KISSsoft Release 03/2018

Changes from Release 03/2017
to Release 03/2018

These changes affect the results if you open an existing KISSsoft calculation from an older release.

NEW!

These new features bring improvements to the functionality in Release 03/2018, with new modules, calculations or user-friendliness.

Contents

General Σ

Modules	Changes/Enhancements
General	**Messages:** Some KISSsoft modules do not have "module-specific settings". This sometimes causes confusion if you click on the toolbar. Now, information is displayed if no module-specific settings are present. New message type implemented for important messages. They are also displayed if the message display function is switched off. In this way, vital information that has a significant effect on the result, for example, in a Campbell diagram, will still be displayed. **KUI:** For the identification of input fields, the element ID can be shown. This may be necessary, if the input field has been relocated due to the KUI (KISSsoft User Interface) possibility. **Report:** Report templates can be accessed and stored in accordance with the control logic. This improves the clarity of the structure with the IF, ELSE, etc. commands. This structure can now be used to edit these reports for KISSsoft. **Graphics:** You can now edit the color scale in 3D graphics (for example, to display stress distribution).
Database	Σ **Rolling bearings:** Data for SKF bearings has been updated according to the current manufacturer specifications. Σ **Rolling bearings:** Data for Schaeffler (FAG, INA bearings) has been updated according to the main 2017 catalog and the relevant media. The calculation for friction has been updated from 2014 to 2017. Coefficients f1, f0 have been changed for some bearing types. Σ **Rolling bearings:** Data for KOYO bearings has been updated according to the current manufacturer specifications. **NEW!** **Materials:** 8 new plastics have been added: • DURACON M90-44 and DURACON M90-44 (from Polyplastics) • ALCOM PA66 910/1 GF30 PTFE15 SI2, ALCOM PA66 910/1 PTFE20, ALCOM POM 770/1 PTFE15, ALCOM POM 770/1 SLBV, TEDUR L 9404-3.2 (from Albis Plastic) • DELRIN 311 DP (from Dupont) S-N curves (Woehler lines) (root) have been added for 3 Kuraray plastics: • Genestar N1000A, Genestar N1001A, Genestar N1002A

The DAT plastic files now have endurance limit values for 3 calculation methods: VDI 2736, VDI 2545mod (YF-B) and VDI 2545mod (YF-C). For this reason, three plastics have been removed from the materials list: PBT, PA66 (VDI 2545) and POM (VDI 2545).

Σ

For some SABIC materials, the property data for Young's modulus, ultimate strength and yield strength were re-evaluated by anisotropic tests (2D isotropic data). This influences the results in static strength etc. The affected materials are Lubricomp OCL36A, EFL36, UCL36AS, UFL36AS, RCP36, RFL36 and RAL23.

Base Packages

Modules	Changes/Enhancements
ZPK	**Cylindrical gear basic package**

NEW! Load: A calculation that takes into account the relative speed of a planet carrier can now be performed for cylindrical gears, bevel gears, worm gears and crossed helical gears. Click on the plus button when you enter the speed in the load tab to input this data. This function is useful if you want to calculate one gear pair in an epicyclic gear configuration correctly (it is only shown if the gear calculation is opened through KISSsys).

Modifications: The definition of twist has been changed and now corresponds to the commonly used German GFT definition (refer to the figure in the help).

The angle value can be entered directly for pressure angle and helix angle modifications. To do this, select the individual items from the modifications list and enter the angle modification (in angular minutes) in the "Factor 1" column. The value in micrometers is then displayed as a comment.

Reference profile: The Reference profile tab for gear pairs now displays both gears next to each other again.

Coefficients, lengths and diameters can now be displayed in parallel in the Reference profile tab.

Simply click a button to copy the values from the reference profile of one gear to another gear. However, these values are not copied for pre-machining.

Calculation for single gears: The extended graphics settings have an option for entering the active tip and root diameters manually. These values are then displayed in the graphic so that the example form diameters of the active diameter can be compared visually.

WPK	**Basic shaft and bearing package**

Shaft editor: The zoom box, move and measure functions are now available both in the Shaft editor and in a new toolbar (displayed above the Shaft editor).

NEW! Cylinder elements can be edited by moving their grid points, which means you can now use the mouse to modify their length and diameter.

NEW! A background drawing (.dxf) can be imported to compare a shaft in the Shaft editor with a design drawing. Additionally, grid lines can be displayed.

The oil level can either be hidden or displayed in the Shaft editor, irrespective of whether it is being taken into account in the calculation.

If the force and bearing elements can be moved, the cursor now appears as a double arrow icon.

Elements tree: You can display or delete any of the shafts in the Elements tree (right-click in the empty field in the Elements tree). You can also copy or add a shaft.

A cylinder element can be sub-divided or converted into a conus (right-click on the cylinder element in the Elements tree or in the Shaft editor).

NEW! Different views can now be set to display the data in the Elements tree, for example, display only geometries, forces or bearings.

The shafts displayed in the Shaft editor can be expanded or summarized (click on the icons in the bottom right-hand corner of the Elements tree).

The shafts displayed in the Shaft editor can be hidden individually or simply displayed as single shafts (right-click on the shaft in the Elements tree).

The number of documentation points is no longer limited to 10. The values for normal stress and shear stress can also now be displayed in the documentation points.

NEW! The toolbar on the right-hand of the Shaft editor has been replaced by an element box which provides fast access to all the elements, notch effects etc.

Elements list: You can delete a selected element from the Elements list (minus sign in the bottom right-hand corner). Shafts can also be hidden or displayed.

NEW! Force elements: Multiple contacts can now be defined for the gear force element. As a result, you no longer need to add more than one force element for planetary stages, for example, for the sun wheel.

The angular position of eccentric mass can also be entered for the additional mass force element.

NEW! Plain bearing: The plain bearing has been added as a new bearing type, available both as an individual bearing element and as a connecting bearing element.

Grease lifetime: The estimation of grease lifetime is calculated and output. The methods according to Schaeffler and SKF have been implemented (enable these in "Module-specific settings – rolling bearing").

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Shaft calculation: The calculation of cylindrical shafts using the linear calculation method can now be performed irrespective of the number of nodes. Shaft calculations are now faster thanks to the faster Solver and the reduction in the amount of memory required.

Bearing lifetime calculation, classical: Bearing clearance class C5 has been added for a number of bearing types.

The bearing clearance classes from DIN 620:1988 have been harmonized with ISO 5753 (2009 or 2010 edition).

Axial stiffness can now be predefined in the classical bearing calculation method, in the same way as radial and tilting stiffness. Checkboxes have also been implemented to control whether damping values are displayed.

NEW! The new "Service life factors (classic)" report is a detailed list of the individual parameter values for bearing service life.

Graphic: In addition to displaying forces, the "3D deformation display (bending)" graphic now includes torques. The toothing is displayed with curved flanks.

MPK	**Haft-hub connections**
	Splines: Standard DIN 5480-2 has been updated to its 2015 edition.
	Press fit: DIN 7190-1 and DIN 7190-2 have been updated to their 2017 editions.
APK	**Coupling:** In a new feature, both "coupling" and "brake" types can be defined as opening or closing systems. This affects the effective direction of the spring forces (see graphic in the Help).
FPK	**NEW! Springs:** Conical compression springs have been implemented according to the "Metal springs" technical literature. In the current "Compression springs" module, you can now either select a cylindrical compression spring or a conical compression spring. Right: F6

System Modules

KISSsys

Modules	Changes/Enhancements
SYS	**KISSsys**
	Housing: New housing dimensions can be sized for rectangular and cylindrical shapes, after the gear unit design has been changed.
	NEW! Interface to GEMS®: Data can be exchanged between GEMS® (Gleason's bevel gear manufacturing and analysis software) and KISSsys. It is now possible to export and import bevel and hypoid gear geometry data and displacements under load. The results of the GEMS® contact analysis can then be displayed in KISSsys. This interface can be accessed with the CD3 module (see "Interfaces for data exchange").
	Template for load spectra: The results for each load stage can be exported and stored in user-specific Excel files. This means load stages, for example, deviations in rotational error over different torques etc., can now be evaluated individually.
	Template for additional results: The cost calculation process is now integrated in the template. Rolling bearing costs can now be entered as price/kg and type.
	Template for settings: You can now add your own variables to the "Settings table" and so control them for the entire drive train in KISSsys.
	NEW! Template for bevel gear displacements: EPG or VHJ bevel gear displacements are determined based on the shaft deformations and displayed in the template.
	Shaft sizing: You can now size all the shafts in the entire gear unit in a single step.
	Torque distribution: Up to now, if you were working with power-split gear units, the torque had to be distributed manually. This can now be performed automatically with the "Powersplit" function.
	KISSsys elements: Plain bearing and connecting plain bearing elements have been added to KISSsys. You can now predefine damping values for each type of bearing elements.
GPK	**Gearbox calculation package**
	GPK models: GPK models have been updated with the latest template in the 2018 release.

KISSsys Expert Modules

Modules	Changes/Enhancements
KS3 **NEW!**	**Modal analysis for shaft systems:** A fee will be charged for modal analysis from Release 2018 onward. Beta versions of other functions, such as the Campbell diagram and forced vibration, will continue to be free of charge. Right: K11i1
KS10	**Interface to MSC:** Gear teeth modifications are exported from KISSsys and written to MSC files.

Reliability

Modules	Changes/Enhancements
KLR	**Reliability:** The Weibull shape parameters and the coefficient for failure free time can be predefined in the gear and shaft calculations. Different values for ball bearings, roller bearings and shafts can be predefined in the shaft calculation. You enter these values in the module-specific settings.

Expert Modules for Gears

Cylindrical gears

Modules	Changes/Enhancements
ZA3	**Rough sizing:** You can also input the ratio in the rough sizing for planetary stages using the ratio of numbers of teeth (Z3/Z1).

Strength calculation methods

Modules	Changes/Enhancements
ZA19	**Strength calculation according to DNV:** DNVGL-CG-0036 (2015) has been added to DNV 41.2 (2012). The DNVGL-CG-0036 edition is identical to DNV 41.2

Contact analysis

Modules	Changes/Enhancements
ZA30 ZA34	**Contact analysis for cylindrical gears and planetary gears:** Σ Improved calculation of tooth thickness (swn and swnMax) and of the decrease in stiffness toward Σ the edges of helical gear teeth. The contact analysis now takes the **real face width** of both gears into account. However, some of the tooth width-specific graphics in the contact analysis may return different results. The Hertzian pressure and root stress graphics are now displayed separately for gear 1 and gear 2. The root stress calculation is now using the tooth bending and tilting force instead of the normal force. This is due to an improvement of the contact analysis model: The tooth bending and tilting force is now available through the complete facewidth of each gear individually, while the normal force was only available for the common facewidth. **Iterative wear calculation:** The tooth form's smoothing amount can now be modified in the module-specific settings/contact analysis. **NEW! Excitation force:** Excitation force can now be calculated according to FVA-No. 487, in the contact analysis. The values for min/max/mean/delta/stdabw are displayed in the results window and in the report. You can also display the progress of the values as a graphic.
ZA33	**Modification sizing:** The Conditions I tab now displays the partial load for the KHb calculation and contact analysis.

Bevel gears

Modules	Changes/Enhancements
ZC1	**Bevel gears geometry: NEW!** The conversion used in Gleason Dimension Sheets can now also be applied to Type 3 (Klingelnberg or Oerlikon). The tooth thickness at the tip in the middle of the facewidth (mean topland, tINP & tNLG according to AGMA929-A06) is calculated. **Tolerances:** In the dropdown list of the tooth thickness tolerance new entries are implemented, which result in backlash according to Gleason (based ion AGMA) and Klingelnberg (based on Klingelnberg book). The tooth thickness tolerances according to ISO 23509-C.3 are modified, so that the minimum outer normal backlash is achieved exactly.

Modules	Changes/Enhancements
ZC2, ZC9	**ISO 10300-20: NEW!** Function implemented for calculating scuffing on bevel and hypoid gears (draft 2017-12-12).
ZC30	**Bevel gear contact analysis: NEW!** Excitation force can now be calculated according to FVA-Nr. 487, in the contact analysis process. The values for min/max/mean/delta/stdabw are displayed in the results window and in the report. You can also display the progress of the values as a graphic. Contact analysis of bevel gears is considering change in meshing tooth form along facewidth due to V, H, J and ΔΣ. This improves accuracy of results.

Tooth form calculation

Modules	Changes/Enhancements
ZY6	**Manufacturing twist: NEW!** The new "twist due to manufacturing process" modification simulates the twist created by generation grinding of helical gears with crowning. You can now specify the Cb value for the crowning when you select "deviation error of axis caused by manufacturing" in the list of modifications.

Other gear-specific modules

Modules	Changes/Enhancements
ZZ1	**Calculation of equivalent torque according to ISO 6336-6, Annex A1: NEW!** The equivalent torque is always calculated and reported, when load spectra are selected. Additionally, the micropitting safety is calculated using the equivalent torque (enable these in "Module-specific settings"). Classification according to F.E.M. (Edition 1.001, 1998) is calculated and reported.
ZZ5	**Calculate measurement grid: NEW!** A measurement grid is calculated and displayed for worms and globoid worm wheels.
ZZ6	**Plastics Manager:** The characteristic values of existing materials can now also be imported and modified (click on "Calculation – Import material data"). Different wear coefficients can be determined for oil lubrication, grease lubrication or dry running. When you generate the materials file (properties for plastic), you can now specify where it is to be saved. Σ Properties for plastic are calculated differently for the VDI 2736, VDI 2545mod (YF-B) and VDI 2545mod (YF-C) calculation methods and saved to the material file.
ZZ7 **NEW!**	**Effective normal backlash based on the exact tooth form:** This calculates the effective normal backlash for each point of contact for pitch based on the exact tooth form and shaft misalignment (needs ZA35). This calculation is especially important for the watch-making industry, and for special tooth forms (cycloid, arc of circle or tooth form via DXF). The minimum and maximum values for backlash are documented in the results window and in the report (section 6). To display a graphic of the backlash curve along the length of path of contact, click on "Evaluation – backlash with actual toothform". To enable this calculation, click on "Module specific settings – Calculations". Right: Z19v

Expert Modules for Shafts and Bearings

Shafts

Modules	Changes/Enhancements
WA1	**Coaxial shafts:** The maximum number of shafts is no longer limited to 30. The stress ratio R can be defined separately for each shaft (to enable this function, click on the "Strength" tab and input the R values for the particular shaft in the Element editor). **NEW! Bearing with internal geometry:** You can now predefine the number of rolling bodies when approximating internal geometry (click on the "Internal geometry" tab in the database). This value is considered when approximating the remaining parameters. The internal geometry method can now also be used to calculate deep groove ball bearings (double row) and axial angular contact roller bearings. Radial bearing can be calculated either with or without an inner or outer ring (enable this function in the database).
WA11	**Forced vibration:** You can now compensate for imbalances by defining the angular position in the "eccentric mass" force element.

Other shaft-specific modules

Modules	Changes/Enhancements
DPK	**NEW! Gear body deformation:** Gear body geometry is also now available for inclined webs. You can display the gear body in a preview, and then check it independently of the FE calculation.

Interfaces for Data Exchange

Modules	Changes/Enhancements
CD1 NEW!	**GDE exchange format:** GDE (Gear Data Exchange, XML format, VDI 2610: 2014) export available under special reports for cylindrical gears. Right: K5f
CD2 NEW!	**GAMA exchange format:** GAMA (Gleason Automated Measurement and Analysis) export is now available under special reports for cylindrical gears. Right: K5g
CD3 NEW!	**Interface to GEMS®:** Data can be exchanged with GEMS® (Gleason's bevel gear manufacturing and analysis software) via KISSsys. It is now possible to export and import bevel and hypoid gear geometry data and misalignments due to workload. The results of the GEMS® contact analysis can then be displayed in KISSsys. Right: K11k6