Bevel gear modules

General

- Strength, life and reliability rating for nominal load and load spectrum
- Database for reference profile and tolerances
- Different geometry configurations with uniform tooth depth, constant slot width, modified slot width, different root and tip apex positions
- For spur, helical, zerol or spiral bevel gears
- Rough and fine sizing function, fine sizing function for modifications
- Calculation of measurement grid for Klingelnberg, Gleason or Zeiss gear tester

Strength rating

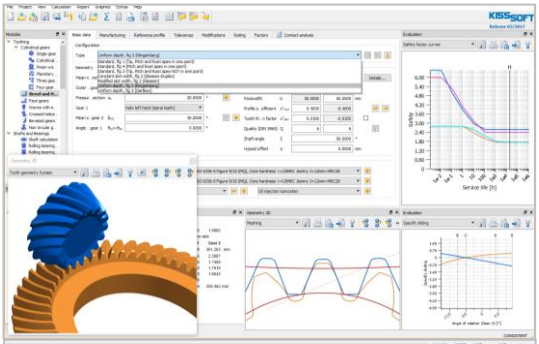
- Strength rating along ISO 10300, DIN 3991, AGMA 2003, KN3028 / KN3030 for Cyclo-Palloid gears and along KN3025 / KN3030 for Palloid gears
- Hypoid gear calculation along KN3029 / KN3030 for Cyclo-Palloid gears, KN3026 for Palloid gears, ISO 10300
- Plastic gear rating along VDI 2545 or Niemann, static strength rating and rating of differential planetary gears
- Efficiency along Wech, Niemann, ISO/TS 1300-20
- Flank breakage calculation along ISO/DTS 10300-4
- Scuffing rating along DIN 3990-4, ISO/TS 6336-20, ISO/TS 6336-21, ISO/TS 10300-21

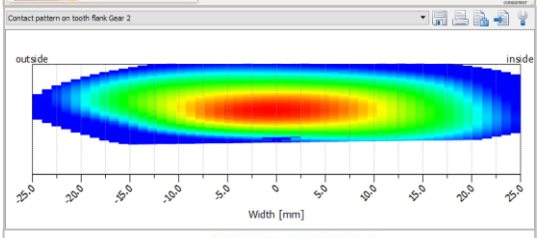
Manufacturing

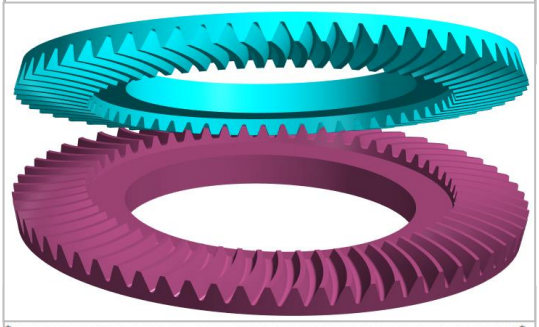
- For face hobbed or face milled gears
- Considering Klingelnberg machine list
- Accurate 3D gear geometry for CNC machining, based on planar involute geometry
- No load tooth contact analysis considering lead and profile modifications

No load tooth contact

- Calculated of loaded tooth contact with low load
- Considers all gear modifications
- Direct input of misalignment values
- For verification of contact patterns after manufacturing

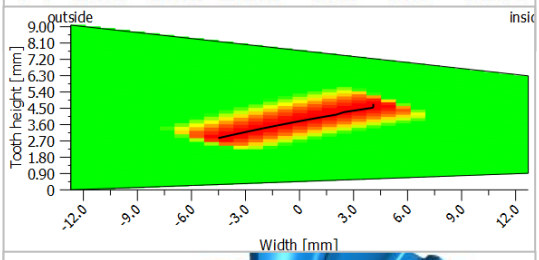






* PART # : 0.000.0 NUMBER OF TEETH % Z ! 8 *
* DIFF. ANG: % DEDI ! -20.0032 REF. PT.: ! (5, 8) *
* NUMBER COLUMNS: ! 9 NUMBER LINES: ! 10 *
* DATE: 05.03.2014 TIME: 10:26:14 UNITS: mm *

J	I	X	Y	Z	XN	YN	ZN	
1	1	34.1256	11.8662	-205.3563	0.9153	0.4028	0.0068	R
1	2	34.1795	14.4455	-205.0465	0.8878	-0.1792	-0.4238	R
1	3	34.8105	15.4836	-204.8064	0.7368	-0.4024	-0.5434	R
1	4	35.5667	16.2260	-204.5769	0.6011	-0.5315	-0.5968	R
1	5	36.3979	16.8016	-204.3525	0.4882	-0.6127	-0.6215	R
1	6	37.7523	17.5938	-204.0040	0.5665	-0.5585	-0.6060	F
1	7	40.3957	20.2943	-203.1895	0.7592	-0.3764	-0.5310	F
1	8	42.5707	23.7809	-202.3724	0.8536	-0.2428	-0.4608	F
1	9	44.2772	27.8776	-201.5733	0.9118	-0.1254	-0.3910	F
1	10	45.4751	32.4919	-200.8104	0.9469	-0.0177	-0.3211	F
2	1	34.1933	7.2546	-198.4391	0.9597	0.2808	0.0125	R
2	2	34.5644	9.7351	-198.1374	0.8600	-0.3018	-0.4114	R
2	3	35.3046	10.6591	-197.9031	0.6812	-0.5057	-0.5293	R



Loaded tooth contact analysis

- LTCA of spur, helical and spiral bevel gears
- For nominal load or with consideration of KA and Kv and for load spectrum
- Using slice model
- Line load distribution over whole face width (contact pattern under load)
- Momentary line load distribution as contact lines for different mesh positions

Bevel gear transmission error

- Loaded or non-loaded (lightly loaded) TE
- PPTE values
- FFT of transmission error

Further load distribution-based results

- Flash and contact temperature
- Scuffing safety factor
- Flank fracture safety factor
- Micropitting (adapted from cylindrical gear calculation)

Contact for misaligned systems

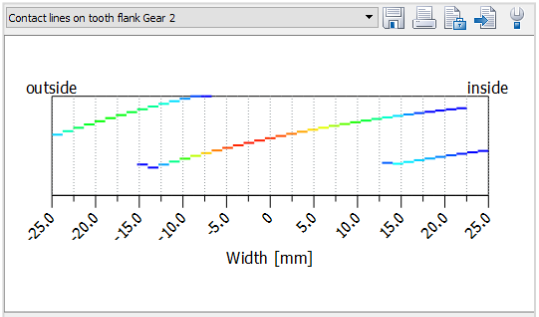
- Input of HGV misalignment
- Input of shaft angle deviation
- For drive and coast side
- Considering housing, bearing and shaft deformation

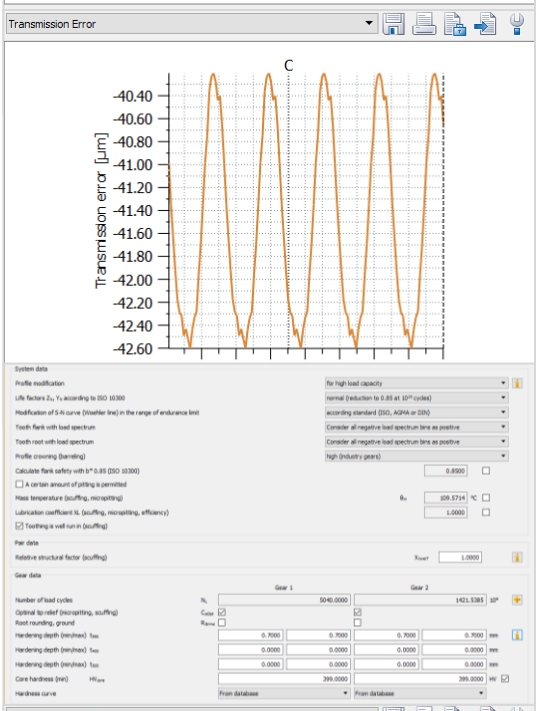
Tooth flank fracture calculation

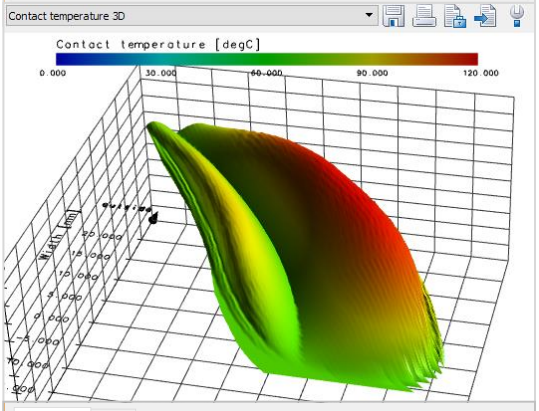
- Calculated hardness distribution
- Hardness distribution input from measurements
- Calculation along ISO/DTS 6336-4 and Annast

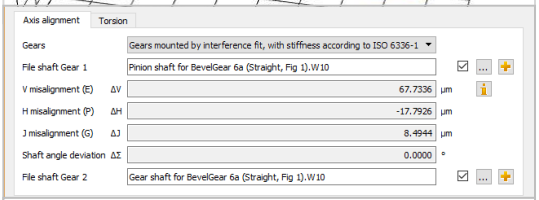
Differential gears

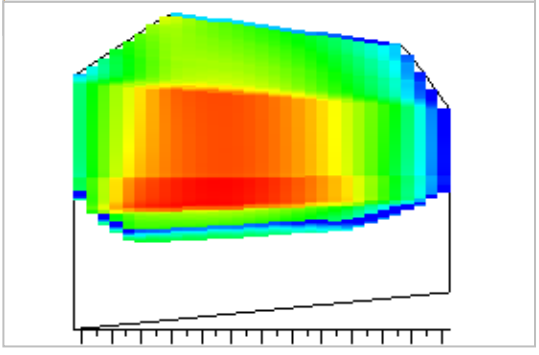
- Fine sizing of differential gears
- LTCA for spur gears with modifications











Gleason GEMS® – KISSsoft / KISSdesign interface

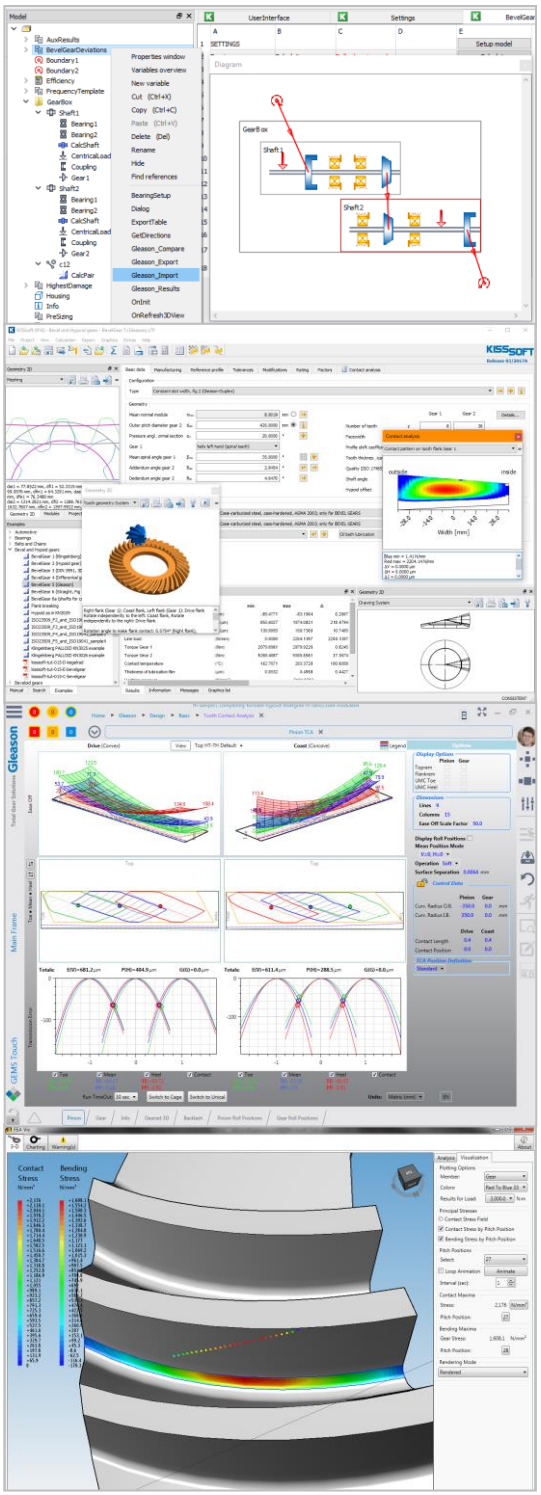
GEMS Gleason Engineering & Manufacturing System

KISSsoft Drivetrain Design Solutions

System Design Data Interface

Two software solutions, one common goal

- KISSdesign: Design, optimization and analysis of systems. Considering power losses, load spectra, housing deformation …
- GEMS®: Design, optimization and analysis of spiral bevel and hypoid gears, preparation of data for Gleason gear production machines
- KISSdesign: System deformation (EPG / VHJ values) for pinion and wheel considering housing, bearings, shafts.
- GEMS®: 2D / 3D LTCA including interactive root bending stress and contact stress output with S-N curves.
- Interface for gear data and displacement values between GEMS® and KISSdesign



Value proposition

- Improved customer experience, human efficiency and part quality by connecting system design, gear design and gear manufacturing software systems
- Closed loop to manage manufacturing process using GEMS® based on gears sized and designed in KISSsoft
- Gear micro geometry preliminary design in KISSsoft and final design in GEMS® / CAGE®
- Flank and root strength, scuffing resistance, micropitting safety, flank fracture risk and static strength calculation in KISSsoft

KISSsoft

- Flank and root strength, scuffing resistance, micropitting safety, flank fracture risk, life rating with LDD and static strength
- Rough and fine sizing, modifications sizing
- 3D geometry export

GEMS®

- Transfer data with, CAGETM®, UNICAL®, and common design software
- Import design data files from CAGE® and UNICAL
- Connect with GEMS® on-line via web app
- Generate data for blade grinding machines
- Closed loop to manage manufacturing process