

Master gears

- Can we use an available master gear or is a new one required?
- Which area of the involute is checked?

Based on a given workpiece design and the required diameters to be in contact with a master gear, the suitability of a given master gear is checked. Alternatively, a new master gear design is calculated considering workpiece diameter tolerances. Master gears may then be used on Gleason and other testers.



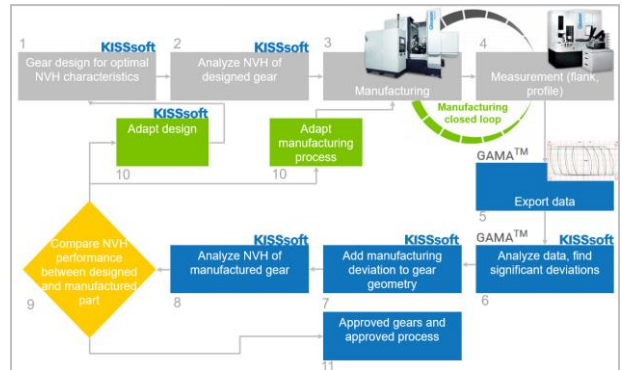
MASTER GEAR CALCULATION FOR DOUBLE FLANK TEST		(for Gear 1)
Check of introduced Master Gear with da	228.3600 mm	
Master gear:	[zM]	36.0000
	[Q]	3
	[betaM]	0.0000 °
	[dM]	216.0000 mm
	[xM]	0.0300
	[x.eM]	0.0254
	[x.iM]	0.0254
Data when pair gear/master gear is running (no backlash situation):		
Center distance	[aM in]	184.4047 mm
	[aM ax]	184.4956 mm
Restrictions for Master gear tip diameter da:		
Optimum diameter (for dNf of gear)	[daopt.e]	229.5148 mm
	[daopt.l]	229.2804 mm
Maximal diameter (for dFf of gear)	[damax]	230.5777 mm
Maximal diameter for tip clearance 0.0060 mm	[damax-cl]	231.0764 mm

Lower image: Calculated master gear properties for a given workpiece, considering tip and root form diameter tolerances.

Analysis of manufactured gears

Design-manufacture-measure

- What is the vibration characteristic of the machined gear compared to the designed gear?
- How do machining errors influence the contact pattern under load?



The design-manufacture-measure loop integrates KISSsoft, Gleason gear machines and metrology solutions. Machining errors may result in elevated noise levels or poor contact patterns in operation. To predict if the performance characteristics of a machined gear are satisfactory, the measured flank deviations are imported into KISSsoft. There, the designed and the measured geometry are analyzed (contact pattern under load, transmission error, force excitation, ...) and performance characteristics are compared in parallel. Based on this, the manufacturing process with its deviations may be approved or the need for a more accurate or stable process may be identified.

Root radius and tooth root stresses

- What is the stress concentration due to a grinding notch?
- How can we assess root stresses for non-trochoidal root shapes?

Gear root strength is usually assessed using applicable DIN, ISO or AGMA rating standards. However, in the case of nonstandard root shapes or grinding notches, a FEM calculation is required.

