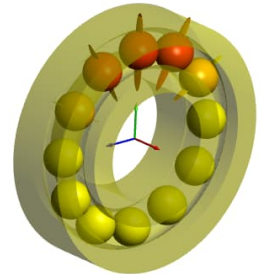
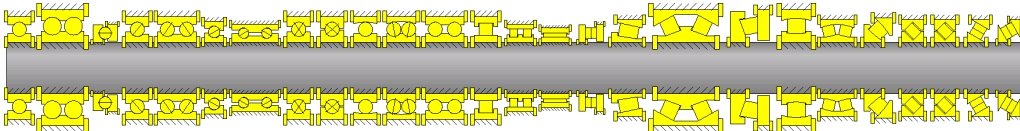


Tutorial Series Rolling Bearing Calculation - Starter Essential Operation – Settings – Results

Content

This tutorial provides a practical introduction to the key functions of the MESYS Rolling Bearing Calculation software. The goal is to help new users quickly become familiar with the core features and typical workflows. The version used in this guide is MESYS 12-2025.



General

Please refer to the corresponding section of the online manual for detailed information on the settings under the “General” tab.

For the purposes of this tutorial, keep the default settings after launching the rolling bearing calculation module.

- Conclusion, Key Takeaway
- Call to Actions

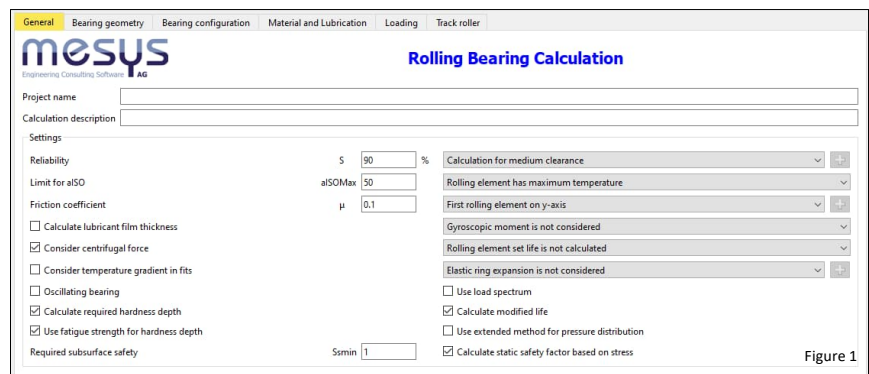


Figure 1

Bearing geometry

Here you have the option to select a rolling bearing directly from the software’s internal database, using filters for bearing type and diameter.

Figure 2

If no user input is provided, the load ratings are calculated automatically according to ISO 281 and ISO 76.

The radial clearance (Pd) can be entered manually or selected as a clearance class according to ISO 5753.

For bearings with contact angle or axial bearings, you can define either an axial clearance (Pa) or apply a preload (Fp).

Five modes are available for the geometric definition of the rolling bearing, using load ratings from the database, from calculation, or from user input.

A wide range of basic bearing types can be selected via the dropdown menu.

Manufacturer	name	di [mm]	De [mm]	B [mm]	C [kN]	CO [kN]	n _{ms}
FAG	61808-ZZ-HLC	40	52	7	4.93	4.18	164C
FAG	61808-2RSR-HLC-C3	40	52	7	4.93	4.18	620C
FAG	61808-2RSR-HLC	40	52	7	4.93	4.18	620C
FAG	6008-Z-122R	40	68	15	17.8	11.5	146C
FAG	6008-Z-C3	40	68	15	17.8	11.5	146C

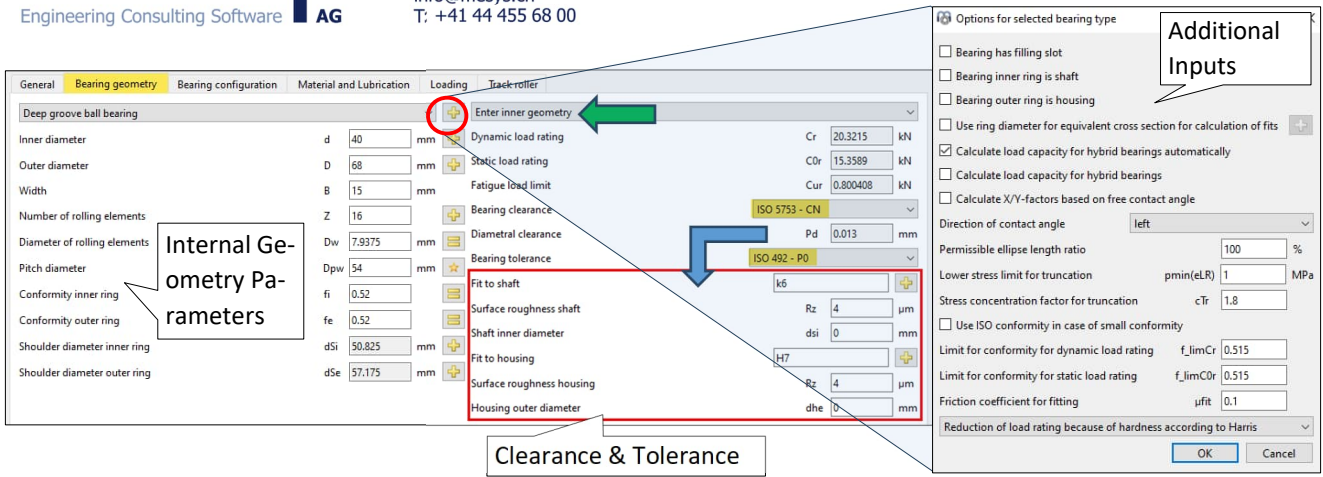


Figure 3

Bearing configuration

A generic angular contact ball bearing 7308B is to be paired or considered as a double-row bearing of the same type:

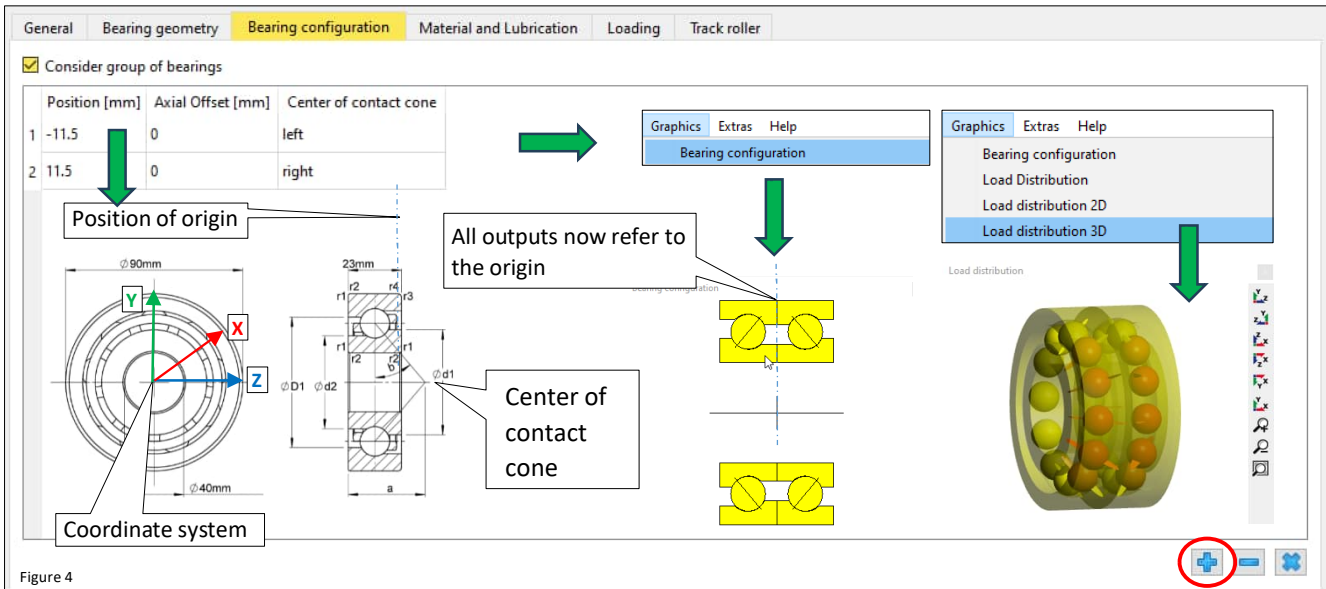


Figure 4

Select the generic 7308B and activate 'Consider bearing set'. Define the Positions and orientations of contact cone Centers by adding rows using the button **+**, as shown in Figure 4.

Material and Lubrication

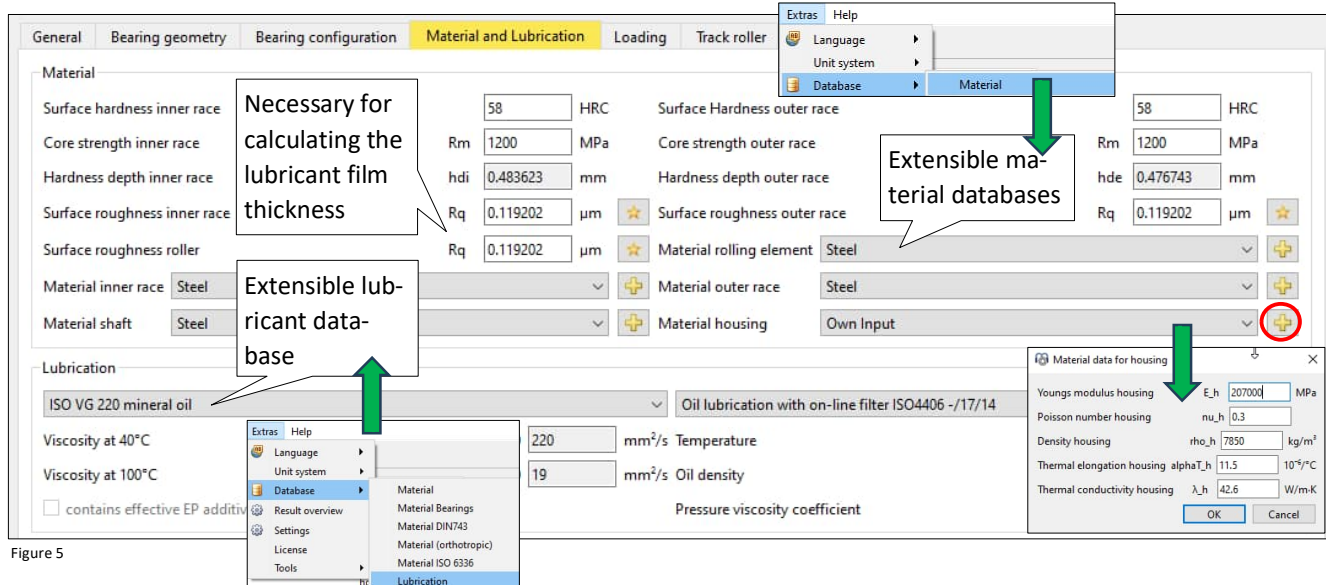
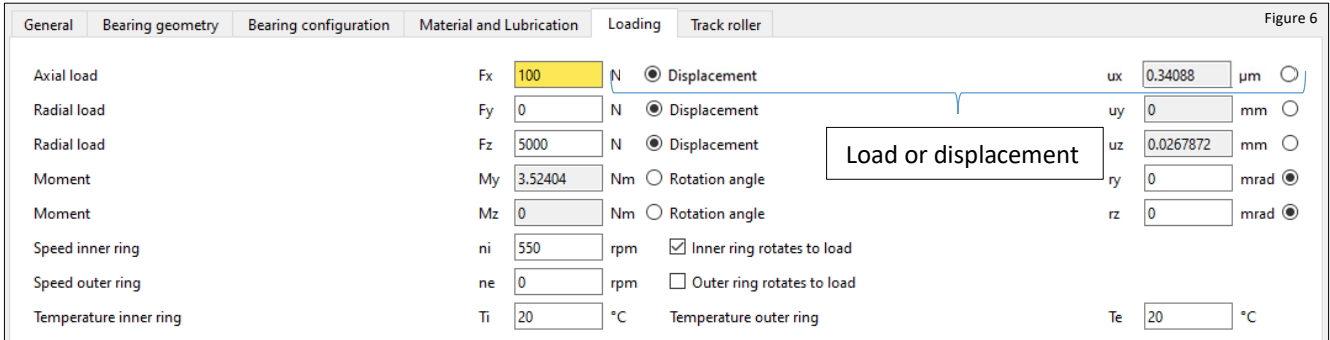


Figure 5

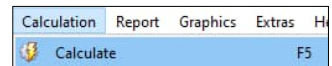
Loading

- ➔ For each coordinate direction, either a force or a displacement (ux) can be specified as needed (see Figure 6). If the ring used to apply preload on our angular contact bearing is assumed to be fixed, the axial displacement (ux) can be set to zero, and the resulting reaction force in the axial direction (Fx) will be calculated.
- ➔ A moment load or a tilt can only be defined in two directions, since rotation around the bearing axis (X) cannot be constrained.



Calculation

The calculation can be started using the ⚡ button, the F5 key, or the corresponding menu item.



- ➔ Please always check the icon in the bottom right corner, which confirms that the calculation has been executed and is up to date.
- ➔ Apply the loads as shown in Figure 6 and start the calculation with an axial clearance Pa = 0 mm.

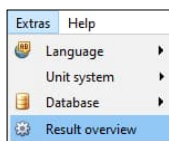


Results

Result overview

This overview provides various details about the bearing condition at the bottom of the user interface.

- ➔ The contents can be edited via the 'Extras' menu.



Result overview					
Modified reference rating life	Lnmrh	431669 h	Maximal pressure	pmax	1825.53 MPa
Static safety factor	SF	12.1782	Static safety factor (ISO 17956)	S0eff	12.2561
Reference load	Pref	4897.41 N	Dynamic load rating, system	Crsys	63422.8 N
Static load rating, system	C0sys	53322.6 N	Viscosity ratio	κ	1.74593
Effective diametral clearance	Pdeff	0.26203 mm	Effective axial clearance	Paeff	0 mm
Maximum spin to roll ratio	maxSpinToRoll	0.216789	Maximum contact angle difference	Δα	31.1473 °
Basic reference rating life	L10r	2171.89	Ellipse length ratio inner race	eLR_i	151.673 %
Ellipse length ratio outer race	eLR_e	154.469 %	Extension contact ellipse inner ring	dCimax	57.7444 mm
Extension contact ellipse outer ring	dCemin	73.6787 mm	Effective free contact angle	α0eff	40 °

Figure 7

Graphics

- ➔ Various graphical representations can be loaded via the 'Graphics' menu.
- ➔ Open the graphics for load distribution 3D, Contact Stress, Subsurface stress, and Reliability as shown in Figure 9.

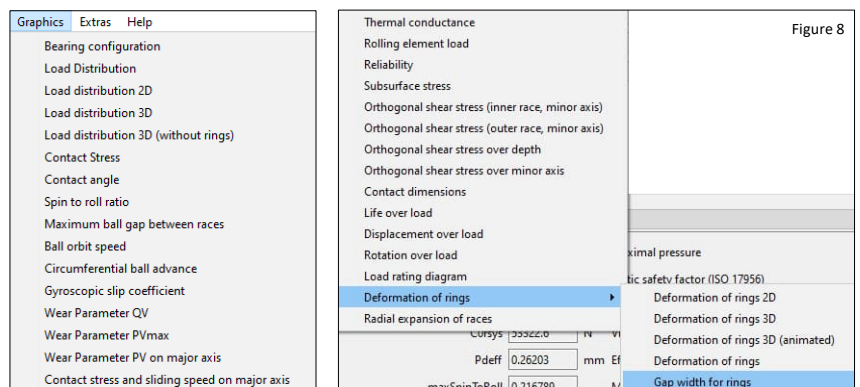


Figure 8

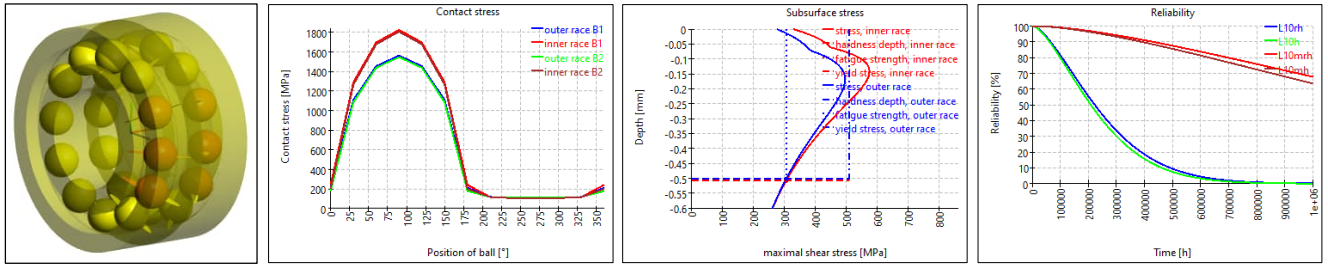


Figure 9



Now enter an unmounted preload F_{pu} of 1000 N as shown in Figure 10.

Compare the results prior to and after the change.

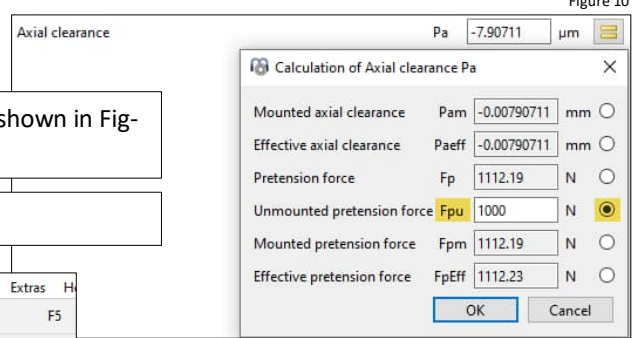


Figure 10

Parameter variation

By using parameter variation, you can analyze which value of axial clearance yields the best performance for a given application scenario.

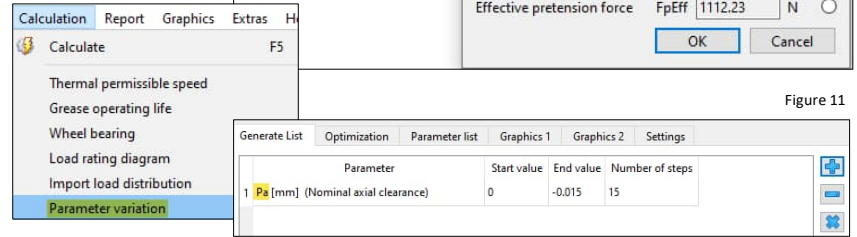


Figure 11

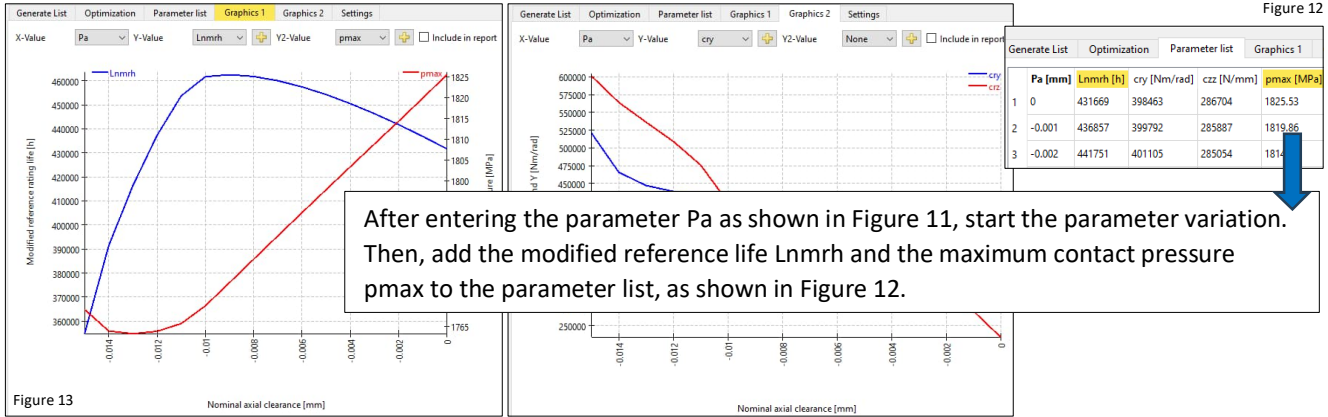
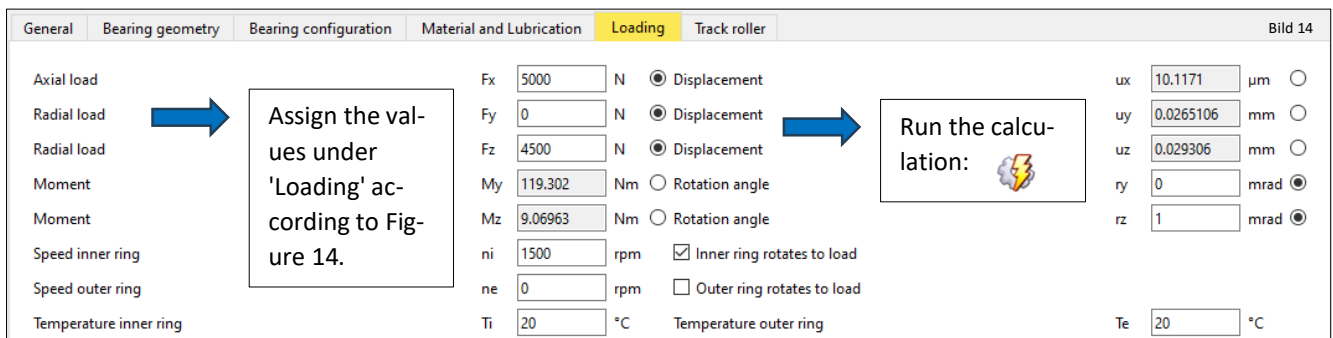


Figure 12

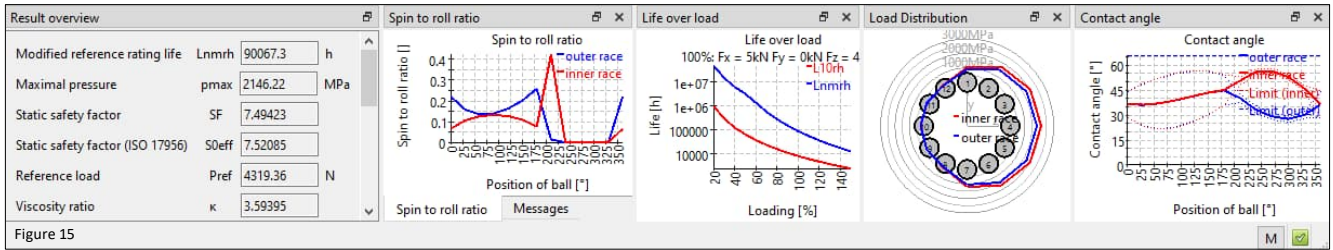
After entering the parameter Pa as shown in Figure 11, start the parameter variation. Then, add the modified reference life L_{nmrh} and the maximum contact pressure p_{max} to the parameter list, as shown in Figure 12.



Deactivate the checkbox for 'Consider bearing set' (see Figure 4) and set Pa back to 0 μm .



Drag the graphics to the lower area next to the results overview, as shown in Figure 15.



➡ Modify the inputs under 'Loads' and observe the changes in the graphics.

➡ Activate the load spectrum and check the corresponding box under the 'General' tab Use load spectrum (see Figure 1).

➡ Enter a load spectrum as shown in Figure 16 by adding entries using the **+** button.



	General	Bearing geometry	Bearing configuration	Material and Lubrication	Loading	Track roll					
	Frequency	Fx [N]	Fy [N]	Fz [N]	ry [mrad]	rz [mrad]	ni [rpm]	ne [rpm]	T _i [°C]	T _e [°C]	TOil [°C]
1	0.333333	5000	0	4500	0	1	1500	0	20	20	70
2	0.333333	5500	0	5000	0	1	1600	0	22	20	70
3	0.333333	6000	0	5500	0	1	1700	0	24	20	70

Figure 16

➡ Compare the results in the results overview and in the graphics for the three load spectrum elements.

MESYS wishes you an instructive and profitable experience with our tutorials. If you have any queries, suggestions or questions, please do not hesitate to contact info@mesys.ch.