
- Berulub FR 16
- Berulub FR 43
- Berulub FH 57
- Berulub FR 150-21
- Berulub XP Series

Panels
- Berucoats AK-Series
- Berulub ND-Fluids
- Berulub ND-Dispersions
- Berusil-Series

Legend
- Noise Damping
- Plastic Lubrication
- Electrical Contact Lubrication
- Chassis Lubrication
- Special Components
Development partner for the automotive industry

The essential basis for innovative automotive lubricants is intense research and development work as well as modern testing equipment. In BECHEM’s laboratories the latest physicochemical testing and analytical systems are available to characterise lubricants, control their application, analyse customer-specific problems and finally to develop the appropriate lubricant solutions. The testing of lubricants on model systems, original components and materials and the simulation of different vehicle-related conditions in the BECHEM laboratories help shorten product development times for our customers.

In cooperation with our customers and partners various test systems have been developed in research projects over the past few years. Involving our customers in the development of lubricants is also an essential part of our future problem solving.

Effective partners support us and thus our customers in the development of cross-system concepts. In addition to cooperating with universities and academies, BECHEM has excellent contacts with industry partners in the dosing and feeding technology, measurement and control technology, process and coating technology.

BECHEM’s strategy is to offer automobile customers a global partnership in the fields of lubricant development and production to ensure that these are always tailored to the latest requirements.

Lubrication solutions for demanding requirements

- Reduction of friction and wear
- Durability and functional reliability
- Material compatibility
- Noise reduction
- Environmental compatibility
- Wide service temperature range
- Corrosion protection
Interior components

With targeted vibration damping and optimisation of friction values, BECHEM lubricants allow controlled reproducible movements in all interior components such as cup holders, arm rests, door trims, consoles, control and switching systems. BECHEM products therefore make a major contribution to the functionality and haptics of interior components and upgrade the relevant parts and vehicles. Products, which are specifically designed for noise reduction, significantly improve driving comfort.

### Approvals / references

(in alphabetical order)

- Brose group 53.2
- Brose group 53.4
- Brose group 55.1
- Daimler DBL 6827.42
- Fiat Specification 9.55580 Gras V
- Ford WSD-MIC 234 A2
- GM W16531-Type 4
- GM W16531-Type 5
- GM 9986248
- VW-TL 778 A
- VW-TL 778 B
- VW-TL 52150

### Products

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>Description</th>
<th>Properties</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berulub FR 16</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Suitable for the material combinations plastic/plastic and metal, excellent low temperature behaviour, resistant to water and oxidation, prevents stick-slip, contains PTFE</td>
</tr>
<tr>
<td>Berulub FR 43</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Suitable for material combinations plastic/plastic and metal, excellent low temperature behaviour, resistant to water and oxidation, prevents stick-slip, contains PTFE, available with UV tracer</td>
</tr>
<tr>
<td>Berulub FR 32-21</td>
<td>Polyalpha-olefin (PAO)</td>
<td>For long-term lubrication of the material combinations metal/polymer, excellent low-temperature behavior, prevents stick-slip, resistant to water and oxidation, very good noise damping properties, good EP properties</td>
</tr>
<tr>
<td>Berulub FR 50-23</td>
<td>Polyalpha-olefin (PAO)</td>
<td>For long-term lubrication of the material combinations metal/polymer, prevents stick-slip, excellent low-temperature behavior, resistant to water and oxidation, very good noise damping properties, good EP properties</td>
</tr>
<tr>
<td>Berulub FR 57</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Fully synthetic grease for long-life lubrication of polymer components, excellent noise damping properties, excellent low temperature behaviour, contains PTFE</td>
</tr>
<tr>
<td>Berusrift 15</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Synthetic special grease for noise damping, good plastic and elastomer compatibility, good oxidation resistance, minimal oil separation, prevents stick-slip, also available with UV-tracer</td>
</tr>
<tr>
<td>Berulub XP 3000</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Good plastic and elastomer compatibility, high adhesion, good low temperature properties, very low oil separation, excellent protection against corrosion, excellent noise damping, UV tracer</td>
</tr>
<tr>
<td>Berulub FR 3000-21</td>
<td>Polyalpha-olefin (PAO)</td>
<td>For the material combinations metal/polymer, maximum noise damping properties, prevents stick-slip, resistant to water and oxidisation, high adhesion, very good low-temperature behavior, good EP properties</td>
</tr>
<tr>
<td>Berulub LP 21 F</td>
<td>Polyglycol Lithium complex soap</td>
<td>Synthetic special lubricant for tribological pairings metal/elastomer, EPDM and plastic, temperature-stable/oxidation-stable, good adhesion, good corrosion protection, good EP properties, water-resistant</td>
</tr>
<tr>
<td>Berulub L</td>
<td>Polyoxypropylene (PFPE), polytetrafluoroethylene (PTFE)</td>
<td>Fully synthetic special grease for plastic and polymer materials, excellent resistance to oxidation/aggressive media, good noise damping properties, prevents stick-slip, also available with UV tracer</td>
</tr>
<tr>
<td>Berulub TS 1</td>
<td>Polyurethane</td>
<td>Noise damping silicone lubricant for long-life lubrication, good plastic and elastomer compatibility, wide temperature range, water resistant, prevents stick-slip</td>
</tr>
<tr>
<td>Berulub AK 975</td>
<td>Organic binder</td>
<td>Water based interior AF-coating, prevents stick-slip and disturbing noises, highly compatible with plastics, transparent, free of formaldehyde, UV tracer</td>
</tr>
<tr>
<td>Berulub AK 376</td>
<td>Organic binder</td>
<td>Long-life lubrication for plastic and/or steel material combinations, no dust adsorption, prevents stick-slip, good protection against corrosion</td>
</tr>
<tr>
<td>Berulub AF 320 E</td>
<td>Organic binder</td>
<td>Suitable for plastic/steel combinations, long-life coating, prevents stick-slip, no dust adsorption, excellent protection against corrosion, oil resistant, curing temperature +120 °C</td>
</tr>
<tr>
<td>Berulub ND-Fluid 160</td>
<td>Polyoxypropylene (PFPE)</td>
<td>Noise damping fluid, excellent material compatibility (polymers, elastomers, non-ferrous metals, leather), high thermal stability and oxidation resistance, other viscosities are also available</td>
</tr>
</tbody>
</table>

*Value indicates unworked penetration

**Noise damping**

***Good noise damping***

****Very good noise damping***

<table>
<thead>
<tr>
<th>Fluid</th>
<th>Anti-squeak applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-squeak coverings</td>
<td></td>
</tr>
</tbody>
</table>

**Lubricating Components**

- Anti-squeak applications
- Kinematic components, cup holder
- HVAC regulation, seat adjustments
- Sun roof, convertible roof top systems
- Noise damping
- Cup holder, ash-tray, kinematic components, sun-shades
- Air condition console, center console, window runner
- HVAC, glove box compartment, steering column adjustment
- HVAC regulation, seat adjustments, grid and guide rails of electrical switches
- Air condition console, gear shift mechanism
- Climate control, glove box, arm rest, GPS controller
- Center arm rest, arm rest closure, gear selection cover, folding table
- Controls, sun visors, steering column adjustment, window regulator, center console, arm rest
- Sun roof, convertible roof top systems
- Anti-squeak applications, convertible top gear
- Flap mechanism for HVAC-Systems, kinematic construction parts
- Anti-squeak applications, door modules, covers, arm rest closure
- Anti-squeak applications
- Sun visor, convertible top guide way, cigarette lighter
- Kinematic components, cup holder, air vents, anti-squeak applications

**Approvals / references**

- VW-TL 52150
- VW-TL 778 B
- VW-TL 778 A
- Brose group 55.1
- Daimler DBL 6827.42
- Fiat Specification 9.55580 Gras V
- Ford WSD-MIC 234 A2
- GM W16531-Type 4
- GM W16531-Type 5
- GM 9986248
BECHEM provides a wide product range for a whole variety of manually and electrically operated actuators and control gears in the vehicle interior and body. These are characterised by their high wear resistance, excellent noise reduction properties and high functional reliability under the harshest climatic conditions worldwide. High levels of compatibility with various materials and the lowest starting torques at very low temperatures complete the range of benefits.

**Mechatronic systems**

**Approvals / references**

- **Alphabetical order**
  - Brose group 53.2
  - Brose group 53.4
  - Brose group 55.1
  - Daimler DBL 6827.42
  - Delphi Automotive
  - Fiat Specification 9.55580 Gras V
  - Ford WSD-MIC 234 A2
  - GM 9986237, GM 9986248
  - Kiekert AG
  - Kostal
  - Valeo
  - VW-TL 778 A, VW-TL 778 B

---

**PRODUCT**

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>Base oil/Type</th>
<th>Composition/Grade</th>
<th>Viscosity [mm²/s] at 40 °C</th>
<th>Temperature range °C</th>
<th>Applications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berulub FR 16</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Special lithium soap</td>
<td>2 32 6 -50 +140</td>
<td>Low torque, small gears, low noise damping</td>
<td><strong>Suitable for the material combinations plastic/plastic and -/metal, excellent low temperature behaviour, resistant to water and oxidation, prevents stick-slip, contains PTFE</strong></td>
</tr>
<tr>
<td>Berulub FR 43</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Special lithium soap</td>
<td>2 32 6 -50 +140</td>
<td>Low torque, medium noise damping</td>
<td><strong>Suitable for material combinations plastic/plastic and -/metal, excellent low temperature behaviour, resistant to water and oxidation, prevents stick-slip, contains PTFE</strong></td>
</tr>
<tr>
<td>Berulub FR 32-21</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Special lithium soap</td>
<td>1 - 2 32 6 -50 +140</td>
<td>Low torque, medium noise damping</td>
<td><strong>For long-term lubrication of the material combinations metal/polymer, excellent low-temperature behaviour, prevents stick-slip, resistant to water and oxidation, very good noise damping properties, good EP properties</strong></td>
</tr>
<tr>
<td>Berusref 10</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Special lithium soap</td>
<td>2 600 70 -40 +150</td>
<td>High torque, high noise damping</td>
<td><strong>Special grease for noise damping, excellent compatibility with plastic and elastomers, good resistance to oxidation, low oil separation, prevents stick-slip, available with UV tracer</strong></td>
</tr>
<tr>
<td>Berulub FG-H 2 SL</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Special lithium complex soap</td>
<td>2 50 8 45 +160 +200</td>
<td>Low torque, small gears</td>
<td><strong>High-performance lubricant with good adhesion and sealing qualities, resistant to water and ageing, reliable protection against corrosion</strong></td>
</tr>
<tr>
<td>BECHEM Ceritol PK 1 Soft</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Polyurea 0 - 1 32 6 -60 +140</td>
<td>Low torque, small gears, low noise damping</td>
<td><strong>Special lubricant for metal and polymer materials, excellent low temperature behaviour, protection against corrosion, resistant to oxidation, contains EP-additives, prevents stick-slip, available with UV tracer</strong></td>
<td></td>
</tr>
<tr>
<td>Berulub FR 150-21</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Special lithium soap</td>
<td>1 - 2 150 20 -50 +140</td>
<td>Medium torque, medium noise damping</td>
<td><strong>For long-term lubrication of the material combinations metal/polymer, prevents stick-slip, excellent low temperature behaviour, resistant to water and oxidation, very good noise damping properties, good EP properties</strong></td>
</tr>
<tr>
<td>Berulub FH 97</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Polyurea 1 - 2” 150 20 -40 +160</td>
<td>Medium torque, medium noise damping</td>
<td><strong>Fully synthetic grease for long-life lubrication of polymer components, excellent noise damping properties, excellent low temperature behaviour, contains PTFE</strong></td>
<td></td>
</tr>
<tr>
<td>Berulgide H 90</td>
<td>Synthetic oil combination</td>
<td>Special lithium soap/PTFE</td>
<td>2 30 6 60 +160</td>
<td>Low torque, small gears, high noise damping</td>
<td><strong>Long-life lubrication for plastic/plastic, -/metal and non-ferrous metal/ non-ferrous metal, excellent low temperature behaviour, noise damping, resistant to water, PTFE, UV tracer, hybrid technology</strong></td>
</tr>
<tr>
<td>Berulub FRK 164-2 UV</td>
<td>Polyurethane</td>
<td>Polyurethane</td>
<td>2 600 150 45 -60 +250</td>
<td>Low torque, small gears, high noise damping</td>
<td><strong>Lubricating paste for gold and silver plated sliding/plug-in contacts, excellent plastics/elastomer compatibility, excellent low temperature behaviour</strong></td>
</tr>
<tr>
<td>Berulub LF 10</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Lithium-complex soap</td>
<td>0 - 1 48 8 -50 +140</td>
<td>Low torque, small gears</td>
<td><strong>Fully synthetic multipurpose grease for long-life lubrication of plastic/plastic, -/metal and steel/steel, excellent low-temperature behaviour, noise damping, resistant to oxidation and water, corrosion protection, available in NLGI-grade 1-2</strong></td>
</tr>
<tr>
<td>Berulub LHC 2 M</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Lithium soap</td>
<td>2 18 4 -50 +140</td>
<td>Low torque, small gears</td>
<td><strong>Suitable for the material combinations metal/plastic, plastic/plastic and metal/non-ferrous metal, excellent low-temperature properties, prevents stick-slip, contains PTFE, also available in NLGI-grade 3</strong></td>
</tr>
</tbody>
</table>

*Value indicates unworked penetration

**Value marked in grey indicates short term maximum temperature**

**g o. noise damped
** g o. good noise damped
** g o. very good noise damped**
### Electrical contacts

BECHEM electrical contact lubrication products for the automotive industry meet the highest standards and make a major contribution to the functionality and durability of electrical contact systems with different currents due to their wide service temperature range. Highly specialised formulations guarantee excellent oxidation stability and material compatibility as well as protection against the formation of impurity layers and sparks.

#### Approvals / references

<table>
<thead>
<tr>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bosch</td>
</tr>
<tr>
<td>BJA</td>
</tr>
<tr>
<td>Delphi Automotive</td>
</tr>
<tr>
<td>HELAG</td>
</tr>
<tr>
<td>Kostal</td>
</tr>
<tr>
<td>SAIA-Burgess</td>
</tr>
<tr>
<td>Siber</td>
</tr>
<tr>
<td>TRW</td>
</tr>
<tr>
<td>Valeo</td>
</tr>
</tbody>
</table>

#### Electrical contacts require particularly high-performing lubricants.

<table>
<thead>
<tr>
<th>Product</th>
<th>Base oil</th>
<th>Thickener</th>
<th>NLGI-grade</th>
<th>Viscosity at 40°C</th>
<th>Service temperature range</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berulub FK 125</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Special lithium soap</td>
<td>1 - 2</td>
<td>4</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td>Berulub FK 202</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Lithium-calcium soap</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td>18</td>
</tr>
<tr>
<td>Berulub KR-EL 2</td>
<td>Ester</td>
<td>Lithium soap</td>
<td>2</td>
<td>4</td>
<td>10</td>
<td>13</td>
</tr>
<tr>
<td>Berulub FK 97 E</td>
<td>Ester</td>
<td>Polyurea</td>
<td>1</td>
<td>78</td>
<td>12</td>
<td>40</td>
</tr>
<tr>
<td>Berulub FK 122 UV</td>
<td>Ester</td>
<td>Polyurea</td>
<td>0</td>
<td>78</td>
<td>11</td>
<td>50</td>
</tr>
<tr>
<td>Berulub FK 164-2 UV</td>
<td>Perfluoro-polyether (PFPE)</td>
<td>Polytetrafluoroethylene (PTFE)</td>
<td>2</td>
<td>150</td>
<td>45</td>
<td>60</td>
</tr>
<tr>
<td>Berulub FK 164 Dispersion O2F 1-10</td>
<td>Perfluoro-polyether (PFPE)</td>
<td>-</td>
<td>-</td>
<td>150</td>
<td>45</td>
<td>60</td>
</tr>
<tr>
<td>Berulux VP 84 Dispersion O2F 0.5-20</td>
<td>Perfluoro-polyether (PFPE)</td>
<td>-</td>
<td>-</td>
<td>325</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

*Value indicates unworked penetration
With maximum material compatibility, corrosion protection, load-carrying capacity and protection against tribocorrosion, BECHEM products provide very high levels of reliability over the lifetime of the product for various systems and applications in chassis, brake and steering systems and for transmissions and clutches.

Approvals / references

(in alphabetical order)

- Brose group 55.1
- Fiat Specification 9.55580 Gras V
- Ford WSD-MIC 234 A2
- GM 9986237
- GM 9986248
- VW-TL 52150
- VW-TL 778 A

PRODUCT

<table>
<thead>
<tr>
<th>PRODUCT</th>
<th>Base oil / Base</th>
<th>Thickener</th>
<th>NLGI-grade</th>
<th>Viscosity [mm²/s] at 40 °C</th>
<th>Viscosity [mm²/s] at 100 °C</th>
<th>Service temperature range [°C]</th>
<th>Applications</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beruplex LI-EP 2</td>
<td>Mineral oil</td>
<td>Lithium complex soap</td>
<td>2</td>
<td>180</td>
<td>16</td>
<td>-30</td>
<td>+150</td>
<td>Wheel bearing, drive shaft, clutch release bearing, brake cylinder</td>
</tr>
<tr>
<td>Berulub CVN 140</td>
<td>Mineral oil</td>
<td>Lithium complex soap</td>
<td>1 - 2</td>
<td>140</td>
<td>13,5</td>
<td>-35</td>
<td>+130</td>
<td>CV-joint, components of the power train</td>
</tr>
<tr>
<td>Berulub CVN 170</td>
<td>Mineral oil/ Polyalpha-olefin (PAO)</td>
<td>Polyurea</td>
<td>1 - 2</td>
<td>170</td>
<td>14</td>
<td>-35</td>
<td>+160</td>
<td>CV-joint, components of the power train</td>
</tr>
<tr>
<td>Berulub FE 16</td>
<td>Polyglycol</td>
<td>Lithium complex soap</td>
<td>1 - 2</td>
<td>120</td>
<td>20</td>
<td>-40</td>
<td>+120</td>
<td>Elastomer seals, boots in hydraulic brake systems</td>
</tr>
<tr>
<td>Beruplex LG 21 F</td>
<td>Polyglycol</td>
<td>Lithium complex soap</td>
<td>1 - 2</td>
<td>390</td>
<td>66</td>
<td>-40</td>
<td>+145</td>
<td>Clutch systems, elastic axle bearings, steering column gasket</td>
</tr>
<tr>
<td>Beruplex LG 1-30</td>
<td>Polyglycol</td>
<td>Lithium complex soap</td>
<td>1 - 2</td>
<td>30</td>
<td>7</td>
<td>-50</td>
<td>+145</td>
<td>Electro-hydraulic actuators, electrical parking brake</td>
</tr>
<tr>
<td>Berulub FR 16</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Special lithium soap</td>
<td>2</td>
<td>32</td>
<td>6</td>
<td>-50</td>
<td>+140</td>
<td>Electrical parking brake</td>
</tr>
<tr>
<td>Berulub FH 57</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Polyurea</td>
<td>1 - 2&quot;</td>
<td>150</td>
<td>20</td>
<td>-40</td>
<td>+160</td>
<td>Steering column assembly</td>
</tr>
<tr>
<td>Beruglide L</td>
<td>Perfluoro-polyether (PFPE)</td>
<td>Polytetrafluoroethylene (PTFE)</td>
<td>1 - 2&quot;</td>
<td>160</td>
<td>16</td>
<td>-40</td>
<td>+190</td>
<td>Steering column assembly</td>
</tr>
<tr>
<td>BECHEM Coated PK</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Polyurea</td>
<td>0 - 1</td>
<td>32</td>
<td>6</td>
<td>-60</td>
<td>+140</td>
<td>Clutching cartridges, door closing mechanisms</td>
</tr>
<tr>
<td>Berucoat AF 309 E</td>
<td>Organ. binder</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-70</td>
<td>+250</td>
<td>Locking hooks, bolt connections, hinge pins, cams, notches, springs</td>
<td>Suitable for plastic/stainless steel combinations, long-term coating, prevents stick-slip, no dust adorption, excellent corrosion protection, oil resistant, curing temperature +120 °C</td>
</tr>
</tbody>
</table>

*Value indicates unworked penetration

Noise damping: 
- noise damped
- good noise damping
- very good noise damping
Seating and belt systems

For various applications in automotive seating and belt systems, whether actuators, cable winch systems or simple gear segments, with its excellent damping properties, wide service temperature range and good surface adhesion, the BECHEM product range offers maximum reliability even in emergency situations.

Approvals / references (in alphabetical order)

- Brose group 53.2
- Brose group 53.4
- Brose group 55.1
- Daimler DBL 6827.42
- Faurecia
- Fiat Spezifikation 9.55580 Gras V
- Ford WSD-M1C 234 A2, Ford WSS-M1C 253 A
- GM W16531-Type 4, GM W16531-Type 5, GM 9986248
- Johnson Controls
- Lear Corporation
- TRW
- VW-TL 778 A, VW-TL 778 B

PRODUCT

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>General</th>
<th>NLGI Grade</th>
<th>Thermal Conductivity (W/mK)</th>
<th>Thermal Stability, Service Temperature</th>
<th>Anti-squeak applications</th>
<th>Approval / references</th>
</tr>
</thead>
<tbody>
<tr>
<td>Berolux 54-2</td>
<td>Perfluoro-polyether (PFPE)</td>
<td>Polyetherfluoride(acrylyl) (PFTE)</td>
<td>2</td>
<td>210</td>
<td>-30 to +230</td>
<td>Anti-squeak applications</td>
<td>***</td>
</tr>
<tr>
<td>Berolub FR 16</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Special lithium soap</td>
<td>2</td>
<td>32</td>
<td>-50 to +140</td>
<td>Seat track, seat belt height adjustment</td>
<td>***</td>
</tr>
<tr>
<td>Berolub FR 43</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Special lithium soap</td>
<td>2</td>
<td>32</td>
<td>-50 to +140</td>
<td>Seat recliner, seat adjustment, seat height adjustment</td>
<td>***</td>
</tr>
<tr>
<td>Berolub FR 32-21</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Special lithium soap</td>
<td>1 - 2</td>
<td>32</td>
<td>-50 to +140</td>
<td>Seat recliner, seat adjustment, seat height adjustment</td>
<td>***</td>
</tr>
<tr>
<td>Berolub 15</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Polyurea</td>
<td>1 - 2</td>
<td>900</td>
<td>100</td>
<td>Seat recliner, seat adjustment</td>
<td>***</td>
</tr>
<tr>
<td>Berolub FH 57</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Polyurea</td>
<td>1 - 2</td>
<td>150</td>
<td>20</td>
<td>Seat recliner, easy entry, seat belt height adjustment, seat adjustment</td>
<td>***</td>
</tr>
<tr>
<td>Berolub XP 748</td>
<td>Ester</td>
<td>Gel</td>
<td>0</td>
<td>1200</td>
<td>120</td>
<td>Seat recliner, seat track</td>
<td>***</td>
</tr>
<tr>
<td>Berolub XP 3000</td>
<td>Polyalpha-olefin (PAO)</td>
<td>Gel</td>
<td>1 - 2</td>
<td>2400</td>
<td>180</td>
<td>Seat catch, seat track</td>
<td>***</td>
</tr>
<tr>
<td>Berolub NO-Dispersion 15</td>
<td>Perfluoro-polyether (PFPE)</td>
<td>-</td>
<td>325</td>
<td>20</td>
<td>-40 to +250</td>
<td>Anti-squeak applications</td>
<td>***</td>
</tr>
<tr>
<td>Berocast AF 320 E</td>
<td>Organ, binder</td>
<td>-</td>
<td>-</td>
<td>-70</td>
<td>+250</td>
<td>Locking hooks, bolt connections, hinge pins, cams, notches, springs</td>
<td>***</td>
</tr>
<tr>
<td>Berocast AF 732</td>
<td>Organ, binder</td>
<td>-</td>
<td>-</td>
<td>-70</td>
<td>+250</td>
<td>Ratchet notches, seat belt ratchet, panels</td>
<td>***</td>
</tr>
<tr>
<td>Berocast AK 376</td>
<td>Organ, binder</td>
<td>-</td>
<td>-</td>
<td>-40</td>
<td>+120</td>
<td>Anti-squeak applications</td>
<td>***</td>
</tr>
<tr>
<td>Berocast AK 978</td>
<td>Organ, binder</td>
<td>-</td>
<td>-</td>
<td>-40</td>
<td>+80</td>
<td>Headrest adjustment, anti-squeak applications</td>
<td>***</td>
</tr>
</tbody>
</table>

*Value indicates unwarked penetration. o o o noise damping, o o o good noise damping, o o o o very good noise damping

Applications

- Noise damping
- Anti-squeak applications
- Seat track, seat belt height adjustment
- Seat recliner, seat adjustment, seat height adjustment
- Seat recliner, seat adjustment, seat height adjustment
- Seat recliner, seat adjustment, seat height adjustment
- Seat recliner, seat adjustment
- Synthetic special grease for noise damping, good plastic and elastomer compatibility, good oxidation resistance, minimal oil separation, prevents stick-slip, also available with UV-tracer
- Fully synthetic grease for long-life lubrication of polymer components, excellent noise damping properties, excellent low temperature behaviour, contains PFTE
- Noise damping grease, good adhesion, water and fuel resistant, low oil separation, good oxidation resistance and good protection against corrosion
- Good plastic and elastomer compatibility, high adhesion, very low oil separation, excellent protection against corrosion, noise damping, UV-tracer
- For noise damping, excellent plastic/elastomer/non-ferrous metal compatibility, very high thermal stability, excellent resistance to oxidation
- For plastic/steel combinations, prevents stick-slip, no dust adsorption, excellent protection against corrosion, oil resistant, curing temperature +120 °C
- Suitable for plastic/steel combinations, prevents stick-slip, no dust adsorption, excellent protection against corrosion, oil resistant
- Suitable for metal/metal material combinations, long-life coating, very good adhesion, no sticking of dust, prevents stick-slip, excellent protection against corrosion, oil resistant
- Suitable for metal/metal material combinations, long-life coating, very good adhesion, no sticking of dust, prevents stick-slip, excellent protection against corrosion, oil resistant
- Long-life lubrication for plastic and/or steel material combinations, no dust adsorption, prevents stick-slip, good protection against corrosion
Locking systems and hinges

For increasingly complex door locking mechanisms and hinges, BECHEM offers the appropriate lubricants and coating systems characterised by outstanding low-temperature properties, excellent water and deicing fluid resistance, paint compatibility and reliable corrosion protection.

| PRODUCT | Base oil / base binder | Organ. binder | Special additive | MGO / MGO-oil | MGO-oil / HMG | NLGI-grade | Slickness | Adhesion | Shock absorber | Wear | Noise damping | EP properties | Against dust | Against steam | Against corrosion | Against abrasion | Temperature range | Excellent protection against corrosion, excellent water and deicing fluid resistance, paint compatibility and reliable corrosion protection. | Suitable for the material combinations plastic/plastic and plastic/metal, excellent low-temperature behaviour, resistant to water and oxidation, prevents stick-slip, contains PTFE. | Suitable for the material combinations plastic/plastic and plastic/metal, excellent low-temperature behaviour, resistant to water and oxidation, prevents stick-slip, contains PTFE, available with UV tracer. | Excellent adhesion and resistance to wash-out, low oil separation, protection against corrosion, good oxidation resistance, reduces friction and wear. | Excellent grease for noise damping, compatible with elastomers, good resistance to oxidation, low oil separation, prevents stick-slip. | Suitable for material combinations plastic/plastic and metal/plastic, resistant to substances, noise damping, resistant to ageing, low friction coefficient, prevents stick-slip. | Suitable for material combinations plastic/plastic and metal/plastic, resistant to substances, noise damping, resistant to ageing, low friction coefficient, prevents stick-slip. | Suitable for material combinations metal/polymer, excellent low-temperature behavior, prevents stick-slip, resistant to water and oxidation, very good noise damping properties, good EP properties. | For material combinations plastic/plastic and metal/plastic, resistant to substances, noise damping, resistant to ageing, low friction coefficient, prevents stick-slip. | Excellent thermal and mechanical stability, very good noise damping properties, good EP properties. | Multipurpose grease for long-life lubrication, excellent sealing qualities, excellent resistance to water and steam, excellent corrosion and wear protection, EP-properties. |

Appraisals/references

(in alphabetical order)

- Brose group 53.2
- Brose group 53.4
- Daimler DBL 6827.42
- Edscha AG
- Fiat Specification 9.55580 Gras V
- Ford WSD-MIC 234 A2
- Ford WSS-MIC 238 B
- Ford WSS-MIC 253 A2
- GM 9986248
- Valeo
- VW-TL 778 A
- VW-TL 778 B

*Value indicates unworked penetration
Anti-friction coatings

Anti-friction coatings are touch dry lubricant solutions for lifetime lubrication in most varied applications. Defined friction values, reduced wear and tribo-corrosion are only a few characteristics which allow these innovative coating technologies. The BECHEM coating product series each offer numerous advantages for all kinds of automotive applications, whether for metal materials, elastomers and plastics or leather and vinyl materials.

Approvals / references

(in alphabetical order)

- Boshoku Automotive
- Daimler
- Faurecia
- GM W 16531-Type 4
- GM W 16531-Type 5
- Johnson Controls
- Lear Corporation
- Porsche
- Stoz

Perfluoropolyether (PFPE) products

The high performance PFPE based lubricants in the BECHEM range are chemically inert (non-reactive) towards most materials and therefore offer outstanding compatibility especially with plastics as well as excellent resistance to very high temperatures. PFPE based lubricant products are high-purity, fully synthetic base oils with an excellent ageing and oxidation stability.

Approvals / references

(in alphabetical order)

- BMW group
- Delphi Automotive
- Faurecia
- Grammer
- Jaguar
- Kostal
- VW-TL 52141

» Anti-friction coatings play a decisive role. «

» Excellent temperature stability. «
When it comes to lubrication-related matters in automobiles, the requirements profile also includes noise damping properties. Often, vibration is behind this noise. BECHEM offers a comprehensive range of products providing the right solution. As one of the first lubrication manufacturers, BECHEM has designed a case containing noise damping products and antifriction coatings specifically for workshops, now established in the automotive industry.

Lubricants or antifriction coatings should be considered as a engineered element early on in component development, as this is the only way to fine-tune to different material groups, temperature and climatic effects. Our standard range featuring over 250 special lubricants and noise damping products can be tailored to specific requirements.

When it comes to lubrication-related matters in automobiles, the requirements profile also includes noise damping properties. Often, vibration is behind this noise. BECHEM offers a comprehensive range of products providing the right solution. As one of the first lubrication manufacturers, BECHEM has designed a case containing noise damping products and antifriction coatings specifically for workshops, now established in the automotive industry.

Lubricants or antifriction coatings should be considered as an engineered element early on in component development, as this is the only way to fine-tune to different material groups, temperature and climatic effects. Our standard range featuring over 250 special lubricants and noise damping products can be tailored to specific requirements.

Please get in touch with your responsible sales contact to order the BECHEM noise damping kit.

Outstanding success worldwide – BECHEM products for plastic lubrication.

The mentioned compatibilities are based on laboratory tests and references. In view of the variety of used raw materials as well as the complex chemical and morphological structure of the polymers the given information represent general tendencies only. In individual cases and especially prior to serial production the compatibilities should be confirmed by the supplier or verified in laboratory tests.

Please get in touch with your responsible sales contact to order the BECHEM noise damping kit.
Lubrication solutions for industry