your global specialist

Industrial sector

Reliable and efficient cement production.

Speciality lubricants meeting the highest requirements
Producing cement reliably and safely while reducing downtime is a continual challenge faced every day. Machines in the cement industry are subject to extreme operating conditions like high contamination, temperatures, vibrations and shock loads. These conditions make maintenance and repair of your machinery a very challenging task.

In the extreme environment in which drives, bearings, conveyors and other components have to function, the lubricant has to meet the highest demands. First, the right lubricant has to be selected, as there is no standard solution for many of the applications in this industry.

Depending on the mode of operation and the location of use, you have to use different lubricants that are made up of different base oils, additives, viscosities and consistencies. Making the wrong decision can lead to premature component failure or even production stoppages, resulting in high maintenance costs and production losses. In addition, your plant must run efficiently and cost-effectively with minimum impact on the environment.

Klüber Lubrication supports you by offering solutions particularly suited to these requirements of the cement industry.

We offer a range of speciality lubricants tailored to the needs of the cement industry that show their strengths particularly in critical applications. We support you in selecting the right lubricant and are with you as partner from changeover to routine checks, from the lubricant sampling and the set-up of lubrication systems to the optimisation of lubricant quantities. Our long-standing experience of more than 80 years in the industrial lubrication and intense cooperation with well-known OEMs helps us develop just the right lubricant to ensure high reliability, optimised consumption and achievement of the design life.
Cement plant applications: Optimally equipped with our speciality lubricants
Lubricants for raw cement plant transport
Apron feeders, belt & screw conveyers, bucket elevators, stackers & reclaimers

Better protection against temperature influence and shock loads

During the transport of raw material and additional materials, bearings and joints are mainly influenced by excessive contamination from dust and water in combination with high temperature fluctuations. The consequence: high wear and short lifetime of the loaded components. High-quality speciality lubricants help you prevent damage; the right lubricant protects your machines against temperatures and shock loads or oscillating movements.

### Component

<table>
<thead>
<tr>
<th>Cardan shafts, pivoting bearings, sliding and rolling bearings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Klüberlub BEM 41-122</td>
</tr>
<tr>
<td>Klüberplex BEM 41-132</td>
</tr>
<tr>
<td>Circulation systems/screw conveyor drives</td>
</tr>
<tr>
<td>PETAMO GHY 133 N</td>
</tr>
<tr>
<td>Lubricating nipple/automatic lubricant dispenser</td>
</tr>
<tr>
<td>Klübermatic dispenser with suitable lubricant</td>
</tr>
<tr>
<td>Drive gearboxes</td>
</tr>
<tr>
<td>Klüberoil GEM 1 N</td>
</tr>
<tr>
<td>Klübersynth GEM 4 N</td>
</tr>
<tr>
<td>Klübersynth GH 6*</td>
</tr>
</tbody>
</table>

### Features

<table>
<thead>
<tr>
<th>Klüberlub BEM 41-122</th>
</tr>
</thead>
<tbody>
<tr>
<td>– Temperature range: -30 °C to 140 °C</td>
</tr>
<tr>
<td>– Grease based on a mixture of mineral oil and synthetic hydrocarbon oil thickened with a special lithium soap and light-coloured solid lubricants</td>
</tr>
<tr>
<td>– NLGI grade 2</td>
</tr>
<tr>
<td>– Speed factor up to 400,000 mm/min</td>
</tr>
<tr>
<td>– Prolongs life of bearings subjected to high surface pressure and slow, oscillating movements</td>
</tr>
<tr>
<td>– Prevents fretting corrosion and scuffing in pivoting bearings</td>
</tr>
<tr>
<td>– Preferably used for steel/steel bearings</td>
</tr>
<tr>
<td>Klüberplex BEM 41-132</td>
</tr>
<tr>
<td>– Temperature range: -40 °C to 150 °C</td>
</tr>
<tr>
<td>– Grease based on a mixture of synthetic hydrocarbon oil, mineral oil and a special lithium soap</td>
</tr>
<tr>
<td>– NLGI grade 2</td>
</tr>
<tr>
<td>– Speed factor up to 1,000,000 mm/min</td>
</tr>
<tr>
<td>– Longer service life</td>
</tr>
<tr>
<td>– Less maintenance</td>
</tr>
<tr>
<td>– Prolongs life of bearings subjected to vibration and shock loads</td>
</tr>
<tr>
<td>PETAMO GHY 133 N</td>
</tr>
<tr>
<td>– Temperature range: -40 °C to 160 °C</td>
</tr>
<tr>
<td>– Grease based on polyurea thickener, mineral oil, synthetic hydrocarbon oil and additives</td>
</tr>
<tr>
<td>– NLGI grade 2</td>
</tr>
<tr>
<td>– Speed factor up to 500,000 mm/min</td>
</tr>
<tr>
<td>– High thermal loads, increased lifetime and reduced consumption</td>
</tr>
<tr>
<td>– Corrosion protection</td>
</tr>
<tr>
<td>Klübermatic dispenser with suitable lubricant</td>
</tr>
<tr>
<td>– Automatic lubricant dispenser suitable for single-point lubrication in rotating and plain bearings, slideways, open gears, toothed racks, shaft seals and chains</td>
</tr>
<tr>
<td>Drive gearboxes</td>
</tr>
<tr>
<td>Klüberoil GEM 1 N</td>
</tr>
<tr>
<td>– Max. temperature: up to 100 °C</td>
</tr>
<tr>
<td>– Gear/multipurpose oils based on selected mineral oils</td>
</tr>
<tr>
<td>– FZG scuffing test, A / 8.3 / 90, scuffing load stage ≥ 14</td>
</tr>
<tr>
<td>– Excellent results in FAG FE8 rolling bearing test</td>
</tr>
<tr>
<td>– Approved by leading gear drive manufacturers</td>
</tr>
<tr>
<td>– Low maintenance cost</td>
</tr>
<tr>
<td>– Protection even at peak loads, vibrations and oscillation</td>
</tr>
<tr>
<td>Klübersynth GEM 4 N</td>
</tr>
<tr>
<td>– Max. temperature: up to 140 °C</td>
</tr>
<tr>
<td>– Gear oils based on polyalphaolefin (PAO) and synthetic hydrocarbon (SHC) oil</td>
</tr>
<tr>
<td>– FZG scuffing test, A / 8.3 / 90, scuffing load stage ≥ 14</td>
</tr>
<tr>
<td>– Excellent results in FAG FE8 rolling bearing test</td>
</tr>
<tr>
<td>– Reduces power losses and improves energy efficiency</td>
</tr>
<tr>
<td>– Protection even at peak loads, vibrations and oscillation, high temperatures</td>
</tr>
<tr>
<td>– Extended service life of bearings, seals</td>
</tr>
<tr>
<td>– Longer oil change intervals resulting in cost savings</td>
</tr>
<tr>
<td>Klübersynth GH 6*</td>
</tr>
<tr>
<td>– Max. temperature: up to 160 °C</td>
</tr>
<tr>
<td>– Polyglycol synthetic oil</td>
</tr>
<tr>
<td>– FZG scuffing test, A / 8.3 / 90, scuffing load stage ≥ 14</td>
</tr>
<tr>
<td>– Excellent results in FAG FE8 rolling bearing test</td>
</tr>
<tr>
<td>– Excellent wear protection, ageing and oxidation resistance, good viscosity-temperature behaviour and very good thermal stability</td>
</tr>
<tr>
<td>– Reduces power losses and improves energy efficiency</td>
</tr>
<tr>
<td>– Protection even at peak loads, vibrations and oscillation, high temperatures</td>
</tr>
<tr>
<td>– Prevents premature rolling bearing failure</td>
</tr>
<tr>
<td>– Extended service life</td>
</tr>
<tr>
<td>– Longer oil change intervals resulting in cost savings</td>
</tr>
</tbody>
</table>

Check compatibility and follow the application notes in the product information sheet.
**Lubricants for crushing processes**

Crushing processes are particularly demanding for bearings, as vibrations, shocks and contamination are extremely high, and temperatures fluctuate considerably. Speciality lubricants can protect highly loaded bearings in these processes; they reduce wear, extend maintenance intervals and increase reliability.

We make speciality lubricants to suit these requirements; they have the right viscosity and consistency combined with the right additives and offer reliable lubricant pumpability. They are also chemically and physically stable, contributing to long bearing life.

### Vibrating screens

<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
</table>
| Bearings  | Klüberplex BEM 41-132 | - Temperature range -40 °C to 150 °C  
- Grease based on mixture of synthetic hydrocarbon oil, mineral oil and a special lithium soap  
- NLGI grade 2  
- Speed factor up to 1,000,000 mm/min | - Longer service life  
- Less maintenance  
- Prolong life of bearings subjected to vibration and shock loads |
|          | Klüberlub BVH 71-461 | - Temperature range -20 °C to 160 °C  
- NLGI grade 1  
- Grease based on mineral oil, synthetic hydrocarbon oil and polyurea | - Efficient at increased temperatures, vibrations and shock loads |
|          | Klüberlub BE 41-542 | - Temperature range -20 °C to 140 °C  
- NLGI grade 2  
- Speed factor up to 500,000 mm/min  
- Extreme-pressure grease based on highly viscous mineral oil, special lithium soap, antiwear, anti-oxidant and anticorrosion additives | - Protects highly loaded bearings running at slow to medium speeds |

### Crushers

<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
</table>
| Crushers  | Klüberol BE 41-1501 | - Temperature range -10 °C to 150 °C  
- NLGI grade 1  
- Grease consisting of highly viscous mineral hydrocarbon oil (ISO VG 1500), special lithium soap and particularly effective extreme pressure/antiwear (EP/AW) additives  
- Contains solid lubricants (MoS₂ and graphite) | - Increased bearing life  
- Improved pumpability  
- Increased productivity due to less downtime  
- Recommended by leading OEMs |
| Drive gearbox | Klüberol GEM 1 N | - Max. temperature: up to 100 °C  
- Gear/multipurpose oils based on selected mineral oils  
- FZG scuffing test, A/2.5/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test | - Approved by leading gear drive manufacturers  
- Low maintenance cost  
- Protection even at peak loads, vibrations and oscillation |
|          | Klüberolynth GEM 4 N | - Max. temperature: up to 140 °C  
- Gear/multipurpose oils based on polyalphaolefin (PAO) and synthetic hydrocarbon (SHC) oil  
- FZG scuffing test, A/2.5/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test | - Approved by leading OEMs  
- Reduces power losses and improves energy efficiency  
- Protection even at peak loads, vibrations and oscillation, high temperatures  
- Extended service life of bearings, seals  
- Longer oil change intervals resulting in cost savings |
|          | Klüberolynth GH 6 * | - Max. temperature: up to 160 °C  
- Polyglycol synthetic gear oil  
- Excellent results in FAG FE8 rolling bearing test  
- FZG scuffing test, A/2.5/90, scuffing load stage ≥ 14  
- Excellent wear protection, ageing and oxidation resistance, good viscosity-temperature behaviour and very good thermal stability | - Reduces power losses and improves energy efficiency  
- Approved by leading OEMs  
- Protection even at peak loads, vibrations and oscillation, high temperatures  
- Prevents premature rolling bearing failure  
- Extended service life  
- Longer oil change intervals resulting in cost savings |

* Check compatibility and follow the application notes in the product information sheet.
## Lubricants for crushing processes
### Vertical roller mills

### Oil lubrication

<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main bearing/roller bearing</td>
<td>Klüber synth GH 6* -680, -1000, -1500</td>
<td>- Max. temperature up to 160 °C (Klübersynth GH 6)  - Polyglycol synthetic oil  - Excellent results in FAG FE8 rolling bearing test  - Excellent wear protection, ageing and oxidation resistance, good viscosity-temperature behaviour and very good thermal stability</td>
<td>- Prevents premature rolling bearing failure  - Reduces power losses and improves energy efficiency  - Extended service life  - Approved by leading OEMs</td>
</tr>
<tr>
<td></td>
<td>SYNTHESO HT 1000 (CLP PG 1000)</td>
<td>- Max. temperature up to 150 °C (SYNTHESO HT)</td>
<td></td>
</tr>
<tr>
<td>Main drive gearbox</td>
<td>Klüber oil GEM 1 N</td>
<td>- Max. temperature: up to 100 °C  - Gear/multipurpose oils based on selected mineral oils  - FZG scuffing test, A / 8.3 / 90, scuffing load stage ≥ 14  - Excellent results in FAG FE8 rolling bearing test</td>
<td>- Approved by leading gear drive manufacturers  - Low maintenance cost  - Protection even at peak loads, vibrations and oscillation</td>
</tr>
<tr>
<td></td>
<td>Klüber synth GEM 4 N</td>
<td>- Max. temperature: up to 140 °C  - Gear oils based on polyalphaolefin (PAO) and synthetic hydrocarbon (SHC) oil  - FZG scuffing test, A / 8.3 / 90, scuffing load stage ≥ 14  - Excellent results in FAG FE8 rolling bearing test</td>
<td>- Reduces power losses and improves energy efficiency  - Protection even at peak loads, vibrations and oscillation, high temperatures  - Extended service life of bearings, seals  - Longer oil change intervals resulting in cost savings</td>
</tr>
<tr>
<td></td>
<td>Klüber synth GH 6*</td>
<td>- Max. temperature: up to 160 °C  - Polyglycol synthetic oil  - Excellent results in FAG FE8 rolling bearing test</td>
<td>- Reduces power losses and improves energy efficiency  - Protection even at peak loads, vibrations and oscillation, high temperatures  - Prevents premature rolling bearing failure  - Extended service life  - Longer oil change intervals resulting in cost savings</td>
</tr>
</tbody>
</table>

Check compatibility and follow the application notes in the product information sheet.

### Grease lubrication

<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main bearing/rock arm</td>
<td>Klüber lub BE 41-1501</td>
<td>- Temperature range: -10 °C to 150 °C  - NLGI grade 1  - Grease consisting of highly viscous mineral hydrocarbon oil (ISO VG 1500), special lithium soap and particularly effective extreme pressure/antwear (EP/AW) additives  - Contains solid lubricants (MoS₂ and graphite)</td>
<td>- Increased bearing life  - Improved pumpability  - Increased productivity due to less downtime  - Recommended by leading OEMs</td>
</tr>
<tr>
<td></td>
<td>Klüber lub BE 41-1002</td>
<td>- Temperature range: -15 °C to 120 °C  - NLGI grade 2  - Grease consisting of highly viscous mineral hydrocarbon oil (ISO VG 1500), special lithium thickener  - Contains solid lubricants</td>
<td>- Good pumpability at low temperatures  - Less maintenance</td>
</tr>
<tr>
<td>Elastomer seals of rollers</td>
<td>SYNTHESO GLEP 1</td>
<td>- Temperature range: -50 °C to 150 °C  - Special lubricating grease with EP additives, compatible with EPDM</td>
<td>- Compatible with EPDM seals. No more leakages due to seal failures</td>
</tr>
<tr>
<td></td>
<td>Klüber lub BE 41-1501</td>
<td>- Temperature range: -10 °C to 150 °C  - Grease consisting of highly viscous mineral hydrocarbon oil (ISO VG 1500), special lithium soap and particularly effective extreme pressure/antwear (EP/AW) additives  - Contains solid lubricants (MoS₂ and graphite)</td>
<td>- Increased component life  - Improved pumpability  - Increased productivity due to less downtime  - Recommended by leading OEMs</td>
</tr>
<tr>
<td>Component</td>
<td>Product</td>
<td>Features</td>
<td>Application notes and benefits</td>
</tr>
<tr>
<td>--------------------------</td>
<td>----------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| Top and bottom bearings  | Klüberplex BEM 41-132            | - Temperature range: -40 °C to 150 °C  
- Grease based on mixture of synthetic hydrocarbon oil, mineral oil and a special lithium soap  
- NLGI grade 2  
- Speed factor up to 1,000,000 mm/min | - Longer service life  
- Less maintenance  
- Prolongs bearing life subjected to vibration and shock loads                                                          |
|                          | Klüberlub BE 41-542              | - Temperature range: -20 °C to 140 °C  
- NLGI grade 2  
- Extreme-pressure grease based on highly viscous mineral oil, special lithium soap, antiwear, anti-oxidant and anticorrosion additives | - Protects highly loaded bearings running at slow to medium speeds                                       |
|                          | Klüberlub BE 41-1501             | - Temperature range: -10 °C to 150 °C  
- NLGI grade 1  
- Grease consisting of highly viscous mineral hydrocarbon oil (ISO VG 1500), special lithium soap and particularly effective extreme pressure / antiwear (EP / AW) additives  
- Contains solid lubricants (MoS₂ and graphite) | - Increased bearing life  
- Improved pumpability  
- Increased productivity due to less downtime  
- Recommended by leading OEMs                                                                                               |
| Gearboxes                | Klüberoil GEM 1 N                | - Max. temperature up to 100 °C  
- Gear/multipurpose oils based on selected mineral oils  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test | - Approved by leading gear drive manufacturers  
- Low maintenance cost  
- Protection even at peak loads, vibrations and oscillation                                                                 |
|                          | Klübersynth GEM 4 N              | - Max temperature up to 140 °C  
- Gear oils based on polyalkylsiloxane (PAO) and synthetic hydrocarbon (SHC) oil  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test | - Reduces power losses and improves energy efficiency  
- Protection even at peak loads, vibrations and oscillation, high temperatures  
- Extended service life of bearings, seals  
- Longer oil change intervals resulting in cost savings                                                                      |
|                          | Klübersynth GH 6 *               | - Max. temperature up to 160 °C  
- Polyglycol synthetic oil  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test  
- Excellent wear protection, ageing and oxidation resistance, good viscosity-temperature behaviour and very good thermal stability | - Reduces power losses and improves energy efficiency  
- Protection even at peak loads, vibrations and oscillation, high temperatures  
- Prevents premature rolling bearing failure  
- Extended service life  
- Longer oil change intervals resulting in cost savings                                                                      |

Check compatibility and follow the application notes in the product information sheet.
Lubricants for crushing processes
Roller presses

In bearings subjected to high shock loads the lubricating film has to ensure trouble-free operation, especially as lubrication starvation, contamination or the wrong lubricant can quickly contribute to bearing failure. Factors like long lead times for delivery of expensive spares can have an adverse effect on production and cost. Typical roller press bearings are cylindrical roller bearings operating at maximum 75 °C. We need to ensure adequate lubricant film formation to prevent metal-to-metal contact between the rollers and bearing raceways.

Klüberlub BE 41-1501 is a grease specially designed for such heavily loaded roller press bearing lubrication. Even at 75 °C, it ensures that no metal-to-metal contact occurs between rollers and bearing raceways.

Please select viscosity and consistency according to your operating parameters, e.g. temperature, speed and load. Your Klüber Lubrication contact will be glad to help you.

<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main bearing</td>
<td>Klüberlub BE 41-1501</td>
<td>- Temperature range -10 °C to 150 °C&lt;br&gt;- NLGI grade 1&lt;br&gt;- Grease consisting of highly viscous mineral hydrocarbon oil (ISO VG 1500), special lithium soap and particularly effective extreme pressure / antwear (EP/AW) additives&lt;br&gt;- Contains solid lubricants (MoS$_2$ and graphite)</td>
<td>- Increased bearing life&lt;br&gt;- Improved pumpability&lt;br&gt;- Increased productivity due to less downtime&lt;br&gt;- Recommended by leading OEMs</td>
</tr>
<tr>
<td></td>
<td>Klüberlub BE 41-1002</td>
<td>- Temperature range -15 °C to 120 °C&lt;br&gt;- NLGI grade 2&lt;br&gt;- Grease consisting of highly viscous mineral hydrocarbon oil (ISO VG 1000), special lithium thickener&lt;br&gt;- Contains solid lubricants</td>
<td>- Good pumpability at low temperatures&lt;br&gt;- Less maintenance</td>
</tr>
<tr>
<td>Planetary gearbox</td>
<td>Klübersynth GEM 1 N</td>
<td>- Max. temperature up to 100 °C&lt;br&gt;- Gear / multipurpose oils based on selected mineral oils&lt;br&gt;- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14&lt;br&gt;- Excellent results in FAG FE8 rolling bearing test</td>
<td>- Approved by leading gear drive manufacturers&lt;br&gt;- Low maintenance cost&lt;br&gt;- Protection even at peak loads, vibrations and oscillation</td>
</tr>
<tr>
<td></td>
<td>Klübersynth GEM 4 N</td>
<td>- Max. temperature up to 140 °C&lt;br&gt;- Gear oils based on polyalphaolefin (PAO) and synthetic hydrocarbon (SHC) oil&lt;br&gt;- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14&lt;br&gt;- Excellent results in FAG FE8 rolling bearing test</td>
<td>- Reduces power losses and improves energy efficiency&lt;br&gt;- Protection even at peak loads, vibrations and oscillation, high temperatures&lt;br&gt;- Extended service life of bearings, seals&lt;br&gt;- Longer oil change intervals resulting in cost savings</td>
</tr>
<tr>
<td></td>
<td>Klübersynth GH 6</td>
<td>- Max. temperature up to 160 °C&lt;br&gt;- Polyglycol synthetic oil&lt;br&gt;- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14&lt;br&gt;- Excellent results in FAG FE8 rolling bearing test&lt;br&gt;- Excellent wear protection, ageing and oxidation resistance, good viscosity-temperature behaviour and very good thermal stability</td>
<td>- Reduces power losses and improves energy efficiency&lt;br&gt;- Protection even at peak loads, vibrations and oscillation, high temperatures&lt;br&gt;- Prevents premature rolling bearing failure&lt;br&gt;- Extended service life&lt;br&gt;- Longer oil change intervals resulting in cost savings</td>
</tr>
</tbody>
</table>

Check compatibility and follow the application notes in the product information sheet.
# Lubricants for crushing processes

## Tube mills / ball mills

<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
</table>
| Pinion bearings | Klüberlub BE 41-1501 | - Temperature range -10 °C to 150 °C  
- NLGI grade 1  
- Grease consisting of highly viscous mineral hydrocarbon oil (ISO VG 1500), special lithium soap and particularly effective extreme pressure/antirawear (EP/AW) additives  
- Contains solid lubricants (MoS$_2$ and graphite) | - Increased bearing life  
- Improved pumpability  
- Increased productivity due to less downtime  
- Recommended by leading OEMs |
| Neck bearings / drive gearboxes | Klüberoil GEM 1 N | - Max. temperature up to 100 °C  
- Gear/multipurpose oils based on selected mineral oils  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test | Approved by leading gear drive manufacturers  
- Low maintenance cost  
- Protection even at peak loads, vibrations and oscillation |
| | Klübersynth GEM 4 N | - Max temperature up to 140 °C  
- Gear oils based on polyalphaolefin (PAO) and synthetic hydrocarbon (SHC) oil  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test | - Reduces power losses and improves energy efficiency  
- Protection even at peak loads, vibrations and oscillation, high temperatures  
- Extended service life of bearings, seals  
- Longer oil change intervals resulting in cost savings |
| | Klübersynth GH 6* | - Max. temperature up to 160 °C  
- Polyglycol synthetic oil  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test  
- Excellent wear protection, ageing and oxidation resistance, good viscosity-temperature behaviour and very good thermal stability. | - Reduces power losses and improves energy efficiency  
- Protection even at peak loads, vibrations and oscillation, high temperatures  
- Prevents premature rolling bearing failure  
- Extended service life  
- Longer oil change intervals resulting in cost savings |
| Rubber seals of neck / shoe bearings and girth gear cover | POLYLUB GA 352 P | - Temperature range -35 °C to 120 °C  
- Adhesive long term grease based on synthetic hydrocarbon oil, mineral oil and aluminium complex soap  
- Good water resistance | - Good sealing effect prevents entry of contaminants like dust and water  
- Protects components against corrosion |

* Check compatibility and follow the application notes in the product information sheet
<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
</table>
| Roller bearings/plummver blocks/reducer coupling | Klüberlub BE 41-1501 | - Temperature range: -10 °C to 150 °C  
- NLGI grade 1  
- Grease consisting of highly viscous mineral hydrocarbon oil (ISO VG 150), special lithium soap and particularly effective extreme pressure/antiwear (EP/AW) additives  
- Contains solid lubricants (MoS$_2$ and graphite) | - Increased bearing life  
- Improved pumpability  
- Increased productivity due to less downtime  
- Recommended by leading OEMs |
| Rotary joints                     | PTFE/O H 133 N | - Temperature range: 40 °C to 160 °C  
- Grease based on polyurea thickener, mineral oil, synthetic hydrocarbon oil and additives  
- NLGI grade 2  
- Speed factor 500,000 mm/min | - Reduction of lubrication intervals, less maintenance  
- Cost reduction by reducing consumption  
- Prolongs bearing life even under high temperature and corrosive media |
| Scraper bearings                  | Klüberoil GEM 1-150 N | - Max. temperature up to 100 °C  
- Gear/multipurpose oils based on selected mineral oils  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Good results in FAG FE8 rolling bearing test | - Approved by leading gear drive manufacturers  
- Low maintenance cost  
- Protection even at peak loads, vibrations and oscillation |
| Bavel gearbox                     | Klübersynth GEM 1 N | - Max. temperature up to 140 °C  
- Gear oils based on polyalphaolefin (PAO) and synthetic hydrocarbon (SHC) oil  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test | - Reduces power losses and improves energy efficiency  
- Protection even at peak loads, vibrations and oscillation, high temperatures  
- Extended service life of bearings, seals  
- Longer oil change intervals resulting in cost savings |
| Coupling bearing                  | Klüberoil GEM 1-320 N | - Max. temperature up to 100 °C  
- Gear/multipurpose oils based on selected mineral oils  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Good results in FAG FE8 rolling bearing test | - Approved by leading gear drive manufacturers  
- Low maintenance cost  
- Protection even at peak loads, vibrations and oscillation |

Bed compression grinding units

<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
</table>
| Combination gear drives in mills   | Klüberoil GEM 1 N | - Max. temperature up to 100 °C  
- Gear/multipurpose oils based on selected mineral oils  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test | - Approved by leading gear drive manufacturers  
- Low maintenance cost  
- Protection even at peak loads, vibrations and oscillation |
| Klübersynth GEM 4 N               | - Max. temperature up to 140 °C  
- Gear oils based on polyalphaolefin (PAO) and synthetic hydrocarbon (SHC) oil  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test | - Reduces power losses and improves energy efficiency  
- Protection even at peak loads, vibrations and oscillation, high temperatures  
- Extended service life of bearings, seals  
- Longer oil change intervals resulting in cost savings |
| Klübersynth GH 6*                 | - Max. temperature up to 160 °C  
- Polyglycol synthetic oil  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test  
- Excellent wear protection, aging and oxidation resistance, good viscosity-temperature behaviour and very good thermal stability | - Reduces power losses and improves energy efficiency  
- Protection even at peak loads, vibrations and oscillation, high temperatures  
- Prevents premature rolling bearing failure  
- Extended service life  
- Longer oil change intervals resulting in cost savings |

Combination drive units

Check compatibility and follow the application notes in the product information sheet

---

**Lubricants for crushing processes**

**Bed compression grinding units**

**Combination gear drives in mills**

**Combination drive units**

---

18
<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gearbox drive manifold</td>
<td>Klüber synth GH 6</td>
<td>- Max. temperature up to 160 °C</td>
<td>- Reduces power losses and improves energy efficiency</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Polyglycol synthetic oil</td>
<td>- Protection even at peak loads, vibrations and oscillation, high temperatures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- FZG scuffing test, A / B / C / D, scuffing load stage ≥ 14</td>
<td>- Prevents premature rolling bearing failure</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Excellent results in FAG FE8 rolling bearing test</td>
<td>- Extended service life</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Excellent wear protection, ageing and oxidation resistance, good viscosity-temperature behaviour and very good thermal stability</td>
<td>- Longer oil change intervals resulting in cost savings</td>
</tr>
<tr>
<td>Axle bearings</td>
<td>Klüberplex BEM 41-132</td>
<td>- Temperature range -40 °C to 150 °C</td>
<td>- Longer service life</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Grease based on a mixture of synthetic hydrocarbon oil, mineral oil and a special lithium soap</td>
<td>- Less maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- NLGI grade 2</td>
<td>- Prolongs life of bearing even under vibration and shock loads, high temperatures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Speed factor 1,000,000 mm/min</td>
<td></td>
</tr>
<tr>
<td></td>
<td>PETAMO GHY 133 N</td>
<td>- Temperature range -40 °C to 180 °C</td>
<td>- Reduction of lubrication intervals, less maintenance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Grease based on polyurea thickener, mineral oil, synthetic hydrocarbon oil and additives</td>
<td>- Cost reduction by reducing consumption</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- NLGI grade 2</td>
<td>- Prolongs bearing life even under high temperature and corrosive media</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Speed factor 500,000 mm/min</td>
<td></td>
</tr>
</tbody>
</table>

Check compatibility and follow the application notes in the product information sheet.

Lubricants used in clinker production

Pre-heating

The pre-heating section is marked by extreme conditions like high temperature, speed, contaminants and others. The lubrication of bearings subjected to thermal loads is a demanding task. Speciality lubricants from Klüber Lubrication are designed to increase the component life in challenging situations.
The lamellar seal and the riding ring form one of the frequently lubricated friction points in kilns. It is important to ensure that solid lubricants enter the contact area of these friction points to prevent metal-metal wear.

Note: Mix the suspensions well before use to make sure the carrier oil and the solid lubricants are homogenised. The oil might ignite in the event of insufficient homogenisation.

Lubrication of kiln riding rings and lamellar seals

<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
</table>
| Riding ring | WOLFRACOAT C Fluid | - Temperature range: -25 °C to 1,050 °C  
- Viscous high-temperature release agent and lubricating compound based on a mineral and water oil mixture. It contains solid lubricants, metal pigments and an inorganic thickener.  
- Ignition temperature ≥ 370 °C | - Occupational safety: applied through spray equipment  
- Low consumption: low costs, high efficiency  
- Smaller pack sizes for easy handling  
- Designed to lubricate surfaces subjected to high thermal loads  
- Ease of application  
- Shake vigorously prior to application |

| Lamellar inlet/outlet sealing | GRAFLOSCON BY 20 ULTRA | - Temperature range: -30 °C to 700 °C  
- Based on flame-resistant high-temperature dispersion  
- Contains solid lubricant and synthetic oil  
- Solvent-free dispersion  
- Thermal stability of the lubricating film 700 °C | - Occupational safety: applied through spray equipment  
- Easy to apply (no settling of solid lubricants, solvent-free)  
- No residue formation at high temperatures  
- Protection against thermal stress |

| | GRAFLOSCON C-50 500 PLUS | - Adhesive lubricant based on mineral oil with aluminium complex thickener and solid lubricant (fine graphite)  
- Resistant to high pressure  
- Contains antiwear additives, adhesion improvers and corrosion inhibitors  
- Thermal stability of lubricant film up to 200 °C | - Excellent adhesion  
- Wear reduction  
- Corrosion protection |

<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
</table>
| Support roller bearings and thrust roller bearings | Klüberlub BE 41-1501 | - Temperature range: -10 °C to 150 °C  
- NLGI grade 1  
- Grease consisting of highly viscous mineral hydrocarbon oil (ISO VG 1500), special lithium soap and particularly effective extreme pressure/antiwear (EP/AW) additives  
- Contains solid lubricants (MoS2 and graphite) | - Increased bearing life  
- Improved pumpability  
- Increased productivity due to less downtime  
- Recommended by leading OEMs |

| | Klüberoil GEM 1 N | - Max. temperature up to 100 °C  
- Gear multipurpose oils based on selected mineral oils  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test | - Approved by leading gear drive manufacturers  
- Low maintenance cost  
- Protection even at peak loads, vibrations and oscillation |

| | Klübersynth GEM 4 N | - Max. temperature up to 140 °C  
- Gear and multipurpose oils based on polyalphaolefin (PAO) and synthetic hydrocarbon (SHC) oil  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test | - Approved by leading OEMs  
- Reduces power losses and improves energy efficiency  
- Protection even at peak loads, vibrations and oscillation, high temperatures  
- Extended service life of bearings, seals  
- Longer oil change intervals resulting in cost savings |

| | Klübersynth GH 61 | - Max. temperature up to 160 °C  
- Polyglycol synthetic oil  
- FZG scuffing test, A/8.3/90, scuffing load stage ≥ 14  
- Excellent results in FAG FE8 rolling bearing test  
- Excellent wear protection, ageing and oxidation resistance, good viscosity-temperature behaviour and very good thermal stability | - Reduces power losses and improves energy efficiency  
- Approved by leading OEMs  
- Protection even at peak loads, vibrations and oscillation, high temperatures  
- Prevents premature rolling bearing failure  
- Extended service life  
- Longer oil change intervals resulting in cost savings |

* Check compatibility and follow the application notes in the product information sheet.
Bearings in coolers are subjected to high temperatures. Standard greases fail quickly and cause bearing damage, resulting in high maintenance costs.

### Coolers

<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
</table>
| Fan bearings | STABURAGS N 12 M F | - Temperature range -20 °C to 140 °C  
- Mineral oil grease for long-term application, at high temperatures  
- Contains solid lubricant (MoS₂)  
- Speed factor 500,000 mm/min  |
| Electric motor bearings |  |  |  |
| Reciprocating grates | Klüberplex BEM 41-132 | - Temperature range -40 °C to 150 °C  
- Grease based on mixture of synthetic hydrocarbon oil, mineral oil and a special lithium soap  
- NLGI grade 2  
- Speed factor 1,000,000 mm/min |
| Slow-running rolling bearings |  |  |  |
| Reciprocating grates | STABUTHERM GH 461 | - Temperature range -20 °C to 180 °C  
- NLGI grade 1  
- High-temperature grease based on mineral oil and polyurea  
- Suitable for centralised lubrication systems  
- Very adhesive and resistant to water  |
| Slow-running rolling bearings |  |  |  |
| Clinker crushing bearings | Klüberplex HZ 74-401 | - Temperature range -40 °C to 200 °C  
- NLGI grade 1  
- High-temperature grease based on synthetic oil and polyurea thickener  
- High base oil viscosity and special additives  |
| Clinker crushing bearings | Klúberlub BE 41-1501 |  |  |
| Lubricating nipple/automatic lubricant dispenser for reciprocating grates/bearings | Klúbermatic dispenser with suitable lubricant | - Automatic lubricant dispenser suitable for single-point lubrication in rolling and plain bearings, slideways, open gears, toothed racks, shaft seals and chains |
|  |  |  |  |
| Rotary kiln |  |  |  |
| Lubricants used in clinker production |  |  |  |
### Lubricants for open gear drives

You expect your open gears to work reliably. We offer you a comprehensive range of specialty lubricants to reach this goal and select the right viscosity lubricant for your open gear. We will be happy to support you on site during routine inspections, startup, after repair, or with new gears.

There are two basic types of lubricants for open gears: graphite-based greases and Klüber fluids that are free of solid lubricants. Klüber fluids have been used successfully for more than 15 years and are an increasingly preferred alternative. These are oils with additive packages tailored to the particular requirements of open gears. The most important selection criterion is viscosity. The product must be selected based on the tooth flank condition, load and temperature distribution, vibrations, mechanical condition of gear and pinion and the surroundings.

### Operational open gear lubricants – transparent fluids

<table>
<thead>
<tr>
<th>Climate zone</th>
<th>Subtropical to tropical</th>
<th>Tropical</th>
<th>Temperate</th>
<th>Subtropical</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type of lubrication system</strong></td>
<td>Spray lubrication, immersion, circulation, paddle wheel</td>
<td>Spray lubrication, immersion, paddle wheel</td>
<td>Spray lubrication</td>
<td>Spray lubrication, immersion, circulation, paddle wheel</td>
</tr>
<tr>
<td><strong>Product</strong></td>
<td>Klüberfluid C-F 3 Ultra</td>
<td>Klüberfluid C-F 3 M Ultra</td>
<td>Klüberfluid C-F 4 Ultra</td>
<td>Klüberfluid C-F 8 Ultra</td>
</tr>
<tr>
<td><strong>Colour</strong></td>
<td>Transparent</td>
<td>Transparent</td>
<td>Transparent</td>
<td>Transparent</td>
</tr>
<tr>
<td><strong>Maximum peripheral speed in m/s</strong></td>
<td>10</td>
<td>12</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td><strong>Temperature limits for spraying</strong></td>
<td>15 °C to 120 °C</td>
<td>2 °C to 100 °C</td>
<td>0 °C to 80 °C</td>
<td>0 °C to 80 °C</td>
</tr>
<tr>
<td><strong>Temperature limits for immersion or circulation lubrication</strong></td>
<td>Not applicable</td>
<td>0 °C to 80 °C</td>
<td>0 °C to 110 °C/0 °C to 80 °C</td>
<td>10 °C to 80 °C/10 °C to 80 °C</td>
</tr>
<tr>
<td><strong>Viscosity at 40 °C</strong></td>
<td>16,500 mm²/sec</td>
<td>25,500 mm²/sec</td>
<td>4,000 mm²/sec</td>
<td>3,100 mm²/sec</td>
</tr>
</tbody>
</table>

**Application notes and benefits**

- Long service life of open gears
- Easy inspection during operation with UV lamp
- Cost reduction due to less consumption
- Excellent wear protection even at elevated temperatures
- Tested and approved by OEMs
- Reduction in power consumption
- Clean system: no accumulation of used grease in the cover

**Benefits of Klüber Lubrication transparent open gear lubricants:**

- Greater film thickness (higher lambda value) – even at higher operating temperatures resulting in better tooth flank protection
- Intelligent additive package for protection under extreme pressure and mixed friction conditions
- Good flow characteristics ensure clean gears
- No blocking of the spray nozzles results in enhanced life of spray system and cost savings
- Good vibration dampening
- Reduced tooth flank temperature

**Profitability**

- Tooth flanks can be inspected during operation through the transparent film
- Immediate identification of progressive damage in form of material spalling or metal chips
- No more “unpleasant surprises” at shutdowns – if required corrective measures can be planned ahead
- Reduced wear
- Reduced lubricant consumption: up to 50 % less compared to graphite based products
# Lubricants for open gear drives

Graphite-based operational open gear lubricants

<table>
<thead>
<tr>
<th>Climate zone</th>
<th>Temperate</th>
<th>Temperate to subtropical</th>
<th>Subtropical to tropical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate type</td>
<td>Cold winters and mild summers</td>
<td>Cold winters and hot summers</td>
<td>Mild winters to hot summers</td>
</tr>
<tr>
<td>Type of lubrication system</td>
<td>Spray lubrication</td>
<td>Spray lubrication</td>
<td>Spray lubrication</td>
</tr>
<tr>
<td>Product</td>
<td>GRAFLOSCON C-SG 0 ULTRA</td>
<td>GRAFLOSCON C-SG 1000 ULTRA</td>
<td>Klotterfluid C-F 1 Ultra</td>
</tr>
<tr>
<td>Temperature limits for spraying</td>
<td>0 °C to 90 °C</td>
<td>5 °C to 100 °C</td>
<td>-15 °C to 120 °C</td>
</tr>
<tr>
<td>Base oil viscosity at 40 °C</td>
<td>680 mm²/sec</td>
<td>1000 mm²/sec</td>
<td>250 mm²/sec</td>
</tr>
<tr>
<td>Application notes and benefits</td>
<td>- Tried-and-tested, cost-effective operational lubricant contributing to a long service life of your drive, low lubricant consumption and reduced operating costs</td>
<td>- Approved by OEMs</td>
<td>- Service lubricant for open drives with splash or circular lubrication</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Long service life of gears</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Approved by OEMs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Climate zone</th>
<th>Temperate</th>
<th>Temperate to subtropical</th>
<th>Subtropical to tropical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Climate type</td>
<td>Cold winters and mild summers</td>
<td>Cold winters and hot summers</td>
<td>Mild winters to hot summers</td>
</tr>
<tr>
<td>Type of lubrication system</td>
<td>Spray lubrication</td>
<td>Spray lubrication</td>
<td>Spray lubrication</td>
</tr>
<tr>
<td>Product</td>
<td>GRAFLOSCON C-SG 0 ULTRA</td>
<td>GRAFLOSCON C-SG 1000 ULTRA</td>
<td>Klotterfluid C-F 1 Ultra</td>
</tr>
<tr>
<td>Temperature limits for immersion or circulation lubrication</td>
<td>Not applicable</td>
<td>Not applicable</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Base oil viscosity at 40 °C</td>
<td>680 mm²/sec</td>
<td>1000 mm²/sec</td>
<td>250 mm²/sec</td>
</tr>
<tr>
<td>Application notes and benefits</td>
<td>- Tried-and-tested, cost-effective operational lubricant contributing to a long service life of your drive, low lubricant consumption and reduced operating costs</td>
<td>- Approved by OEMs</td>
<td>- Service lubricant for open drives with splash or circular lubrication</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Long service life of gears</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Approved by OEMs</td>
</tr>
</tbody>
</table>
# Priming open gear lubricants

<table>
<thead>
<tr>
<th>Application method</th>
<th>Manual or brush lubrication only</th>
<th>Manual or brush lubrication only</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
<td>Klüberplex AG 11-462</td>
<td>GRAFLOSCON A-G 1 ULTRA</td>
</tr>
<tr>
<td><strong>Colour</strong></td>
<td>White</td>
<td>Black</td>
</tr>
<tr>
<td>Base oil viscosity at 40 °C</td>
<td>460 mm²/sec</td>
<td>500 mm²/sec</td>
</tr>
</tbody>
</table>

### Application notes and benefits
- Low contamination of machine environment due to use of white solid lubricants and low lubricant consumption
- High load-carrying capacity and adhesiveness prevents metal-to-metal contact of tooth flanks
- Clear contact pattern
- Corrosion protection
- Prevents metal-to-metal contact during assembly
- Low durability of lubricating film – protects tooth flanks even during prolonged gear alignment procedures
- Priming and contrast lubricant for determining the parallel alignment of tooth flanks
- Long durability of lubricating film protects tooth flanks even during prolonged gear alignment procedures
- Priming and contrast lubricant for determining the parallel alignment of tooth flanks
- Reduces surface roughness and improves tooth flank quality thus contributing to a longer service life of drives and reduced maintenance costs
- Controlled wear for tooth face connection

### Benefits for you
- Quickly smoothens the rough surfaces and improves the contact ratio. This contributes to a longer service life of the gears.
- Free from solvents and eco-friendly
- Easy inspection through UV indicator

### Running-in open gear lubricants

<table>
<thead>
<tr>
<th>Application method</th>
<th>Spray, immersion and circulation lubrication</th>
<th>Spray lubrication</th>
<th>Immersion and circulation lubrication</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
<td>Klüberfluid B-F 2 Ultra</td>
<td>Black</td>
<td>Klüberfluid B-F 1 Ultra</td>
</tr>
<tr>
<td><strong>Colour</strong></td>
<td>Milky</td>
<td>Black</td>
<td>Black</td>
</tr>
<tr>
<td>Base oil viscosity at 40 °C</td>
<td>400 mm²/sec</td>
<td>500 mm²/sec</td>
<td>1300 mm²/sec</td>
</tr>
<tr>
<td>Temperature limits for spraying</td>
<td>-5 °C to 100 °C</td>
<td>-15 °C to 90 °C</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Temperature limits for immersion or circulation lubrication</td>
<td>0 °C to 100 °C/10 °C to 100 °C</td>
<td>0 °C to 100 °C/10 °C to 80 °C</td>
<td>Not applicable</td>
</tr>
<tr>
<td>Number of hours of operation</td>
<td>Spray 500–600</td>
<td>500–600</td>
<td>500–600</td>
</tr>
</tbody>
</table>

### Benefits for you
- Quickly smoothens the rough surfaces and improves the contact ratio. This contributes to a longer service life of the gears.
- Free from solvents and eco-friendly
- Easy inspection through UV indicator

### Repair open gear lubricants

<table>
<thead>
<tr>
<th>Purpose</th>
<th>Manual or brush lubrication only</th>
<th>Manual or brush lubrication only</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product</strong></td>
<td>Klüberfluid D.F 1 Ultra¹</td>
<td>GRAFLOSCON D-SG 00 ULTRA</td>
</tr>
<tr>
<td><strong>Colour</strong></td>
<td>Green</td>
<td>Black</td>
</tr>
</tbody>
</table>

### Benefits for you
- Ready to use product
- Ready for use
- Applied to the drive at full load capacity
- Suitable for application under full load conditions
- No cleaning of gears required after use
- No subsequent cleaning
- Economic consumption
- Free from solvents, bitumen, heavy metals or chloride
- Ecologically friendly, readily biodegradable
- Easy to spray
- Less cleaning required; fully synthetic products with no tendency to gumming
- Less maintenance required as the product provides a cleaning, lubricating and anticorrosion effect at the same time

### Environmentally sustainable operational lubricant for open gear drives

**Sustainable drive lubricant for total loss lubrication made from renewable raw materials – Klübersustain LG 39-700**

Sustainable production is becoming increasingly important in the cement industry, both for economic considerations and legal requirements.

Klübersustain LG 39-700 is a new open gear lubricant. Its composition and performance are groundbreaking. The grease is based on natural oils thus improving your CO₂ footprint considerably. It also offers excellent protection with its high base oil viscosity and an additive package suited to the requirements of open gears.

### Overview of product benefits:
- Up to 90 % renewable raw materials
- Protection under extreme pressure and mixed friction conditions with special additive package
- High polarity for better adhesion to tooth flanks
- Quantity reduction of up to 40 % compared to graphite products
- Transparent lubricant facilitating tooth flank inspection during operation
- Good vibration damping behaviour (reduced vibration)
- Decrease of tooth flank temperature
- No clogging of spray nozzles with solid lubricants
- Very good pumpability at low temperatures, usable down to -30 °C

¹ Should be applied by a Klüber Lubrication specialist only.
Further applications in the cement industry

Gearboxes in the cement industry are subjected to high temperatures, high loads, vibration, dust and a corrosive environment, which adversely affect reliability, equipment life and energy efficiency. Selecting a high-performance gear oil will help you overcome these challenges and provide hassle-free, energy-efficient operation.

Klüber high-performance synthetic gear lubricants demonstrate outstanding viscosity-temperature behaviour even in extreme operating conditions.

### Viscosity-temperature behaviour of oils

1. Mineral oil
2. Polyalphaolefin
3. Polyglycol

### Comparison of viscosity indexes:

<table>
<thead>
<tr>
<th>Type of oil</th>
<th>VI</th>
<th>Approx.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mineral oil</td>
<td>VI</td>
<td>85–100</td>
</tr>
<tr>
<td>Polyalphaolefin</td>
<td>VI</td>
<td>130–160</td>
</tr>
<tr>
<td>Polyglycol</td>
<td>VI</td>
<td>150–260</td>
</tr>
</tbody>
</table>

**Hint:** A high viscosity index facilitates start-up at low outside temperatures, reduces power loss to a minimum and enables the formation of a load-carrying lubricant film also at high temperatures.

### Cleaning of enclosed gears

<table>
<thead>
<tr>
<th>Application</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cleaning of enclosed gears</td>
<td>Klüber Summit Varnasolv</td>
<td>- Concentrated conditioner fluid containing synthetic ester oil and cleaning additives&lt;br&gt;- Miscible with mineral oils, synthetic hydrocarbons, ester oils and polyglycols&lt;br&gt;- Neutral behaviour towards seals&lt;br&gt;- Designed for cleaning screw-type compressors, hydraulic systems, gears and other oil circulating systems such as calendars</td>
<td>- Dissolves varnish and carbon deposits, reducing maintenance and cleaning costs&lt;br&gt;- No dismantling of systems needed prior to cleaning&lt;br&gt;- Used during operation, no downtime of machines for cleaning&lt;br&gt;- Reduced operating and maintenance costs due to higher efficiency (e.g. compressor) and longer service life of the fresh oil fill</td>
</tr>
</tbody>
</table>

### Klüberoil GEM 1 N
- Mineral oil based
- Temperature range -15 °C to 100 °C (depends on viscosity grade selected)
- High-quality mineral oil approved by leading gear drive manufacturers
- Low maintenance cost
- Protection even at peak loads, vibrations and oscillation

### Klübersynth GEM 4 N
- Polyalphaolefin (PAO) and synthetic hydrocarbon (SHC) oil
- Temperature range -50 °C to 140 °C (depends on viscosity grade selected)
- Reduces power losses and improves energy efficiency
- Protection even at peak loads, vibrations and oscillation, high temperatures
- Extended service life of bearings, seals
- Longer oil change interval resulting in cost savings

### Klübersynth GH 6
- Polyglycol synthetic oil
- Temperature range -55 °C to 160 °C (depends on viscosity grade selected)
- Reduces power losses and improves energy efficiency
- Approved by leading OEMs
- Protection even at peak loads, vibrations and oscillation, high temperatures
- Prevents premature rolling bearing failure
- Extended service life
- Longer oil change interval resulting in cost savings

### Cleaning of enclosed gears

Gearboxes in the cement industry are subjected to high temperatures, high loads, vibration, dust and a corrosive environment, which adversely affect reliability, equipment life and energy efficiency. Selecting a high-performance gear oil will help you overcome these challenges and provide hassle-free, energy-efficient operation.

Klüber Lubrication high-performance synthetic gear lubricants demonstrate outstanding viscosity-temperature behaviour even in extreme operating conditions.
Further applications in the cement industry

**Lubrication of compressors**

The efficiency of screw-type air compressors can increase considerably with the right compressor oil. It can also help decrease lubricant costs through reduced consumption. Mineral oil-based products with poor oxidation stability tend to form residues, resulting in frequent filter and oil changes and consequently higher operating costs. Klüber Summit compressor oils can increase the oil life in the compressor up to four-fold whilst decreasing the operating temperature by up to 10 %. Increasing the lifetime of the compressor and reducing maintenance costs. Carry-over is also reduced leading to lower top-ups.

<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw-type compressor</td>
<td>Klüber Summit SH</td>
<td>Air compressor oils based on synthetic hydrocarbon and additives</td>
<td>Achieve oil changeover interval of up to 10,000 hours.</td>
</tr>
<tr>
<td>Reciprocating piston compressor</td>
<td>Klüber Summit DSL</td>
<td>Air compressor oils based on a synthetic ester oil and additives</td>
<td>Achieve oil changeover intervals of up to 6,000 operating hours.</td>
</tr>
<tr>
<td>Cleaning agent</td>
<td>Klüber Summitt Varnasolv</td>
<td>Concentrated conditioner fluid containing synthetic ester oil and cleaning additives</td>
<td>Dissolves varnish and carbon deposits, thus reducing maintenance and cleaning costs.</td>
</tr>
</tbody>
</table>

**Lubrication of gear couplings**

<table>
<thead>
<tr>
<th>Component</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gear coupling (grease-lubricated)</td>
<td>GRAFLOSCON</td>
<td>Peripheral speed $n_{in} / n &lt; 1.6$</td>
<td>- Prevents failure at high pressure</td>
</tr>
</tbody>
</table>

**Assembly pastes**

<table>
<thead>
<tr>
<th>Application</th>
<th>Product</th>
<th>Features</th>
<th>Application notes and benefits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screw compound (screw connections)</td>
<td>WOLFRACOAT C</td>
<td>Temperature range -30 °C to 1,200 °C</td>
<td>- Prevents seizing at high temperatures</td>
</tr>
<tr>
<td>Screw paste (in presence of moisture)</td>
<td>Klüberpaste HEL 46-450</td>
<td>Temperature range -40 °C to 1,000 °C</td>
<td>- Good water resistance</td>
</tr>
<tr>
<td>Rolling bearings and hub/ shaft fits</td>
<td>ALTEMP GN950</td>
<td>Temperature range -15 °C to 150 °C</td>
<td>- Prevents failure in components subjected to small to minimum motion under high static and dynamic loads</td>
</tr>
<tr>
<td>Other sliding surfaces</td>
<td>WOLFRACOAT C FLUID</td>
<td>Temperature range -25 °C to 1,000 °C</td>
<td>- Corrosion protection</td>
</tr>
</tbody>
</table>

**Application notes and benefits**

- Prevents failure at high loads
- Prevents failure at high loads
- Prevents wear and prolongs component life
- Adhesive lubricant
- Resistant to high pressures
- Anticorrosion properties
- Applicable through automatic lubrication systems

- Adhesive lubricant
- Corrosion protection
- Wear reduction
- Corrosion protection
- Prevents failure at high loads
- Prevents failure at high loads
- Prevents wear and prolongs component life
- Adhesive lubricant
- Resistant to high pressures
- Anticorrosion properties
- Applicable through automatic lubrication systems

- Prevents failure at high loads
- Prevents failure at high loads
- Prevents wear and prolongs component life
- Adhesive lubricant
- Resistant to high pressures
- Anticorrosion properties
- Applicable through automatic lubrication systems

- Prevents failure at high loads
- Prevents failure at high loads
- Prevents wear and prolongs component life
- Adhesive lubricant
- Resistant to high pressures
- Anticorrosion properties
- Applicable through automatic lubrication systems

- Prevents failure at high loads
- Prevents failure at high loads
- Prevents wear and prolongs component life
- Adhesive lubricant
- Resistant to high pressures
- Anticorrosion properties
- Applicable through automatic lubrication systems
Onsite services offered by Klüber Lubrication

Klüber Lubrication offers KlüberEfficiencySupport, the professional service program, not only for large girth gear and pinion drives but for your entire machinery. Our systematic approach identifies and optimises the savings potential at your site and monitors system condition providing plant engineers with trend analysis and an “early warning” of potential failure.

Our trained and experienced lubrication engineers are equipped with IR thermometer, vibrometer and stroboscope. Your machine “health check” will be supported by a comprehensive report interpreted by specialists to determine any appropriate actions that may be required. These same engineers offer a plant-wide service program, not only for large girth gear and pinion drives but for your entire machinery. Our systematic approach identifies and optimises the savings potential at your site and monitors system condition providing plant engineers with trend analysis and an “early warning” of potential failure.

For example: energy consumption, CO₂ emissions, life cycle cost reductions, etc. for all rotating equipment, from general conveyors to air compressors and “workshop” products. Millions are spent every year on corrective and remedial engineering and maintenance actions. These actions can be alleviated at source with proper consultation. Klüber Lubrication provides effective solutions that are comprehensive yet simple to implement.

KlüberRenew includes a running-in and repair service to increase the useful service life of girth gears and pinions by controlling and modifying tooth flank surface roughness, contact ratio, load distribution, removal of surface pitting and ultimately a tooth flank repair where possible.

Our cement industry experts are located worldwide and are happy to support you on site. Our cement industry experts are located worldwide and are happy to support you on site.

The right lubricant at the right place at the right time

Systems for automatic lubrication

We at Klüber Lubrication understand ourselves as a solution provider. We not only supply high-performance oils and greases, but also “intelligent packages” for automatic lubrication of your machines and components. Selected lubricants covering a wide range of typical applications are available in automatic lubricant dispensers for single-point lubrication. These tried-and-tested systems based on electromechanical or electrochemical technology are available with standard, long-term or high-pressure greases, standard or high-temperature chain oils and special oils and greases for the food-processing industry. We are also able to supply other lubricants in automatic dispensers on request and for higher order volumes, provided they have been tested and approved for use – please contact your Klüber Lubrication consultant for details.

Your benefits at a glance

Profitability

Continuous production processes and predictable maintenance intervals reduce production losses to a minimum. Consistently high lubricant quality ensures continuous, maintenance-free long-term lubrication for high plant availability. Continuous supply of fresh lubricant to the lubrication points keeps friction low and reduces energy costs.

Lubrication with Klübermatic can reduce costs by up to 25 %

Safety

Longer lubrication intervals reduce the frequency of maintenance work and the need for your staff to work in danger zones. Klüber Lubrication systems from Klüber Lubrication can therefore considerably reduce occupational safety risks in work areas that are difficult to access.

Lubrication with Klübermatic can decrease the risk of accidents by up to 90 %

Reliability

Automatic lubrication systems from Klüber Lubrication ensure reliable, clean and precise lubrication around the clock. Plant availability is ensured by continuous relubrication of the application.

Lubrication with Klübermatic may help to prevent up to 55 % of rolling bearing failures

From low-cost to high-tech - automatic systems for all requirements

Klüber Lubrication offers you the following technological solutions:
- freely adjustable lubrication increments between 1 and 12 months
- range of specialty lubricants
- self-contained or machine-controlled lubrication systems (time control with programmable controller)
- combination of tried-and-tested Klüber Lubrication lubricants with proven automatic lubricant dispensers

KlüberEnergy
Consultant services for optimisation of the energy efficiency of your lubricant application. Verification through energy measurements and reporting of cost savings

KlüberMaintain
Support for your lubrication management and maintenance programmes/TPM¹ considering the necessary lubrication maintenance tasks

KlüberMonitor
Increased productivity through used lubricant analyses. Recommendations for optimisation based on trend analyses and test rig results

KlüberRenew
Services to increase the lifetime of your cost-intensive components such as large gear drives and chains including appropriate training

KlüberCollege – Increasing people efficiency

¹) TPM: Total Productive Maintenance
Klüber Lubrication – your global specialist

Innovative tribological solutions are our passion. Through personal contact and consultation, we help our customers to be successful worldwide, in all industries and markets. With our ambitious technical concepts and experienced, competent staff we have been fulfilling increasingly demanding requirements by manufacturing efficient high-performance lubricants for more than 80 years.