We have the solution...

...the future has a name

LUBCON® Lubricants
for High Speed Rolling Bearings
The LUBRICANT CONSULT GMBH is one of the leading developers and manufacturers of famous high performance lubricants which guarantee the perfect lubrication of your high speed rolling bearings.

This high efficiency of the lubricants is proven by

- long service life
- good running behaviour
- high operating reliability

Your Partner for the Lubrication of Bearings

Fig. 1: High speed spindle bearing (SKF, D-Schweinfurt)
The extraordinary performance of the LUBCON lubricating greases is the result of the clearly defined selection of the thickener and its portion, the type of the base oil and its viscosity as well as the selected additives.

A quality and environment management introduced in June 1996 has strictly ensured that only raw materials be used without any ingredients that are harmful to the environment. In the production a technically sophisticated circulatory system is used to preserve the environmental resources as much as possible. LUBCON products are not liable to identification marking.

In many operating assays on test stands in the laboratory as well as in practice at famous rolling bearing manufacturers, the application ranges of the greases are thoroughly screened taking into account the different types of construction and sizes of the rolling bearings.

LUBCON offers unique special lubricating greases with excellent operating properties and very good running times for your high speed rolling bearings.

For the three most important operating parameters, i.e.

- high temperature
- high load
- high speed

the well-established LUBCON high performance lubricating greases are indicated in tables and diagrams listing various technical data, successfully passed test runs, compatibility with plastics as well as their resistance to water and aggressive media.

The selection of the appropriate lubricant is an important factor with regard to long-time functioning, high operating reliability and efficiency of your bearings, therefore LUBCON offers you a free consultation and complete assistance - before, during and after your purchase of LUBCON lubricants.

Your very individual demands will be registered and translated into products that are especially developed for your company.

In this brochure you will find additional information on the running-in process necessary for the bearings, to be effected during operation at high speeds.

Fig. 1: High speed spindle bearing (SKF, D-Schweinfurt)

Please note:
This brochure only contains product information. For specific information please refer to our technical data and safety data sheets. The indications made represent the present state of development and knowledge of LUBRICANT CONSULT GMBH. Subject to change. The products are subject to severe controls of manufacture and comply in full with the specifications set forth by our company, but due to the multitude of different influencing factors, we cannot assume any warranty for the successful application in each individual case. Therefore, we recommend to perform field tests. We strictly refuse any liability.
Schedule of the Lubricating Greases

The loads possibly occurring when using different types of bearing constructions are shown in the following table.

**Table 1:**

<table>
<thead>
<tr>
<th>Technical Data</th>
<th>TURMOGREASE® Highspeed L 182</th>
<th>TURMOGREASE® Highspeed L 252</th>
<th>THERMOPLEX® 2 TML</th>
<th>TURMOGREASE® Li 802 EP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base oil type</td>
<td>PAO/Ester</td>
<td>PAO/Ester</td>
<td>Ester</td>
<td>Min/SHC</td>
</tr>
<tr>
<td>Thickener</td>
<td>Li special</td>
<td>Li special</td>
<td>Li</td>
<td>Li</td>
</tr>
<tr>
<td>Service temperature range (°C)</td>
<td>-70 ... +120</td>
<td>-50 ... +120 (140)</td>
<td>-35 ... +160</td>
<td>-35 ... +140</td>
</tr>
<tr>
<td>Density +15 °C DIN 51751 (g/ml)</td>
<td>0.94</td>
<td>0.92</td>
<td>0.98</td>
<td>0.9</td>
</tr>
<tr>
<td>Consistency</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Base oil viscosity DIN 51562 (mm²/s) +40 °C/+100 °C</td>
<td>18/4.5</td>
<td>25/6</td>
<td>55/9</td>
<td>82/12.5</td>
</tr>
<tr>
<td>Drop point (°C) DIN ISO 2176</td>
<td>&gt; +250</td>
<td>&gt; +250</td>
<td>&gt; +180</td>
<td>&gt; +190</td>
</tr>
<tr>
<td>Speed factor n · dₐ (min⁻¹ · mm)</td>
<td>Kula 2 500 000 Kerola 200 000</td>
<td>Kula 2 200 000 Kerola 300 000</td>
<td>Kula 1 300 000 Kerola 300 000</td>
<td>Kula 1 000 000 Kerola 300 000</td>
</tr>
<tr>
<td>Corrosion protection acc. to SKF Emcor DIN 51802</td>
<td>0 - 0</td>
<td>0 - 0</td>
<td>0 - 0</td>
<td>0 - 0</td>
</tr>
<tr>
<td>Water resistance DIN 51807</td>
<td>1 - 90</td>
<td>1 - 90</td>
<td>1 - 90</td>
<td>1 - 90</td>
</tr>
<tr>
<td>Resistance to bases and acids</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Compatibility with NBR, FKM, PTFE and PA 6.6</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Oil separation DIN 51817 (%) at +40 °C/+100 °C</td>
<td>2.9/4.9</td>
<td>1.5/8.5</td>
<td>2.8/8.9</td>
<td>0.8/1.4</td>
</tr>
<tr>
<td>Content of solid foreign matter, particles 25 µm (mg)</td>
<td>&lt; 5</td>
<td>&lt; 5</td>
<td>&lt; 5</td>
<td>&lt; 5</td>
</tr>
<tr>
<td>FE9 test DIN 51821 Fₜₒ (h)</td>
<td>A/1.5/6000-100 &gt; 800</td>
<td>A/1.5/6000-120 &gt; 400</td>
<td>A/1.5/6000-140 &gt; 800</td>
<td>A/1.5/6000-140 &gt; 100</td>
</tr>
<tr>
<td>FE8 test DIN 51819 successful tests</td>
<td>- -</td>
<td>050-6000/5-90</td>
<td>050-7.5/80-135 050-3000/10-144 048-3000/10-130</td>
<td>050-6000/5-90 048-3000/10-100 048-75/50-45</td>
</tr>
<tr>
<td>VKA welding load DIN 51350 Pt. 4 (N)</td>
<td>2200/2400</td>
<td>2200/2400</td>
<td>2600/2800</td>
<td>3000/3200</td>
</tr>
<tr>
<td>Start-torque ASTM D 1478 (mNm)</td>
<td>265/-40 °C</td>
<td>150/-40 °C</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Running-torque ASTM D 1478 (mNm)</td>
<td>26/-40 °C</td>
<td>19.5/-40 °C</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Presentation of the FAG FE8 + FE9 Test Runs

The loads possibly occurring when using different types of bearing constructions are shown in the following table.

Table 1:

<table>
<thead>
<tr>
<th>Running time (h)</th>
<th>Friction moment of the bearing pair (Nm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>100</td>
<td>20</td>
</tr>
<tr>
<td>200</td>
<td>18</td>
</tr>
<tr>
<td>300</td>
<td>16</td>
</tr>
<tr>
<td>400</td>
<td>14</td>
</tr>
<tr>
<td>500</td>
<td>12</td>
</tr>
<tr>
<td>600</td>
<td>10</td>
</tr>
<tr>
<td>700</td>
<td>8</td>
</tr>
<tr>
<td>800</td>
<td>6</td>
</tr>
<tr>
<td>900</td>
<td>4</td>
</tr>
<tr>
<td>1000</td>
<td>2</td>
</tr>
<tr>
<td>1100</td>
<td>1</td>
</tr>
<tr>
<td>1200</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 2:

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Test run 1</th>
<th>Test run 2</th>
<th>FAG requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steady-state temperature in °C</td>
<td>100</td>
<td>95</td>
<td>120</td>
</tr>
<tr>
<td>Peak temperature in °C</td>
<td>116</td>
<td>110</td>
<td>120</td>
</tr>
<tr>
<td>Wear in mg of</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- the rolling element</td>
<td>14/11</td>
<td>10/8</td>
<td>&lt; 35</td>
</tr>
<tr>
<td>- the cage</td>
<td>15/11</td>
<td>43/9</td>
<td>&lt;100</td>
</tr>
<tr>
<td>- the inner ring</td>
<td>4/4</td>
<td>4/1</td>
<td>Evaluation: very good</td>
</tr>
<tr>
<td>- the outer ring</td>
<td>1/2</td>
<td>0/1</td>
<td></td>
</tr>
<tr>
<td>Frictional behaviour over the time (see diagram above)</td>
<td>Running-in finished</td>
<td>Running-in finished</td>
<td></td>
</tr>
</tbody>
</table>

Diagram 1:

FE8 test run with tapered roller bearing 536048 (31312); axial load $F_a = 10$ kN; speed $n = 3000 \text{ min}^{-1}$; time of operation 500 h
Lubrication with TURMOGREASE® Li 802 EP

Diagram 2:

FE9 test run with angular contact ball bearings 529689 (7206 B), mounting type A, i.e. open bearing; axial load $F_a = 1.5$ kN; speed $n = 6000 \text{ min}^{-1}$; temperature +160 °C
Lubrication with THERMOPLEX® 2 TML

Service life of the grease in the test bearings in h: according to the Weibull diagram $F_{50} = 112$ h; $F_{10} = 33$ h
Requirement in acc. with FAG and DIN 51825 $F_{50} = 100$ h → Evaluation: fully meets the requirements
The four LUBCON lubricating greases for high speed rolling bearings are suitable for the lubrication of

- standard steel-steel spindle bearings
- single and double row cylindrical roller bearings of a particularly high accuracy
- tapered roller bearings with increased operating precision
- high speed spindle bearings with small balls of steel
- “hybrid bearings” particularly efficient spindle bearings (x DF > 1.3 millions n · d_m), consisting of silicon nitride.

Advantages of hybrid bearings: lighter than steel-steel spindle bearings, high hardness and thermal resistance, good dimensional stability at highest temperatures, good corrosion resistance, high modulus of elasticity, absence of magnetism.

Application in the field:

The lubricating greases TURMOGREASE® Highspeed L 182 and TURMOGREASE® Highspeed L 252 are used in spindle bearing arrangements of machine tools, e.g. grinding, milling and motor spindle units (spindle units driven by an integrated motor).

In a three-phase motor with frequency converter supply, the lubricating greases TURMOGREASE® Highspeed L 252, THERMOPLEX® 2 TML and TURMOGREASE® Li 802 EP are equally used because the speed factors prevailing here run up to 0.8 million (min⁻¹ · mm).

Product Description:

The lubricating greases TURMOGREASE® Highspeed L 182 are preferably used in spindle bearings and cylindrical roller bearings of a bore size below d = 100 mm of the inner ring. The low viscosity base oil has proven of good results in the lubrication of high speed bearings.

TURMOGREASE® Highspeed L 182 is also particularly suitable for smaller rolling bearings (d < 25 mm) and very high speed factors (above n · d_m = 2.5 min⁻¹) as well as for the use at very low temperatures and applications requiring a very favourable frictional behaviour.

The lubricating grease TURMOGREASE® Highspeed L 252 is regarded as universal grease for high speed rolling bearings; from the FE8 test run (d = 60 mm) successfully passed you can see that it is suitable as well for larger rolling bearings.

For several years this grease has proven to be particularly favourable when used in high speed spindle bearings with ceramic balls (hybrid bearings).

The application of TURMOGREASE® Highspeed L 182 and TURMOGREASE® Highspeed L 252 at moderate temperatures, e.g. +60 °C or lower, leads to extremely high service lives.

The application of TURMOGREASE® Highspeed L 182 and TURMOGREASE® Highspeed L 252 at moderate temperatures, e.g. +60 °C or lower, leads to extremely high service lives.

The soaps of these greases keep the oil output during the application on a low but sufficient level, the same as with often low service temperatures. A lack of grease after a long service time (noticeable by temperature peaks) will be compensated by an increased oil output and grease mobility - without leading to a premature grease ageing.

A running-in is required for such greases to ensure the distribution of the lubricating grease. After expiry of the grease service life, the bearings have to be cleaned, newly greased and again submitted to a running-in process.

Product Description:

The lubricating greases THERMOPLEX® 2 TML and TURMOGREASE® Li 802 EP are equipped with a base oil of a higher viscosity and, in addition, contain EP substances to increase the load carrying capacity. The thickeners are normal lithium soaps.

Furthermore, the lubricating grease THERMOPLEX® 2 TML stands out for a particularly high upper limit of the service temperature of +160 °C, with short peaks up to +180 °C.

Application:

Both greases are equally suitable for high speed factors of > 0.8 million (min⁻¹ · mm). With such speed factors, perform the running-in process to assure the grease distribution and refrain from relubrication.

With speed factors below 0.8 million (min⁻¹ · mm) you might as well proceed to a relubrication. Owing to their special composition, both greases are very well suitable for applications where higher loads and/or higher temperatures add to a high speed factor.

The lubricating grease THERMOPLEX® 2 TML should be used particularly in such cases where very high temperatures prevail. These can occur when the heat discharge from the bearing is hindered by the design of the mounting arrangement, or when heat from the environment is radiated towards the bearing.

Due to its higher viscosity of the base oil TURMOGREASE® Li 802 EP shows excellent properties even with larger spindle bearings (d > 100 mm) at speed factors below 1 million (min⁻¹ · mm).
In order to achieve the best results for your company with LUBCON lubricants, please observe the instructions for the lubrication and the running-in of the rolling bearings. Before the lubrication, largely remove the mostly mineral based preservation oil to avoid any weakening of the synthetic base oil of the lubricating greases. Only TURMOGREASE® Li 802 EP contains a mineral base oil which is compatible with the standard preservation oils.

Removal of the Preservation Oil: Clean all bearing parts, also the spindle cage, with an appropriate cleansing agent (white spirit, alkaline cleanser). Then, after having thoroughly dried these parts, it is important to proceed immediately to the application of the lubricating grease in order to avoid any corrosion.

Capped Bearings: The grease quantity should fill almost 30 % of the free bearings space. Upon demand, the bearing manufacturers or LUBCON indicate the grease quantity favourable for the lubrication of the different bearing constructions and sizes. Apply the grease as uniform as possible over the whole bearing surface. It is useful to take a grease gun for that purpose which LUBCON would like to quote and supply.

Open Bearings: You may count with a grease quantity of up to 100 % of the free bearing space in order to achieve an increase of the service life. The cage space adjacent to the bearing must be large enough to easily receive the grease emerging from the bearing.

Reduction of the Grease Quantity by 30 to 50 %: to be effected in the interests of a fast and simple running-in process with lubricating greases causing temperature peaks during the running-in and distribution of the grease. Diagram 3, p. 8 shows the bearing temperature curve as a function of the operating times of two bearings B 7006 C.T (marked with A and B) of a spindle lubricated with TURMOGREASE® Highspeed L 252, degree of the grease filling 100 %, maximum target speed = 30,000 min⁻¹. The running-in starts at a speed of 10,000 min⁻¹, which is approx. one third of the maximum speed of operation.

It can be proved (see p. 10, table 5, test 2) that this lubricating grease leads to a very low bearing friction. When starting the spindle there are no temperature peaks to be observed, after a few minutes both spindle bearings have already reached a temperature which remains almost unchanged over hours. The speed raised up to the operational value of 30,000 min⁻¹ produces only a gradual increase of the temperature, after about one hour the steady state temperature of +42 °C is nearly reached.

Field Test with TURMOGREASE® Highspeed L 252:

At the Gildemeister company a running-in without any problems was observed in larger spindle bearings d₆ₐ = 75 mm at speed factors below 1 million (min⁻¹ · mm) and showing similar steady state temperatures of +35 to +44 °C at the outer rings of the bearings.

In the running-in process TURMOGREASE® Highspeed L 252 was clearly superior compared to other competitive products.

During the first two service hours, the operational speed shall be limited to a value of 30 % of the maximum speed, then any running-in prescription will not apply for speed factors up to 1.3 million (min⁻¹ · mm) for steel-steel as well as for hybrid bearings.

Diagram 4, p. 8 shows the temperature curve during a running-in process at a speed factor of 1.6 million (min⁻¹ · mm) in dependence on the operating time of two hybrid bearings HC 7006 C.T. The running-in was started at a speed of 20,000 min⁻¹ and raised after just one hour to maximum speed of 40,000 min⁻¹. With an almost completely filled bearing, no perceptible temperature peaks occurred.

Table 3. p. 8 shows you a simplified running-in prescription for a large speed factor range regarding the applied lubricating grease TURMOGREASE® Highspeed L 252.

Service Lives of Greased High Speed Rolling Bearings

The rolling bearings operated at high speed factors, i. e. range from 0.6 to 2.5 million (min⁻¹ · mm), are preferably lubricated by TURMOGREASE® Highspeed L 182 and TURMOGREASE® Highspeed L 252.

After expiry of the grease service life, a relubrication should not be carried out because the new grease in addition to the used grease would lead to an over lubrication of the bearing and a new running-in would not be possible within an acceptable delay. Furthermore, in most cases a sufficient space is missing to receive the displaced used grease. Therefore it is recommended to clean the bearing and to apply new grease.

The grease service life is shown in the right part of the lubrication interval/grease service life diagram (diagram 5, p. 9).

Upper range limit: applies to the particularly efficient ceramic hybrid spindle bearings.

Lower range limit: applies to the standard steel-steel spindle bearings.

The rolling bearings greased with THERMOPLEX® 2 TML and TURMOGREASE® Li 802 EP may be relubricated if the speed factor is below 0.6 million (min⁻¹ · mm).

Make sure that the relubrication will be effected while the bearings are running at a low speed and that the lubrication of the bearing will be complete. A sufficiently large space to receive the used grease must be provided.

The relubrication quantity is to be determined according to table 4, p. 9.

In case of higher speed factors > 0.6 million (min⁻¹ · mm), it is recommended to lubricate the bearings with new grease after expiry of the grease service life. The service life of the grease is to be determined from the coloured part of the diagram (diagram 5, p. 9).

It has to be taken into account that the grease service life of various equally loaded bearings may differ by approx. 1:3. If a high reliability is desired, the lower part of the range should be selected.

TURMOGREASE® Li 802 EP should not be used for ceramic hybrid spindle bearings and the lubricating grease THERMOPLEX® 2 TML only for such cases where temperatures above +60 °C are to be expected.
Test Results and Running-in Prescription

Diagram 3:
Running-in \( n \cdot d_m = 1.3 \text{ million (min}^{-1} \cdot \text{mm)} \)

Diagram 4:
Running-in \( n \cdot d_m = 1.6 \text{ million (min}^{-1} \cdot \text{mm)} \)

Table 3:
Running-in prescription for the lubricating grease TURMOGREASE® Highspeed L 252
Table 4: Relubrication quantities

Relubrication quantity $m_1$ for weekly or annual relubrication intervals

\[ m_1 = D \cdot B \cdot x \ [g] \]

<table>
<thead>
<tr>
<th>Relubrication interval</th>
<th>$x$</th>
</tr>
</thead>
<tbody>
<tr>
<td>weekly</td>
<td>0.002</td>
</tr>
<tr>
<td>monthly</td>
<td>0.003</td>
</tr>
<tr>
<td>annual</td>
<td>0.004</td>
</tr>
</tbody>
</table>

Relubrication quantity $m_2$ for extremely short relubrication intervals

\[ m_2 = (0.5 \ldots 20) \cdot V \ [kg/h] \]

Relubrication quantity $m_3$ before starting reoperation after a standstill of several years

\[ m_3 = D \cdot B \cdot 0.01 \ [g] \]

\[ V = \text{free space in the bearing} \]

\[ \approx \frac{\pi}{4} \cdot B \cdot (D^2 - d^2) \cdot 10^{-3} \cdot \frac{G}{7800} \ [m^3] \]

\[ d = \text{diameter of the bearing bore [mm]} \]

\[ D = \text{outer diameter of the bearing [mm]} \]

\[ B = \text{bearing width [mm]} \]

\[ G = \text{bearing weight [kg]} \]

Diagram 5: Lubrication interval/grease service life dependent on the value $k_1 \cdot n \cdot d_m$ with the application range of the LUBCON lubricating greases for high speed rolling bearings. $n =$ speed in $\text{min}^{-1}$, $d_m =$ reference circle of the bearing in mm.

Relubrication quantity $m$ for weekly or annual relubrication intervals

\[ m_1 = D \cdot B \cdot x \ [g] \]

<table>
<thead>
<tr>
<th>Relubrication interval</th>
<th>$x$</th>
</tr>
</thead>
<tbody>
<tr>
<td>weekly</td>
<td>0.002</td>
</tr>
<tr>
<td>monthly</td>
<td>0.003</td>
</tr>
<tr>
<td>annual</td>
<td>0.004</td>
</tr>
</tbody>
</table>

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\[ \approx \frac{\pi}{4} \cdot B \cdot (D^2 - d^2) \cdot 10^{-3} \cdot \frac{G}{7800} \ [m^3] \]

\[ d = \text{diameter of the bearing bore [mm]} \]

\[ D = \text{outer diameter of the bearing [mm]} \]

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\[ G = \text{bearing weight [kg]} \]

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Relubrication quantities

<table>
<thead>
<tr>
<th>$k_1$</th>
<th>Rolling bearing</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cylindrical roller bearing of a higher dimensional accuracy (N10 ... K.M1.SP)</td>
</tr>
<tr>
<td>0.75</td>
<td>Spindle bearing (C) pressure angle 15°</td>
</tr>
<tr>
<td>0.9</td>
<td>Spindle bearing (E) pressure angle 25°</td>
</tr>
<tr>
<td>2.5</td>
<td>Tapered roller bearing of a higher dimensional accuracy (2344 ... M.SP)</td>
</tr>
</tbody>
</table>
Results Obtained by
LUBCON Lubricating Greases
in Laboratory and Field Tests

For high speed rolling bearings:
TURMOGREASE® High-speed L 182 and
TURMOGREASE® Highspeed L 252

The results of the 5 test runs indicated in table 5 are contained in
the diagram 6. The diagram 6 is the basis for the coloured range in
diagram 5, p. 9 regarding the LUBCON lubricating greases
for high speed rolling bearings. In the diagram 6 the circle of the
range of these results complies with the requirement demanded
by the rolling bearing manufacturer for hybrid bearings.

The time of operation achieved by steel-steel bearings in test 2 is
by approx. 10 times higher than the times reached by competitive
products. The time of operation reached by hybrid bearings in
test 3 is with more than 10 000 service hours extremely high,
comparative values of lubricating greases of other manufacturers
are not available, yet.

Reason for such a high performance of TURMOGREASE®
Highspeed L 252: The bearing lubricated with this grease
causes less than half the friction loss compared to measured
competitive greases.

Table 5:
Results of various tests

<table>
<thead>
<tr>
<th>Test no.</th>
<th>Test site/ test stand</th>
<th>Test bearing/ time of operation (h)</th>
<th>Grease/temperature (°C)</th>
<th>Speed (min⁻¹)</th>
<th>n · d₃₀ (min⁻¹ · mm)</th>
<th>k₁ · n · d₃₀ (min⁻¹ · mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>GMN spindle SM 6005/&gt;2700</td>
<td>TURMOGREASE® Highspeed L 182/60</td>
<td>&gt; 46500</td>
<td>1.7 mill.</td>
<td>1.25 mill.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>IKMT TU Hannover spindle B 7008 C/&gt;5000</td>
<td>TURMOGREASE® Highspeed L 252/64</td>
<td>24000</td>
<td>1.3 mill.</td>
<td>0.97 mill.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>FAG WS 22n HC7006C/&gt;10 000</td>
<td>TURMOGREASE® Highspeed L 252/50</td>
<td>40000</td>
<td>1.7 mill.</td>
<td>1.27 mill.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>GMN spindle SM 6009/1500</td>
<td>TURMOGREASE® Highspeed L 252/60</td>
<td>35000</td>
<td>1.25 mill.</td>
<td>0.94 mill.</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>FAG WS 22a B 7205C 2000-12 000</td>
<td>TURMOGREASE® Highspeed L 252/40</td>
<td>30000</td>
<td>1.15 mill.</td>
<td>0.86 mill.</td>
<td></td>
</tr>
</tbody>
</table>

Other LUBCON Lubricating Greases for High Speed Rolling
Bearings

After long years of experience, almost all cases of application
regarding high speed rolling bearings can be mastered with the
product line consisting of four base greases. Furthermore, there
are cases where the lubricating grease should provide at least
one more characteristic in order to achieve an optimum result.

Therefore, other lubricating greases were derived from
these base greases thus showing at least one modified
parameter. In addition to the existing properties at least one
more specification was obtained.

For further details see table 6.

Table 6:
Other lubricating greases for high speed rolling bearings derived from the base greases

<table>
<thead>
<tr>
<th>Base grease</th>
<th>Derived lubricating greases</th>
<th>Modified parameter</th>
<th>New product property</th>
</tr>
</thead>
<tbody>
<tr>
<td>TURMOGREASE® Highspeed L 182</td>
<td>THERMOPLEX® 2 TML special</td>
<td>thickener</td>
<td>better frictional behaviour</td>
</tr>
<tr>
<td>TURMOGREASE® Highspeed L 252</td>
<td>TURMOGREASE® Highspeed LC 252</td>
<td>base oil, thickener</td>
<td>better resistance to water, bases and acids</td>
</tr>
<tr>
<td>THERMOPLEX® 2 TML</td>
<td>THERMOPLEX® L 552</td>
<td>thickener base oil</td>
<td>better thermal quality, higher operating performance</td>
</tr>
<tr>
<td>TURMOGREASE® Li 802 EP</td>
<td>TURMOGREASE® L 802 EP+</td>
<td>thickener part, consistency</td>
<td>better running-in behaviour, higher operating performance</td>
</tr>
</tbody>
</table>
Whatever you need - from the consultation on tribologic questions to the setting into operation of the lubricant LUBCON is the partner at your side worldwide.

And that is not yet all …

The TOTAL LUBE MANAGEMENT enables you to work even more efficient and more economic as before.

This performance spectrum includes

- ELABORATION of lubricant charts for your company
- DELIVERY of the lubricants determined in the lubricant chart
- LUBRICATION of the individual plant installations with the lubricants listed in the lubricant chart
- DOCUMENTATION of the lubrication processes
- CONCEPTION of the lubricating systems for oils and greases
- SETTING INTO OPERATION of the lubricating systems
- PROCUREMENT of production means, e.g. grease guns, grease nipples, lubricant supply systems, etc.
- FILLING of small series of rolling bearings with the greases indicated by you

Did you know that LUBCON lubricants are applied for your safety worldwide every day?

- e.g. in single-lever mixers of water fittings
- in energy regulators in electric stoves
- in the AIRBUS
- in the ARIANE carrier rocket
- in the FORMULA 1 by Sauber-Petronas, Jordan and Benetton
- in vehicle components lubricated for life
- in the food production with specially approved (NSF-H1) food lubricants
- in large open gear drives of cement mills, in small gears of dental turbines
- in large bearings in the open pit mining, in miniature bearings of computers
- in conveyor chains of paint dryers, in transport chains of refrigerating plants etc.

LUBCON delivery system:
... at the agreed date always the desired LUBCON product available to you:

... 100 ml tubes, 400 ml sprays, 400 ml cartridges, 1 kg cans, 5 l canisters, 20 l canisters, 5 kg buckets, 25 kg buckets, 180 kg drums, 200 l drums or the 1000 l container are just a small selection of the packing units possible...

Fig. 2: Test Stand WS 22