

Rolling bearing calculation according ISO 16281 for track rollers

The bearing life calculation according ISO 16281 (2025) is the latest standardized method for bearing life calculations. Life is calculated considering the load distribution between the single rolling elements and is not only considering external loading, but also tilting and clearance. For each of the five degrees of freedom, either the load or the displacement/rotation can be provided.

As in the classical calculation according ISO 281, the influence of lubrication on life is considered either by the viscosity ration of ISO 281 or by the calculation of lubricant film thickness.

Specialties for track rollers

In contrast to bearings which outer ring is supported by the housing, no such support is available for track rollers. The load is introduced on a point on the outer ring. The outer ring is deforming which is also the reason for usually stiffer outer rings as in normal bearings.

The bearings analysis software extension for track

rollers allows the definition of outer ring geometry and loading in radial and axial direction on several locations on the outer ring. The load distribution is then calculated considering the elastic deformations of the outer ring.

Multi-row bearings are supported. In the current version an elastic outer ring can be considered for radial deep groove ball bearings (single or double row), radial angular contact bearings (single or double row), radial four point bearings, radial cylindrical roller bearings (single or double row) and double row tapered roller bearings.

Effective load capacities

In catalogues for track rollers often reduced effective load capacities C_w , C_{0w} are provided, which are considering the different load distribution. They are calculated by the software in addition to maximal permissible radial load. It is important to consider that the loading should be introduced at a location of a rolling element for the calculation of load capacities, but between two rolling elements for calculation the maximal permissible radial load.

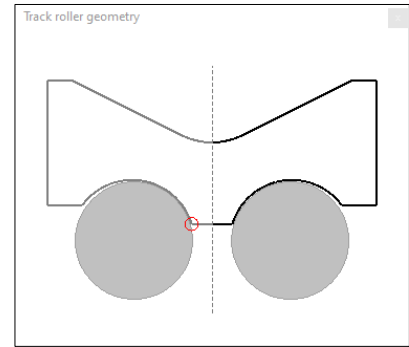
Axial [mm]	Radial [mm]	Radius [mm]
1 0	23	0
2 2	23.5	-5
3 9	27	0
4 10.5	27	0
5 10.5	19	0

Axiales Flächenträgheitsmoment	laa	469.906	mm ⁴
Radiales Flächenträgheitsmoment	lrr	5223.34	mm ⁴
Tangenciales Flächenträgheitsmoment	lrr	5693.25	mm ⁴
Deviatorisches Flächenträgheitsmoment	lar	0	mm ⁴
Schwerpunkt, axial	s_a	0	mm
Schwerpunkt, radial	s_r	22.4033	mm
Querschnittsfläche	A	117.499	mm ²

Geometry

Outer ring geometry can be defined as a polygon and radii. Also unsymmetrical cross sections are possible. The second moments and the position of center of gravity are calculated or they can be provided by the user directly.

If the geometry is defined by a polygon and radii the software also selects the critical point for bending stresses automatically.

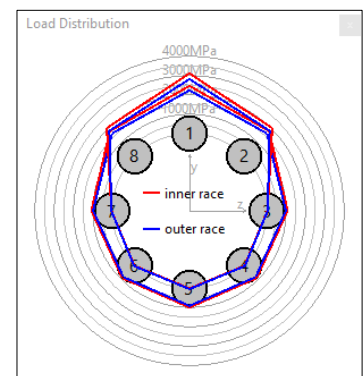


Loading

The loading of the outer ring can be specified on several locations: The only restriction is a zero torque on the bearing.

	Angle [°]	Ax. position [mm]	Radius [mm]	Fr [N]	Ft [N]	Fa [N]
1	0	2	23.5	-3000	0	300

An axial load can occur in belt drives which are not exactly parallel. An axial offset of the radial load can be defined by the axial position in the inputs. Loadings on several locations can occur in bearings used for supporting a planetary gear with small rim thickness. A load spectrum calculation is also possible too.

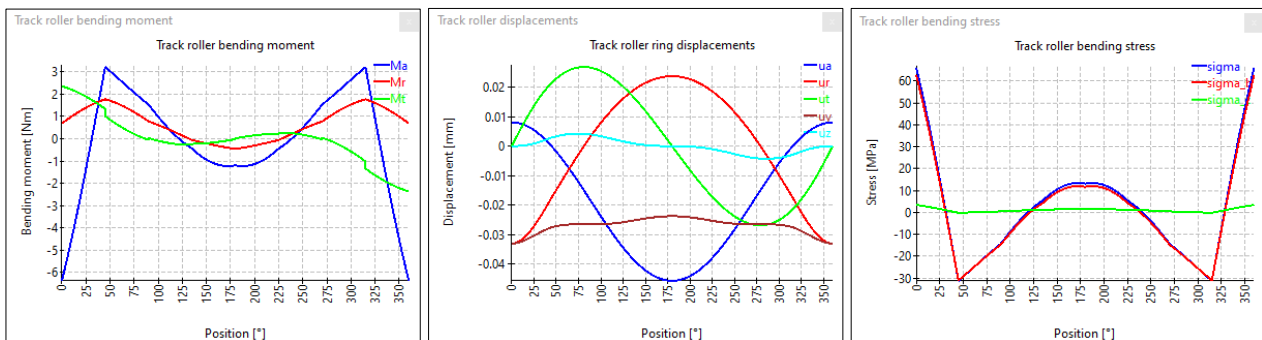


Results

The same results as for rigid bearings are available. These include bearing life, load distribution, lubricant film thickness, bearing displacement, extension of contact ellipsis, and more.

In addition, for track rollers the effective load capacities, the permissible radial load, the stresses in outer ring and the deformations of outer ring are provided.

Results are provided as a configurable result overview, as graphics and as an extensive PDF report.



Contact

MESYS AG - Technoparkstrasse 1 - CH-8005 Zürich

T: +41 44 4556800 - www.mesys.ag – info@mesys.ch

A demo version and the software documentation are available for download on the website. Please contact us to request a trial version without restrictions.

