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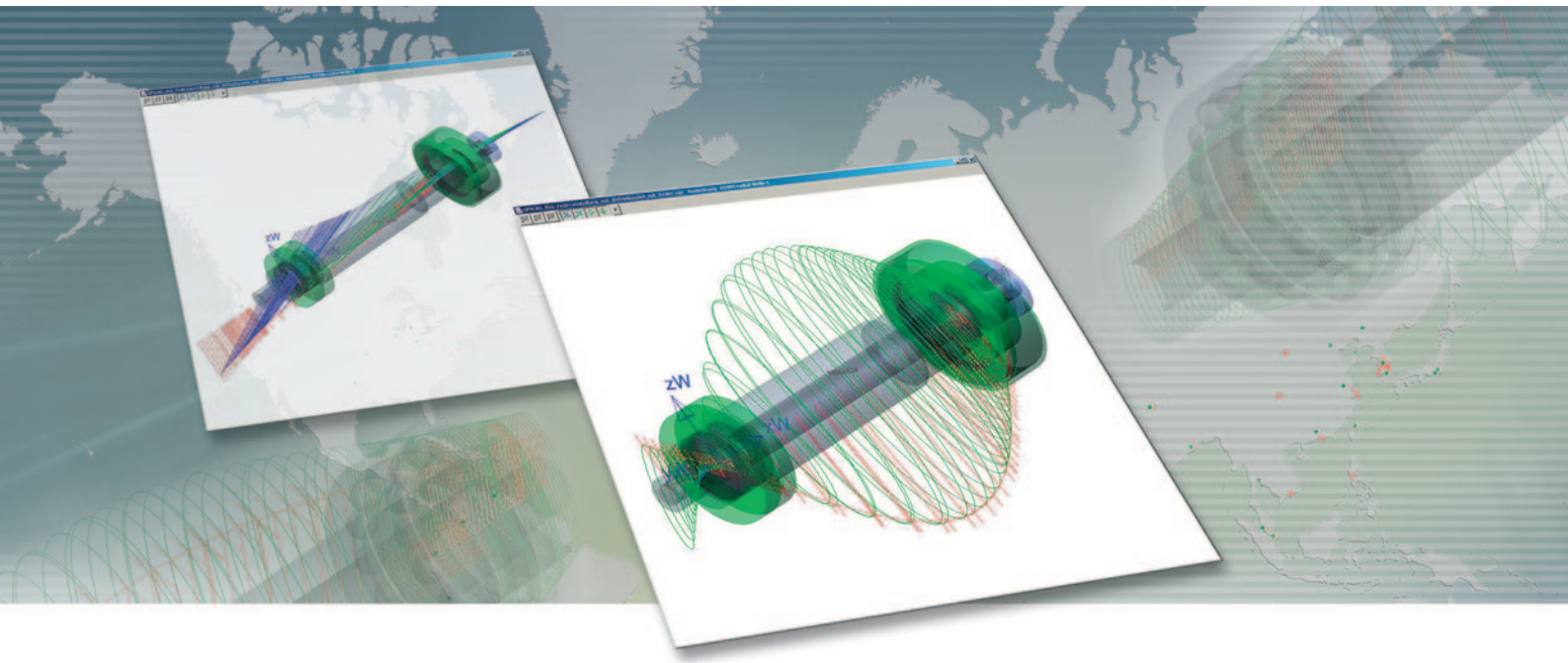

BEARINX®-online Spindle Calculation

SCHAEFFLER GROUP
INDUSTRIAL

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Calculation Software by INA/FAG
A reliable route to optimal bearing design

Along with developing and manufacturing top quality precision parts, great service is an important tradition at INA and FAG. We offer you the support you need as early as the design phase, so you can put our products into operation with confidence, because for us, service means a partnership with the customer from the first design idea right up to supplying the product.

Rolling bearing design is one of the focal points of design support. We want to give you a competitive edge by supplying you with perfectly designed products. We have already been using calculation programs successfully for over 30 years to meet these requirements.

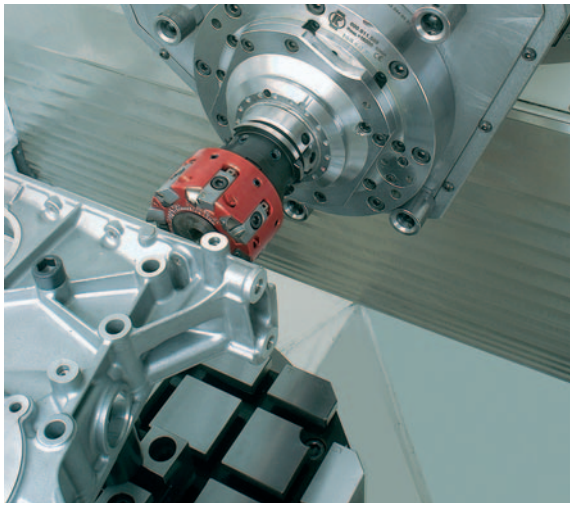
BEARINX® –
A leading calculation program

INA's BEARINX® software is one of the leading programs for performing rolling bearing calculations. The software enables rolling bearing supports to be analyzed in detail – from single bearings via complex shaft or linear guidance systems to entire machine tools. All calculations are performed in a consistent calculation model. Even for complex applications, the contact pressure on each rolling element is considered in the calculation.

Rolling bearings in the system

Amongst others, BEARINX® takes the following into consideration:

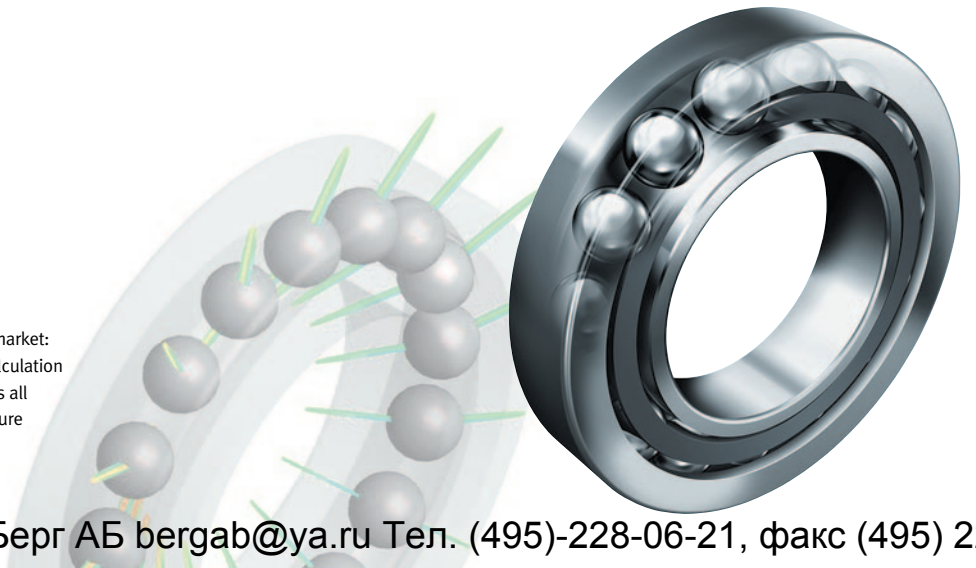
- Non-linear elastic deflection behavior of bearings
- Elasticity of shafts and axles
- The influence of fit, temperature and speed on bearing operating clearance or preload and on the contact pressure
- Roller and raceway profiles as well as raceway osculation
- Load-related contact-angle shifts in the case of ball bearings and angular contact ball bearings
- Actual contact pressure when a tilted position and rolling element profiles are considered
- Effects of lubrication conditions, contamination and actual contact pressure on fatigue life.



Increased operational safety – shorter development times.
We model real operating conditions when designing bearings

Spindle Calculation

A special module for Spindle Calculation has been added to the current version of BEARINX®. BEARINX® now also considers the influence of centrifugal force on the load distribution and the running behavior of the rolling elements in the case of angular contact ball bearings.



For your competitive edge on the market: optimum bearing design with a calculation program that performs calculations all the way down to the contact pressure on a single rolling element.

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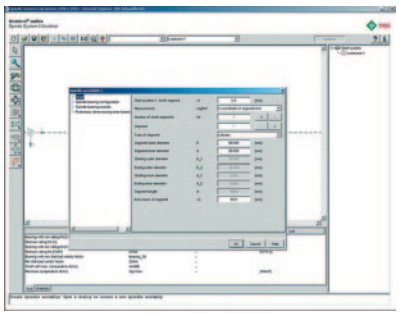
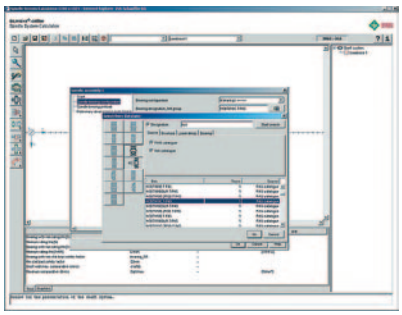
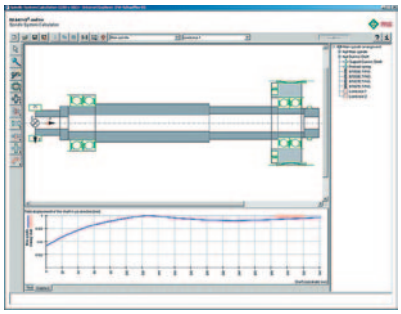
Spindle Calculation Online
Cut your development time!



User-friendly data entry for a spindle assembly



Rolling bearings from the INA/FAG database



Graphic representation of the shaft reaction

Other calculation tools currently on the market usually make use of highly simplified calculation methods. In many cases, the tilted position of bearings resulting from shaft deflection and the differing deflection behavior that is present for various bearing designs are ignored. The internal load distribution in the bearing – decisive for fatigue life – is most often determined by approximation methods.

With our software, you can now determine actual stresses while taking shaft deflection and rolling bearing deflection behavior into account. And of course, exact calculations for the internal load distribution in the bearing are performed, including contact pressure with the actual rolling element profile.

Intuitive user interface

The algorithms used in BEARINX®-online Spindle Calculation are identical to the ones used in BEARINX® at INA and FAG. BEARINX®-online enables you to perform calculations at your desk for single-shaft systems incorporating several bearings.

A Java-based user interface provides support for easy data entry. Graphic representations for your designs allow you to visualize your design and check the data easily.

The data and geometry for bearings in INA and FAG catalogs can be easily accessed from an integrated database. Powerful calculation servers at INA then perform the actual calculation.

Not everything can be done online: Personal contact with you is very important when designing spindle bearings.

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Engineers at your side

The input files you create in BEARINX®-online Spindle Calculation are compatible with BEARINX®. This facilitates any further communication with our engineers and prevents duplicate work.

The comprehensive results in HTML format as well as the graphic representation of shaft reactions and bearing internal load distribution make it easier for you to analyze your design variants. An online tutorial and a detailed help system make it easier for you to use the full potential of BEARINX®-online Spindle Calculation.

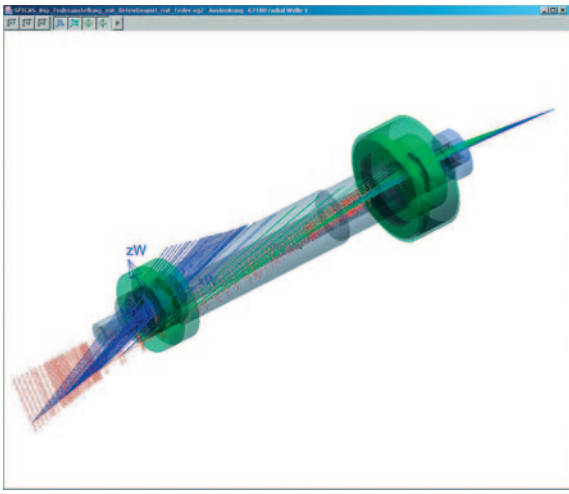
Supplement 4 of DIN ISO 281 (April 2003) defines the standardized calculation of fatigue life using state-of-the-art computer-assisted calculation procedures. This procedure is of course available to you in the new version of BEARINX®-online.

Working together even more closely

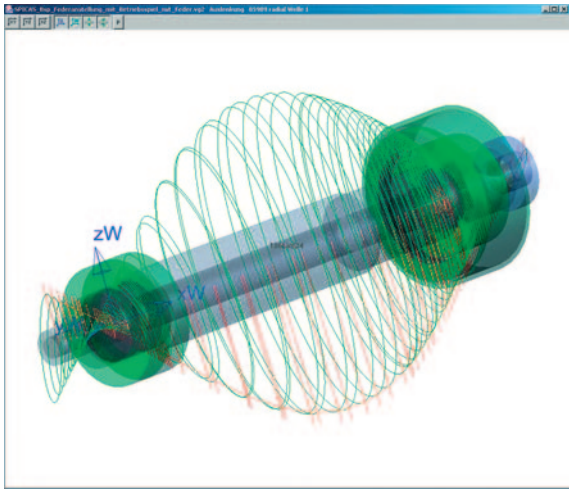
BEARINX®-online Spindle Calculation was not developed to move support and calculation services away from INA and FAG and transfer them to the customer. On the contrary, since we would like to work even more closely with you. Our objective is to allow you to make the suitable preliminary selection for rolling bearings early on in the development process so that you can reduce your development times.

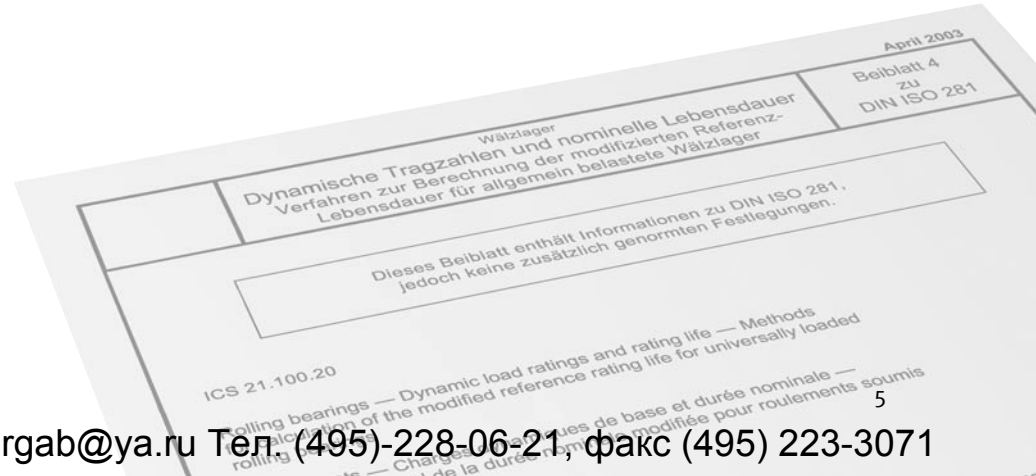
BEARINX®-online Spindle Calculation – an overview

- Recommendations for mounting fit as a function of the indicated speed
- Calculations of design parameters for contact pressure and kinematics in the bearing
- Kinematic bearing frequencies for vibration analyses
- Calculation of bearing stiffness at the operating point taking account of all relevant influences
- Graphic representation of shaft reactions (shaft deflection and inclination)
- Rigid and elastic arrangement of bearings taking account of fit, temperature and speed
- Critical speeds and graphic representation of the natural modes
- Calculation of fatigue life according to DIN ISO 281, Supplement 4.



Axial natural oscillation (above) and
initial flexural vibrations (below) of a spindle




April 2003
Beiblatt 4
zu
DIN ISO 281
Wälzlager
Dynamische Tragzahlen und nominelle Lebensdauer
Verfahren zur Berechnung der modifizierten Referenz-
Lebensdauer für allgemein belastete Wälzlager
Dieses Beiblatt enthält Informationen zu DIN ISO 281,
jedoch keine zusätzlich genormten Festlegungen.
ICS 21.100.20
Rolling bearings — Dynamic load ratings and rating life — Methods
of the modified reference rating life for universally loaded

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Your own calculations
Made easy with training and not much hardware

Ever decreasing development times and product cycles put mechanical engineers and their suppliers under pressure. The only way to obtain the required competitive edge is by reacting fast and employing the proper expertise. With INA and FAG you have found the perfect partners to achieve this.

This is why we give our customers the opportunity to try the outstanding features of BEARINX® themselves. With BEARINX®-online Spindle Calculation you now have access to the newly-integrated module in BEARINX® for designing spindle bearing supports.

What do you need?

BEARINX®-online allows spindle calculations to be performed for complex elastic shaft systems and main spindle bearing supports. We offer training to familiarize you with the program and help you better understand the calculation models used. You'll learn how to work with the user screen and how to interpret calculation results correctly.

The conditions for using the software as well as making use of any additional services such as training programs and support are defined in a mutual contract.

Fees are charged for both the training program and the registration to use BEARINX®-online Spindle Calculation.

System requirements

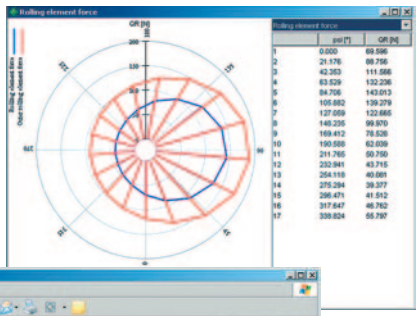
The actual calculations are performed by powerful servers at INA. The only thing that the local hardware does is operate the user interface. This means that the requirements for your local hardware are low.

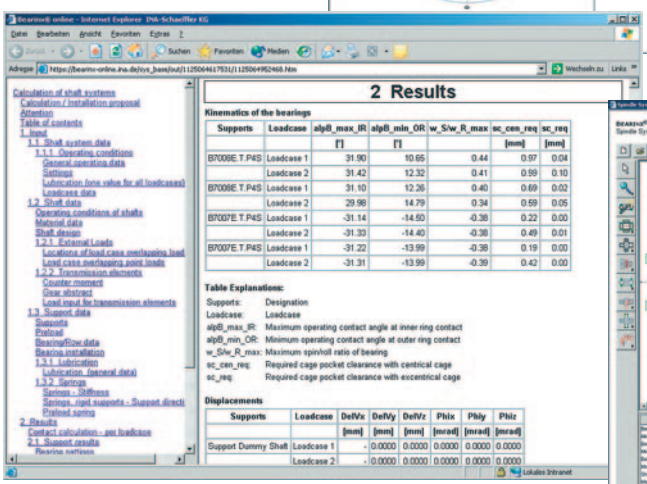
Hardware

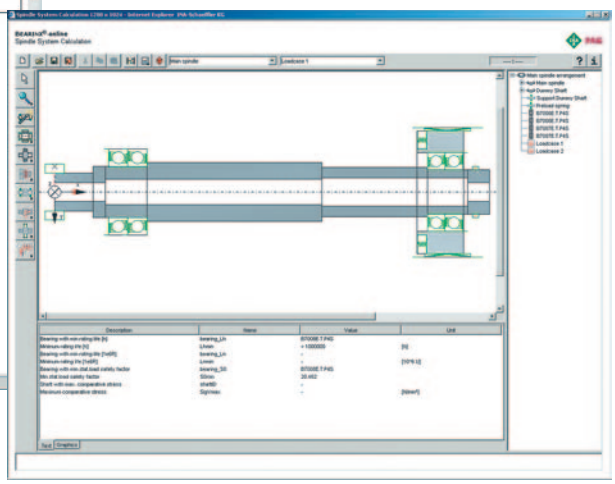
- Processor: 500 MHz or better
- RAM: at least 256 MB (512 MB are recommended)
- Monitor resolution: 1024 × 768 or better
- 80 MB available hard drive space
- Internet hookup via ISDN (DSL is recommended)

Software

- Java 2 runtime environment with 3D enhancement
- Java plug-in compatible browser
- Flash-Player







Convenient: Documentation of results in HTML format

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BEARINX®-online Spindle Calculation

Fax Reply

Corporate Analysis and **Simulation, INA-Schaeffler KG**
Fax no. +49 9132 82-3344

We would like to register to use BEARINX®-online Spindle Calculation.

☐ INA Customer ☐ FAG Customer ☐ INA/FAG Customer ☐ Distributor

Contact partner in Application or Sales at INA/FAG

_____

Company/Department _____

Contact _____

Position _____

City, State, ZIP _____

Phone/Fax _____

E-Mail _____

Please contact the address given below if you have any questions.

(company stamp, city, date, signature)

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