KISSsoft 03/2018 – Instructions 118

Calculating Rolling Bearings with the SKF Bearing Module
Table of Contents

1 Application Description...........................................................................................................3
  1.1 Requirement......................................................................................................................3
  1.2 Registration.......................................................................................................................3
  1.3 Activating the calculation..................................................................................................3
  1.4 Restrictions to the SKF Bearing Module ........................................................................5
  1.5 Results ...............................................................................................................................6
1 Application Description

1.1 Requirement

KISSsoft Release 03/2018 D (SP4) is needed to run this application. The interface described in this document is integrated in later versions. You must have a license for the W05 Rolling bearing calculation module and the modified rating life calculation W05a.

1.2 Registration

To calculate the rating life of rolling bearings with the SKF Bearing Module, run the “Rolling bearing ISO 281, ISO 76” calculation module in KISSsoft.

To give you access to SKF’s cloud-based calculation program, you must first complete the form below and agree to the SKF data protection provisions.

Select “Extras/SKF Registration Tool” to open the window in which you complete registration.

![SKF Registration Tool](image1)

![Registration Tool input screen](image2)

Then click “Register” to send your registration details to SKF. You only need to register once.

Once registration has been completed, the “Change” and “Unregister” buttons become active in this dialog. To modify data you have input, click the “Change” button. To unregister, click the “Unregister” button.

1.3 Activating the calculation

You can now enter the data for the rolling bearings in the input screen.
Select "Calculations/Settings" to display the input window for the module-specific settings.

You enable "Calculate bearing performance with SKF bearing module" by selecting the checkbox marked with the red border in this window.

You can then perform a calculation.
1.4 Restrictions to the SKF Bearing Module

If you click the Info button next to the “Calculate bearing performance with SKF bearing module” checkbox, the system displays a help window that contains a description of the calculation and the restrictions.

For most SKF bearings, the following bearing performance results are calculated via an SKF cloud service:
- SKF rating life (L10m)
- Basic rating life (L10)
- Equivalent dynamic bearing load (P)
- C/P
- Viscosity ratio (K)
- Contamination factor (eC)
- Life modification factor (aSKF)

A direct connection is made to the SKF bearing database, ensuring accurate and up-to-date bearing data.

SKF rating life fully accounts for the benefits of SKF Explorer bearings. In general, SKF rating life is more accurate than ISO 281 rating life, but in particular for SKF Explorer bearings.

Requirements
- Registration is required which can be done via the “SKF Registration Tool” in the ‘Extras’ menu.
- Internet connection is required to connect to the SKF server.

Limitations
- The SKF bearing module does not support the following bearings:
  - non-SKF branded bearings
  - SKF super precision bearings
  - SKF hybrid bearings
  - SKF bearings for extreme temperatures

For these bearings, all results are calculated via the standard methods in KISSsoft.
- The bearing performance results as listed above are calculated. All other bearing performance results are calculated via the standard methods in KISSsoft.
- SKF bearing performance results are calculated when all selected bearings are SKF branded.

Additional info
More info on SKF rating life can be found [here](#). More info on the difference between SKF rating life and ISO 281 rating life can be found [here](#).
For additional questions or need for support by SKF, please contact skfbearingmodule@skf.com.
1.5 Results

The system displays two sets of results in the Results Overview: the rating life as calculated with the SKF Bearing Module and the rating life calculated according to ISO 281. By default, KISSsoft performs the calculation according to ISO 281. During this type of calculation, the software also determines the static safety coefficient, speed limit and torque losses.

![Results Overview](image)

The data entered in the module and the results are documented in the report:

<table>
<thead>
<tr>
<th>KISSsoft- Version</th>
<th>KISSsoft AG</th>
<th>CH-8608 BUBIKON</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td>Deep groove</td>
<td></td>
</tr>
<tr>
<td>Description</td>
<td>KISSsoft example</td>
<td></td>
</tr>
<tr>
<td>Changed by</td>
<td>on: 23.11.2018 at: 14:03:51</td>
<td></td>
</tr>
</tbody>
</table>

**ROLLING BEARING ANALYSIS**

**Calculation with SKF Bearing Module:**
- Modified bearing rating life according to SKF
- Direct online access to SKF bearing database
- Includes full benefits of SKF Explorer range

**General data:**
- Speed (1/min): 980.000
- Axial force (N): -1740.600
- Required bearing rating life (h): 5000.000
- Operating temperature (°C): 70
- Type of oil: Oil: Mobilgear 600 XP 220
- Lubricant base: Mineral-oil base
- Kinematic viscosity oil at 40 °C (mm²/s): 220.00
- Kinematic nominal viscosity at 100 degrees (mm²/s): 19.00
- Specific density oil at 15 °C (kg/dm³): 0.890
- Own Input: Lubricant with additive

**Rolling bearing No. 1:**
- Designation: SKF 6208
- Type: Deep groove ball bearing (single row)
SKF EXPLORER
SKF high availability item

Bearing clearance: \textbf{C0}
Radial and axial load
Radial force (N) \textbf{[Fr]} \quad 3127.500
Axial force (N) \textbf{[Fa]} \quad -1740.600

Inner diameter (mm) \textbf{[d]} \quad 40.000
External diameter (mm) \textbf{[D]} \quad 80.000
Width (mm) \textbf{[B]} \quad 18.000
Basic dynamic load rating (kN) \textbf{[C]} \quad 32.500
Basic static load rating (kN) \textbf{[C0]} \quad 19.000
Fatigue load limit (kN) \textbf{[Cu]} \quad 0.800
Dynamic equivalent load (N) \textbf{[P]} \quad 4332.846
Load conditions \textbf{[C/P]} \quad 7.501
Operating viscosity (mm²/s) \textbf{[v]} \quad 51.794
Viscosity ratio \textbf{[κ]} \quad 3.348
Impurity characteristic quantity \textbf{[ec]} \quad 0.500
Life modification factor \textbf{[aSKF]} \quad 7.770
Life modification factor for reliability \textbf{[a1]} \quad 1.000
Basic rating life (h) \textbf{[Lnh]} \quad 7170.000
SKF rating life (h) \textbf{[Lnmh]} \quad 55700.000

Results of bearing calculation according to ISO 281:2007

Speed limit (oil) (1/min) \textbf{[n.max]} \quad 11000
Static equivalent load (N) \textbf{[P0]} \quad 3127.500
Operating viscosity (mm²/s) \textbf{[v]} \quad 51.701
Reference viscosity (mm²/s) \textbf{[v1]} \quad 19.117
Impurity characteristic quantity \textbf{[ec]} \quad 0.500
Life modification factor \textbf{[aISO]} \quad 4.633
Rolling moment of friction (Nmm) \textbf{[Mrr]} \quad 135.961
Sliding moment of friction (Nmm) \textbf{[Msl]} \quad 88.082
Moment of friction, seals (Nmm) \textbf{[Mseal]} \quad 0.000
Mseal according to SKF Main Catalog 10000/1 EN: 2013
Moment of friction flow losses (Nmm) \textbf{[Mdrag]} \quad 0.000
Total moment of friction (Nmm) \textbf{[M]} \quad 224.044
Basic rating life (h) \textbf{[Lnh]} \quad 7067.093
Bearing rating life (h) \textbf{[Lnmh]} \quad 32745.128
Static safety factor \textbf{[S0]} \quad 6.075

Rolling bearing No. \textbf{2:}

Designation SKF 6207
Type Deep groove ball bearing (single row)
SKF EXPLORER
SKF high availability item

Bearing clearance: \textbf{C0}
Only radial load
Radial force (N) \textbf{[Fr]} \quad 3949.100
Axial force (N) \textbf{[Fa]} \quad 0.000
Inner diameter (mm) \textbf{[d]} \quad 35.000
<table>
<thead>
<tr>
<th>Property</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>External diameter (mm)</td>
<td>D</td>
<td>72.000</td>
</tr>
<tr>
<td>Width (mm)</td>
<td>B</td>
<td>17.000</td>
</tr>
<tr>
<td>Basic dynamic load rating (kN)</td>
<td>C</td>
<td>27.000</td>
</tr>
<tr>
<td>Basic static load rating (kN)</td>
<td>C0</td>
<td>15.300</td>
</tr>
<tr>
<td>Fatigue load limit (kN)</td>
<td>Cu</td>
<td>0.655</td>
</tr>
<tr>
<td>Dynamic equivalent load (N)</td>
<td>P</td>
<td>3949.100</td>
</tr>
<tr>
<td>Load conditions</td>
<td>C/P</td>
<td>6.837</td>
</tr>
<tr>
<td>Operating viscosity (mm²/s)</td>
<td>v</td>
<td>51.794</td>
</tr>
<tr>
<td>Viscosity ratio</td>
<td>κ</td>
<td>3.152</td>
</tr>
<tr>
<td>Impurity characteristic quantity</td>
<td>ec</td>
<td>0.500</td>
</tr>
<tr>
<td>Life modification factor</td>
<td>aSKF</td>
<td>6.170</td>
</tr>
<tr>
<td>Life modification factor for reliability</td>
<td>a1</td>
<td>1.000</td>
</tr>
<tr>
<td>Basic rating life (h)</td>
<td>Lnh</td>
<td>5430.00</td>
</tr>
<tr>
<td>SKF rating life (h)</td>
<td>Lnmh</td>
<td>33500.00</td>
</tr>
</tbody>
</table>

**Results of bearing calculation according to ISO 281:2007**

<table>
<thead>
<tr>
<th>Property</th>
<th>Unit</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed limit (oil) (1/min)</td>
<td>n.max</td>
<td>13000</td>
</tr>
<tr>
<td>Static equivalent load (N)</td>
<td>P0</td>
<td>3949.100</td>
</tr>
<tr>
<td>Operating viscosity (mm²/s)</td>
<td>v</td>
<td>51.701</td>
</tr>
<tr>
<td>Reference viscosity (mm²/s)</td>
<td>v1</td>
<td>20.245</td>
</tr>
<tr>
<td>Impurity characteristic quantity</td>
<td>ec</td>
<td>0.500</td>
</tr>
<tr>
<td>Life modification factor</td>
<td>aISO</td>
<td>3.801</td>
</tr>
<tr>
<td>Rolling moment of friction (Nmm)</td>
<td>Mrr</td>
<td>52.274</td>
</tr>
<tr>
<td>Sliding moment of friction (Nmm)</td>
<td>Msl</td>
<td>57.147</td>
</tr>
<tr>
<td>Moment of friction, seals (Nmm)</td>
<td>Mseal</td>
<td>0.000</td>
</tr>
<tr>
<td>Mseal according to SKF Main Catalog 10000/1 EN: 2013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moment of friction flow losses (Nmm)</td>
<td>Mdrag</td>
<td>0.000</td>
</tr>
<tr>
<td>Total moment of friction (Nmm)</td>
<td>M</td>
<td>109.421</td>
</tr>
<tr>
<td>Basic rating life (h)</td>
<td>Lnh</td>
<td>5435.251</td>
</tr>
<tr>
<td>Bearing rating life (h)</td>
<td>Lnmh</td>
<td>20657.364</td>
</tr>
<tr>
<td>Static safety factor</td>
<td>S0</td>
<td>3.874</td>
</tr>
</tbody>
</table>

Notice:

The modified rating life calculation according to ISO 281 contains only empirical formulae for calculating the fatigue load limit, and the resulting values for aISO are sometimes very high. This is always calculated with a coefficient for additives in the lubricant mybl=0.15.

If you have any questions about the SKF bearing performance results, or a general query about SKF products, please contact SKF directly by sending an e-mail to skfbearingmodule@skf.com.