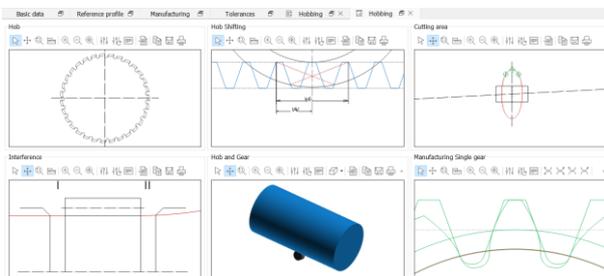


## KISSsoft for Manufacturing

### Process for hobbing

- Cutting process for hobbing
- Sizing functionalities for hobs

Process analysis for hobbing with specification of the hobbing cutter geometry, cutting process (infeed strategy, cutting speed) and interference check. Calculated results are processing time, tool costs per part, feed mark depth and maximum chip thickness.



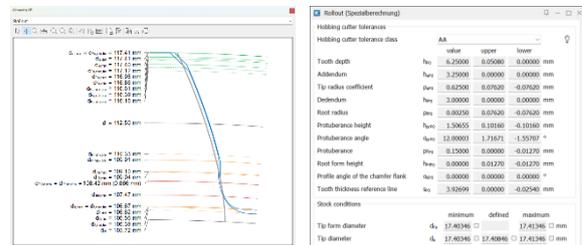
Sizing of the hob is available with consideration of shaft interference, shortest processing time and others. Additional sizing functionalities are implemented such as calculation of smallest hob width, maximum chip thickness and feed mark depth.

### Roll out Analysis

- Analysis of tolerances using Roll out
- Calculation of root form circles

The roll out functionality allows the analysis of the root form circle taking into account various tolerance fields of the final machining stock and hobbing cutter.

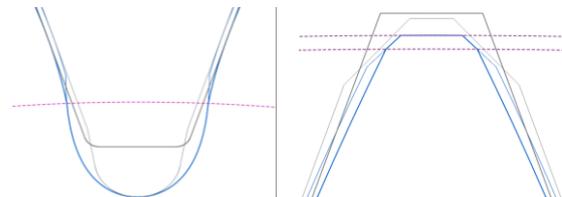
Especially for tools using semi-topping and protuberance, it is important to verify the tolerances, to detect if grinding notches may occur or if the tip chamfer will be sufficient after hard finishing.



### Protuberance and tip chamfer

- Define grinding stock for hard finishing
- Size protuberance and tip chamfer

Based on the required grinding stock, the appropriate protuberance at the tool can be calculated. When a protuberance is applied, an increased root fillet radius can be achieved.



Creating a gear chamfer during premanufacturing requires a separate tool. The angle and size of tooth tip chamfer can be defined in KISSsoft® based on the required tip form circle, considering different tolerance conditions.

### Database for hobs & shaper cutters

- Select tool designs from a database
- Save tool designs in the database

Existing tool designs can be imported into the KISSsoft database to determine whether they can be re-used. This functionality is available for hobs and shaper cutters.



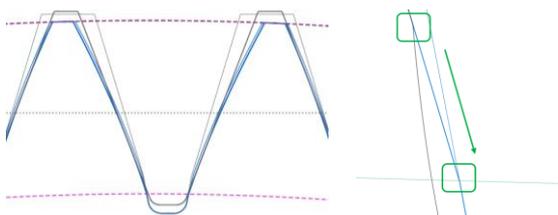
The tools in the database can be checked to see whether the dimensions are within permissible deviations and are therefore suitable for reuse. The permissible deviations can be specified individually for the parameters of engagement angle, head height, head radius and many more.

If a new tool is required, the reference profile data can be exported and added to the database. With the click of a button, a request for a new tool can be sent to Gleason.

### Tools with a modified pressure angle

- Calculate the tool module and pressure angle
- Analyze the root rounding and root form circle

Tools with a modified pressure angle and module are widely used for soft and hard machining.



This results in an improved tool life and optimized root form circle to achieve highest contact ratio.

In KISSsoft, the tool module and pressure angle are converted to achieve the same base circle pitch. The generated root form circles and root roundings can be graphically displayed and checked for potential meshing interference.

### Grinding tools

- Determine the minimum necessary grinding depth
- Profile and threaded wheel grinding

At the click of a button, the grinding tool addendum can be calculated for different grinding process requirements such as the minimum required active root diameter, maximum root form diameter, grinding of root land, etc.



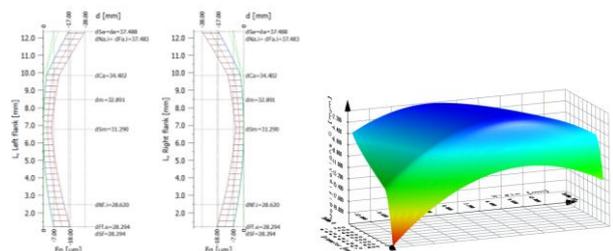
Both grinding processes – profile and threaded wheel grinding – are simulated in KISSsoft and the resulting root rounding is graphically displayed.

### Profile & lead modifications

- Profile, lead and combined modifications
- Display K-diagrams

In KISSsoft, various modification types in profile and lead direction can be defined, such as tip and root relief with different transition types, end relief, twist, etc., and even topological modifications.

The gear modifications for left- or right-hand flanks can be defined independently of each other, to ensure an optimum drive or coast side meshing performance.



The modifications and tolerance ranges for profile and lead are displayed in K-diagrams. Combined modifications are displayed in detailed 3D graphics.

### Dressing disc & modifications

- Use existing dressing discs
- Compare profile modifications of dressing discs

KISSsoft checks whether an existing dressing disc can be used, reducing tool cost and lead time.

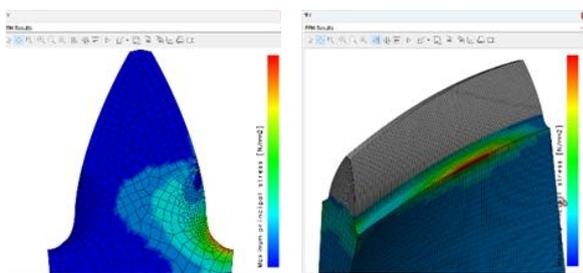


The resulting gear modifications such as tip relief or pressure angle modifications, including tolerances, are displayed in a profile diagram. These can be compared with the initial designed modifications and assessed for deviations in noise excitation.

### Root rounding & tooth root stress

- Grinding notch analysis
- Stress concentration in the tooth root

To identify stress concentration, an FEM calculation is used to analyze the tooth root stress present for root rounding or grinding notches.

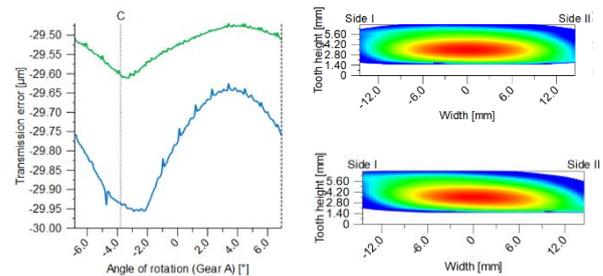


A 2D FEM calculation is sufficient to determine the tooth root stress caused by grinding notches. A 3D FEM calculation is recommended if the influence of a flank modification is to be taken into account.

### Natural twist

- Simulation of twist created by threaded wheel grinding
- Use of LTCA to analyze noise excitation

Natural twist occurs during threaded wheel grinding of helical cylindrical gears with crowning. This twist is simulated in KISSsoft and rated with the loaded tooth contact analysis (LTCA).

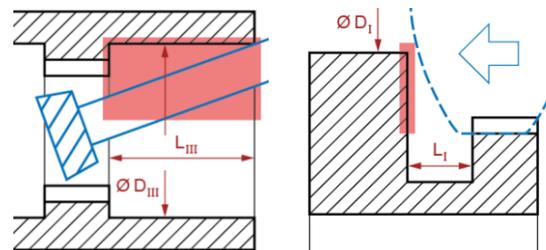


The loaded tooth contact analysis shows the behavior under load, such as stress distribution and contact pattern. The transmission error (PTE) is used to analyze the noise excitation of gears.

### Power Skiving & honing

- Check tool overtravel
- Tool shaft collision with the gear shoulder

KISSsoft analyzes the possibility of the tool colliding with the workpiece, on the basis of the cross-axis angle and tool diameter, shaft contour or internal shaft diameter.



For outer gears the collision check is done between the tool front side and the shaft contour. For internal gears, the collision check is done between the tool shank and the shaft bore diameter.

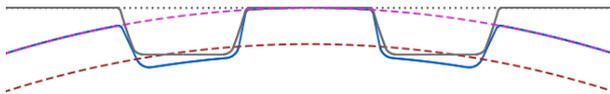
For a detailed analysis, the verification for a potential collision by Gleason is recommended.

### Non-involute gear teeth

- Import non-involute gear profiles
- Create tool profile for generating cutting processes

The tooth forms for non-involute gears can be imported in 2D DXF format or created directly in KISSsoft. Tooth forms include straight flank, cycloid or sprocket profile.

KISSsoft verifies the feasibility using generating cutting processes and calculates the tool reference profile or specific tool form.

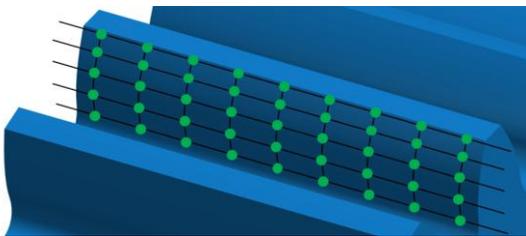


The tool's reference profile or specific tool form can be exported in 2D DXF format and used for the tool's manufacture.

### Measurement grid data

- Generate measurement grid data
- Export data in GDE or GAMA™ format

To control a Coordinate Measuring Machine, the measurement grid data and the normal vectors for the tooth flank are exported from KISSsoft.



GAMA formats can be used for quick and secure data transfer between KISSsoft and a Gleason metrology system. GAMA enables the transfer of macro geometry data of cylindrical gears directly to the metrology system.

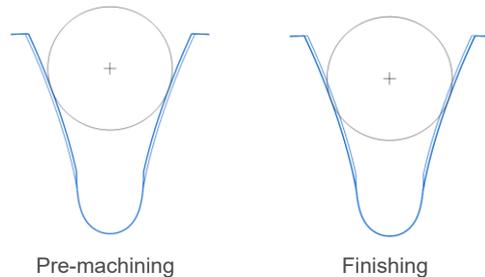
The export format for GDE is defined in the VDI/VDE 2610 guideline. This guideline provides an exact and unique method for describing gear geometry and manufacturing data.

### Tooth thickness allowance

- Calculate the base tangent length and measurement over pins
- Available for splines and deep tooth forms

The base tangent length or measurement over pins is required to measure the tooth thickness.

Using the tooth form analysis, these values can be calculated for every position on the tooth and machining step, even for non-involute gears.



A flattened measuring ball can be defined for spline profiles, to prevent the tooth root from being touched.

In the case of deep tooth forms, the ball or roller diameter is automatically calculated to take a correct measurement outside the tip circle.

### Master gears

- Use existing master gears
- Testing of complete active flank

For roll testing of a production gear and its active flanks meshing with the counter gear, the master gear is calculated. It is important that the master gear covers the full active flank of the production gear, but no interference e.g. in the tooth root area does occur.

A trial version is available upon request through under [www.kisssoft.com/en/products/trial-version](http://www.kisssoft.com/en/products/trial-version)