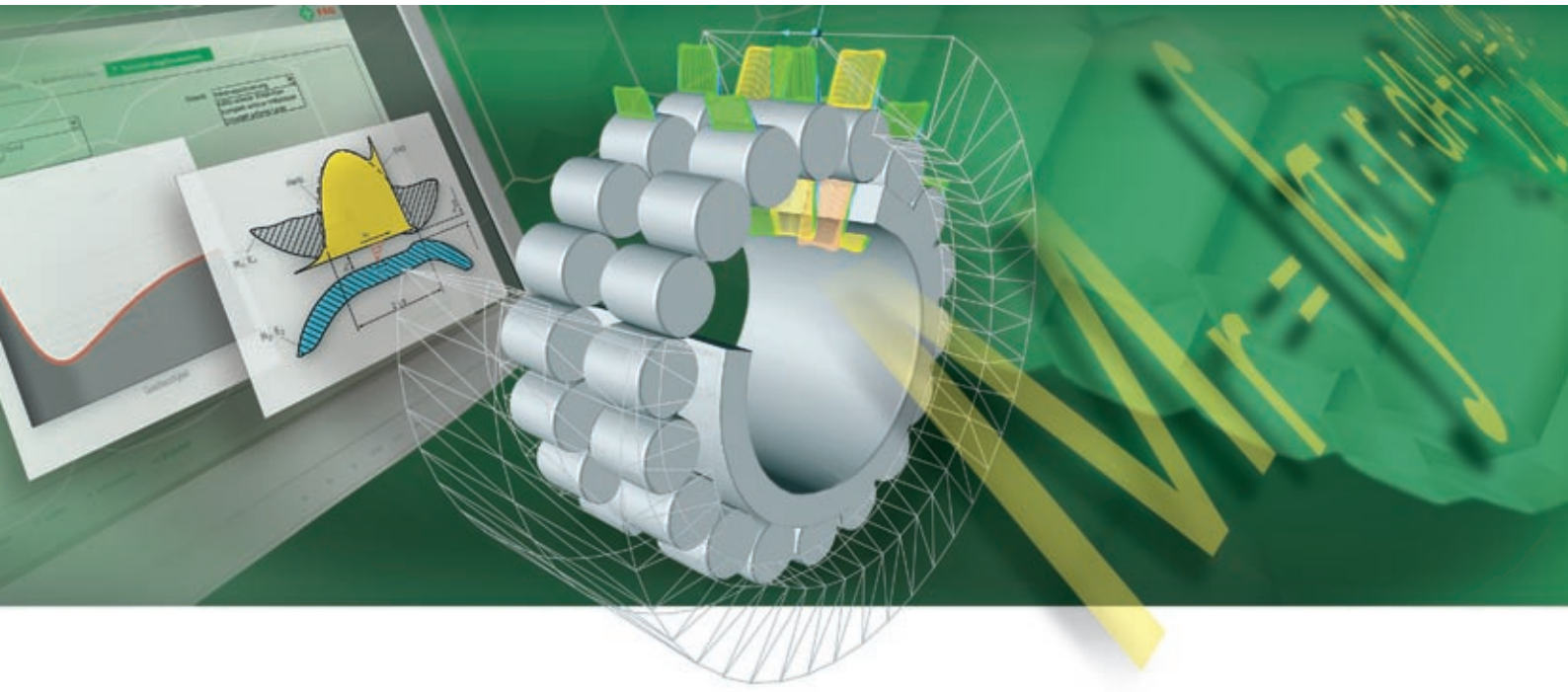


BEARINX®-online Easy Friction

Detailed friction calculations for rolling bearings

SCHAEFFLER GROUP

Detailed friction calculations…

Other calculation tools currently on the market usually make use of highly-simplified calculation methods. These methods usually ignore the tilted position of bearings resulting from shaft deflection as well as the elastic behavior of rolling bearings and contacts. The friction is calculated only by using approximation methods, whereby the results provide hardly any or only approximate values for real applications.

A new addition to the proven BEARINX® family

With the BEARINX®-online "Easy Friction" module you can now determine the friction values of Schaeffler rolling bearings according to a detailed procedure. And of course, this procedure takes the internal load distribution with the contact pressures on the raceways and ribs with the actual rolling element profiles into consideration.

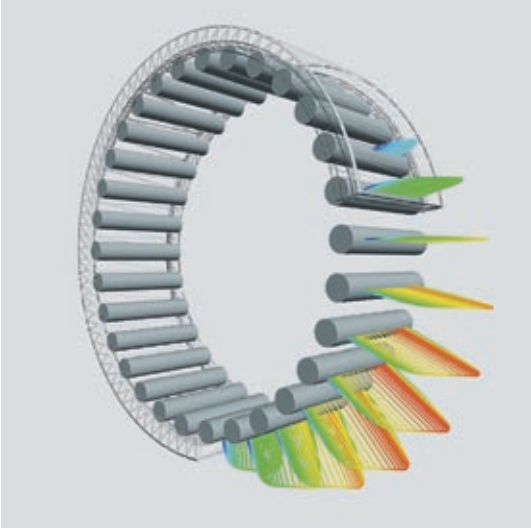
The new module is based on a friction calculation theory that is based on physical algorithms that have been confirmed by a series of comprehensive values from tests. Furthermore, bearing life is also calculated according to ISO/TS 16281.

The algorithms in BEARINX®-online Easy Friction take the following parameters into account in particular:

- Losses in rolling and sliding contacts
- Losses in the load-free zone
- Churning losses
- Seal friction.

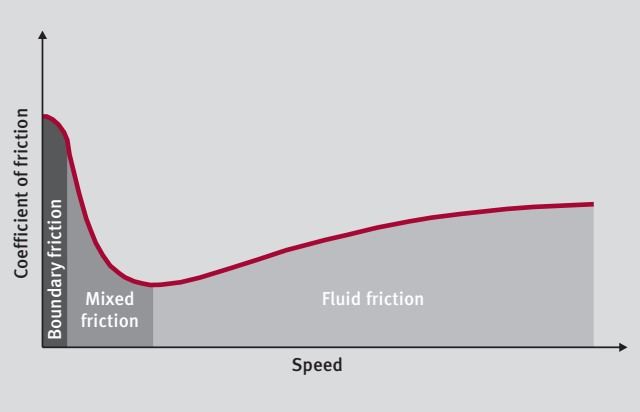
Since the module is embedded in the "parent software" BEARINX® used at Schaeffler, other typical influencing factors are also taken into consideration:

- Radial and axial load
- Tilting of the bearing rings
- Lubricant (viscosity class)
- Temperature

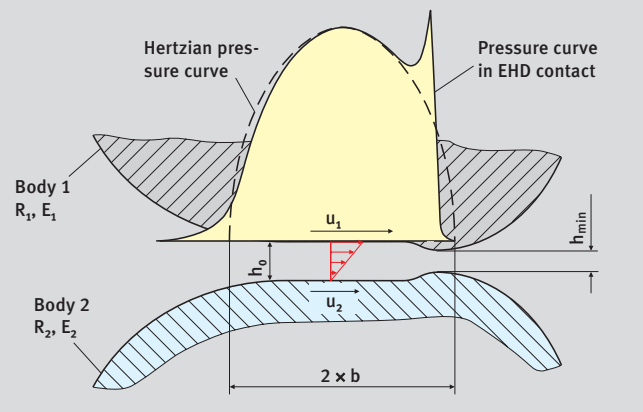


Accurate in every detail: Even the contact pressure on every single rolling element is considered in the calculation

- Precise internal geometry of the bearings
- Internal clearance
- Profiling of bearing components
- Rib geometry.



Stribeck curve



Elasto-hydrodynamic (EHD) contact

... with self-explanatory menu navigation

Intuitive user interface

The self-explanatory menu navigation enables users to enter data quickly and easily for modeling (Figure 1), selecting bearings (Figure 2), and operating conditions. The bearing arrangement for the elastic shaft system can either be modeled with a locating/non-locating bearing support or as an adjusted bearing arrangement. The geometric data of INA and FAG rolling bearings is easily loaded from an integrated database. The user enters the operating data such as the loads on the shaft system, the shaft speed, the internal clearance class and axial preload of the rolling bearings. Details about lubrication and cleanliness complete the data entered into the system (Figure 3).

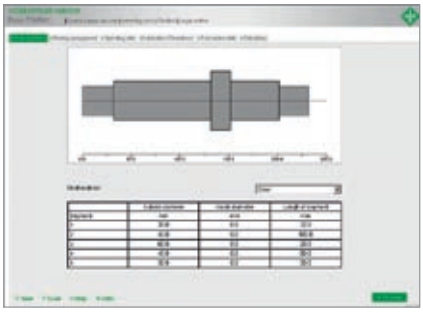
Fast comparisons of friction in various bearing support concepts

Various bearing support concepts can be compared quickly and easily by exchanging the bearings in the model. This enables the user to find an efficient bearing arrangement with optimized friction characteristics. All input data can be saved locally. This enables any relevant changes to an existing design to be made quickly without having to enter the data twice. Furthermore, any saved files can be exchanged with Schaeffler's Engineering Service in order to produce an optimum bearing design. Calculations are carried out on the Schaeffler Group's powerful calculation servers. The most important results are displayed immediately in a results window (Figure 4). In addition, the input data and the calculation results are documented in a PDF file (Figure 5).

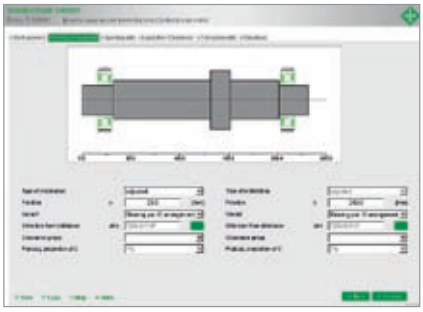
Bearing types suitable for calculation

The following bearing types are suitable for calculation using BEARINX®-online Easy Friction:

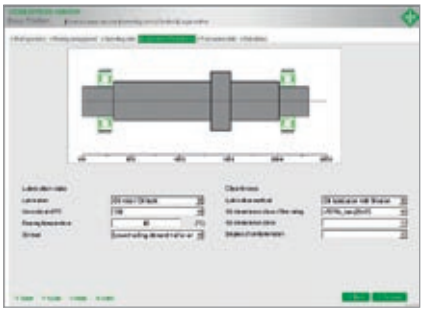
- Deep groove ball bearings
- Angular contact ball bearings
- Tapered roller bearings
- Spherical roller bearings
- Needle roller bearings
- Cylindrical roller bearings.



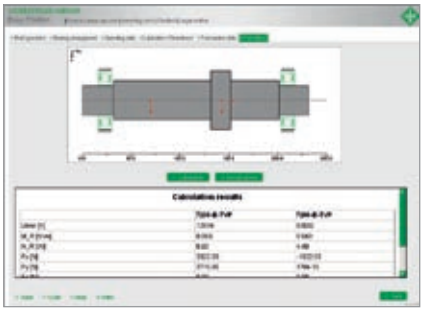
① Modeling of the shaft geometry



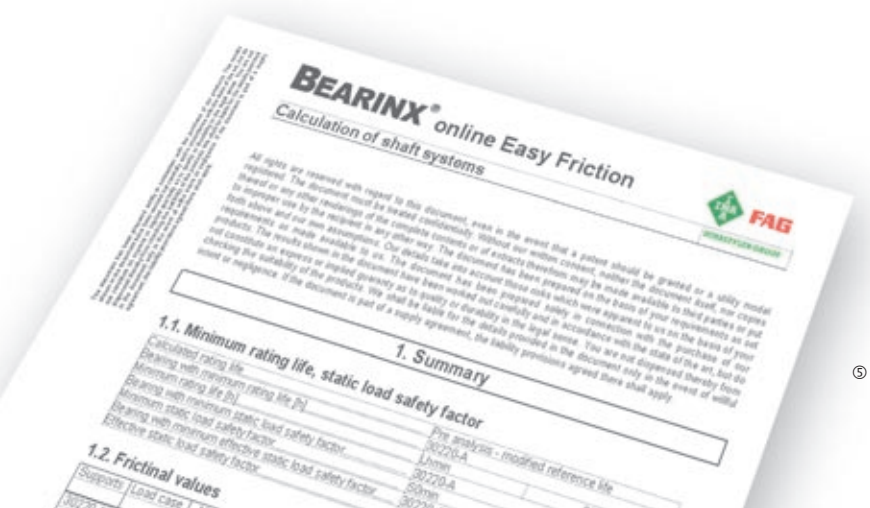
② Arrangement of bearings



③ Lubrication and cleanliness



④ Calculation results


BEARINX® online Easy Friction
Calculation of shaft systems
FAG
1. Summary
1.1. Minimum rating life, static load safety factor
1.2. Frictinal values

⑤ List of results

Registration: BEARINX®-online Easy Friction

The calculation program BEARINX®-online Easy Friction is available online only and can be used free of charge. After initial registration, which takes very little time, you can start your calculation immediately.
http://bearinx-online-easy-friction.schaeffler.com

Additional features: BEARINX®-online Shaft Calculation

For individual requirements in shaft modeling, fitting bearings, selecting bearings and for considering special operating data, we offer our customers and distributors the more comprehensive BEARINX®-online Shaft Calculation system.
http://www.ina.de/content.ina.de/en/services/calculating/bearinx_online/bearinx_online.jsp

Schaeffler Technologies
GmbH & Co. KG

91072 Herzogenaurach (Germany)
E-Mail bearinx-online@de.ina.com
Phone +49 9132 82-7575
Fax +49 9132 82-3344
Internet www.ina.com · www.fag.com

Issued: 2011, March

MATNR 036910040-0000 / PBR / US-D / 2011031 / Printed in Germany by schedel