KISSsoft

Bevel gear pair

S01 Bevel (ISO 10300 Sample 1 FM)

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Description	KISSsoft example
	Non commercial version for demo and support purposes only ! (914)
	KISSsoft Release 2024

Contents

1 Messages

Calculation is consistent.

Affects the inputs in the 'Process' tab:
The following generally applies: The pinion is manufactured by generation. The gear is manufactured by generation; if the gear ratio is higher than i = 2.5, most often the gear is manufactured by form cutting. Bevel gears according Cyclo-Paloid System (Klingelnberg): Pinion and gear are manufactured by generation.

2 Overview

Calculation method	Bevel gear ISO 10300:2023, Method B1
Drive side	
Geometry calculation according to method	1, ISO 23509:2016
Constant slot width, Figure 2, Gleason-Duplex	

Drawing or article number:
Gear 1: 0.000.0
Gear 2: 0.000.0

		------- Gear 1	---------- Gear 2 -------
Power (kW)	[P]	37.699	
Speed (1/min)	[n]	1200.0	430.8
Number of load cycles (in mio.)	[NL]	1440.000	516.923
Rotation direction, Gear 1, viewed on cone tip:		left	
Torque (Nm)	[T]	300.0	835.7
Application factor	[KA]	1.10	
Mesh load factor	[Kγ]	1.00	
Required service life	[H]	20000.00	
Gear driving (+) / driven (-)		+	-
Working flank Gear 1: Left flank			

3 Tooth geometry

		------- Gear 1	---------- Gear 2 -------
Hypoid offset (mm)	[a]	0.000	
Shaft angle (°)	[Σ]	90.0000	
Mean normal module (mm)	[mmn]	3.2133	
Mean normal diametral pitch (1/in)	[Pndm]	7.90461	
Normal pressure angle (°)	[αn]	20.0000	
Mean spiral angle (°)	[βm]	35.0000	
Hand of gear		left	right
Number of teeth	[z]	14	39
Facewidth (mm)	[b]	25.40	25.40
Assumed and measured contact pattern width (mm)	[be]	21.59	21.59
b_e/b =0.850, b_{veff} =21.590 mm, b_v =25.400 mm			
Accuracy grade according	ISO 17485 [Q]	6	8
Internal diameter gearbody (mm)	[di]	0.000	0.000
Pitch apex to front of gear blank (mm)	[yi]	66.086	29.616
Pitch apex to back of gear blank (mm)	[yo]	90.960	42.724

3.1 Misalignments

Mounting distance (mm)	[MD]	90.960	42.724
V misalignment (or E misalignment) (µm)	[ΔV]	0.000	
H misalignment (or P misalignment) (µm)	[ΔH]	0.000	
J misalignment (or G misalignment) (µm)	[ΔJ]	0.000	

4 Materials

Gear 1
Own input, 18CrNiMo7-6, Case hardening steel, case-hardened, ISO 6336-5 Figure 9/10 (MQ), core strength >=30HRC

Gear 2
Own input, 18CrNiMo7-6, Case hardening steel, case-hardened, ISO 6336-5 Figure 9/10 (MQ), core strength >=30HRC

		------- Gear 1	---------- Gear 2 -------
Surface hardness		HRC 61	HRC 61
Optimal quality and experience: Life factors Z_{NT} and Y_{NT} ≥ 1			
Infinite life strength for tooth root stress (N/mm²)	[σFlim]	480.00	480.00
Fatigue strength for Hertzian pressure (N/mm²)	[σHlim]	1500.00	1500.00
Young's modulus (N/mm²)	[E]	210000	210000
Poisson's ratio	[v]	0.300	0.300
Tensile strength (N/mm²)	[σB]	1200.00	1200.00
Yield point (N/mm²)	[σS]	850.00	850.00

4.1 Gear roughness

		------- Gear 1	---------- Gear 2 -------
Arithmetic mean roughness value R_a, flank (µm)	[RAH]	0.60	0.60
Arithmetic mean roughness value R_a, root (µm)	[RAF]	3.00	3.00
Mean peak-to-valley roughness R_z, flank (µm)	[RZH]	8.00	8.00
Mean peak-to-valley roughness R_z, root (µm)	[RZF]	16.00	16.00

4.2 Lubrication

Lubrication type	Oil injection lubrication	
Type of oil	ISO-VG 150	
Lubricant base	Mineral-oil base	
Oil nominal kinematic viscosity at 40°C (mm²/s)	[v40]	150.00
Oil nominal kinematic viscosity at 100°C (mm²/s)	[v100]	13.00
Specific density at 15°C (kg/dm³)	[ρ]	0.892
Oil temperature (°C)	[TS]	90.000

5 Tooth geometry

5.1 Reference profiles

Reference profile Gear 1

Reference profile, own input	1.25 / 0.25 / 1.0 ISO 53.2:1997 Profil C	
Dedendum coefficient	[hfP*]	1.250
Root radius factor	[ρfP*]	0.249
	[ρfPmax*]	0.420
Addendum coefficient	[haP*]	1.000
Tip radius factor	[ρaP*]	0.000
Protuberance height coefficient	[hprP*]	0.000
Protuberance angle	[αprP]	0.000
Tip form height coefficient	[hFaP*]	0.000
Ramp angle	[αKP]	0.000
	not topping	
Smallest radius of curvature, root rounding (mm)	[ρmin.e/i]	0.885 /0.885

Reference profile Gear 2

Reference profile, own input	1.25 / 0.25 / 1.0 ISO 53.2:1997 Profil C	
Dedendum coefficient	[hfP*]	1.250
Root radius factor	[ρfP*]	0.373
	[ρfPmax*]	0.550
Addendum coefficient	[haP*]	1.000
Tip radius factor	[ρaP*]	0.000
Protuberance height coefficient	[hprP*]	0.000
Protuberance angle	[αprP]	0.000
Tip form height coefficient	[hFaP*]	0.000
Ramp angle	[αKP]	0.000
	not topping	
Smallest radius of curvature, root rounding (mm)	[ρmin.e/i]	1.288 /1.288

5.1.1 Information on final machining

		Gear 1	Gear 2
Dedendum reference profile	[hfP*]	1.250	1.250
Tooth root radius reference profile	[ρfP*]	0.249	0.373
Addendum reference profile	[haP*]	1.000	1.000
Protuberance height coefficient	[hprP*]	0.000	0.000
Protuberance angle (°)	[αprP]	0.000	0.000
Tip form height coefficient	[hFaP*]	0.000	0.000
Ramp angle (°)	[αKP]	0.000	0.000
Type of profile modification:	none (only running-in)		
Tip relief by running in (µm)	[Ca L/R]	2.0 /2.0	2.0 /2.0

5.2 Basic data

		Gear 1	Gear 2
No modification at tip circle			
Overall transmission ratio	[itot]	-2.786	
Gear ratio	[u]	2.786	
Outer spiral angle (°)	[βe]	36.8458	36.8458
Mean spiral angle (°)	[βm]	35.0000	35.0000
Inner spiral angle (°)	[βi]	33.9456	33.9456
Pinion offset angle in axial plane (°)	[ζm]	0.0000	
Pinion offset angle in pitch plane (°)	[ζmp]	0.0000	
Offset in pitch plane (mm)	[ap]	0.000	
Outer normal module (mm)	[men]	3.6297	
Outer transverse module (mm)	[met]	4.5357	4.5357
Mean normal module (mm)	[mmn]	3.2133	
Mean transverse module (mm)	[mmt]	3.9227	3.9227
Inner normal module (mm)	[min]	2.7457	
Transverse module, inside (mm)	[mit]	3.3098	3.3098
Outer normal diametral pitch (1/in)	[Pnd]	6.99778	
Outer transverse diametral pitch (1/in)	[Ptd]	5.60000	5.60000
Mean normal diametral pitch (1/in)	[Pndm]	7.90461	
Mean transverse diametral pitch (1/in)	[Ptdm]	6.47507	6.47507
Sum of profile shift coefficients	[xhm1+xhm2]	0.0000	
Profile shift coefficient	[xhm]	0.5052	-0.5052
Undercut boundary	[xhmmin]	-0.3970	-8.6420
Tooth thickness modification coefficient	[xsm]	0.0364	-0.0550
Outer pitch diameter (mm)	[de]	63.500	176.893
Outer tip diameter (mm)	[dae]	75.326	178.287
Outer root diameter (mm)	[dfe]	58.105	172.105
Mean pitch diameter (mm)	[dm]	54.918	152.987
Mean tip diameter (mm)	[dam]	64.023	154.061
Mean root diameter (mm)	[dfm]	50.413	149.176
Inner pitch diameter (mm)	[di]	46.337	129.080
Inner tip diameter (mm)	[dai]	52.720	129.835
Inner root diameter (mm)	[dfi]	42.722	126.246
Outer addendum (mm)	[hae]	6.282	2.063
Mean addendum (mm)	[ham]	4.837	1.590
Inner addendum (mm)	[hai]	3.391	1.117
Outer dedendum (mm)	[hfe]	2.866	7.086
Mean dedendum (mm)	[hfm]	2.393	5.640
Inner dedendum (mm)	[hfi]	1.920	4.195
Outer whole depth (mm)	[he]	9.148	9.148
Mean whole depth (mm)	[hm]	7.230	7.230
Inner whole depth (mm)	[hi]	5.312	5.312
Outer working depth (mm)	[hew]	8.345	
Mean working depth (mm)	[hmw]	6.427	
Inner working depth (mm)	[hiw]	4.508	
Outer tip clearance (mm)	[ce]	0.803	0.803
Mean tip clearance (mm)	[cm]	0.803	0.803
Inner tip clearance (mm)	[ci]	0.803	0.803

Theoretical tip clearance (mm)	[c]	0.803	0.803
Effective tip clearance (mm)	[c.e/i]	0.803 /0.803	0.803 /0.803

5.3 Angles and distances

		------- Gear 1 ----------	Gear 2 -------
Pitch angle (°)	[δ]	19.7468	70.2532
Pitch angle	[δ]	19°44'49"	70°15'11"
Face angle (°)	[δa]	26.2402	72.3856
Face angle	[δa]	26°14'25"	72°23'8"
Addendum angle (°)	[θa=δa-δ]	6.4934	2.1324
Addendum angle	[θa=δa-δ]	6°29'36"	2°7'57"
Root angle (°)	[δf]	17.6144	63.7598
Root angle	[δf]	17°36'52"	63°45'35"
Dedendum angle (°)	[θf=δ-δf]	2.1324	6.4934
Dedendum angle	[θf=δ-δf]	2°7'57"	6°29'36"
Outer cone distance (mm)	[Re]	93.973	93.973
Mean cone distance (mm)	[Rm]	81.273	81.273
Inner cone distance (mm)	[Ri]	68.573	68.573
Characteristic values for sizing	[Re2/b2]	3.700	
	[b2/mmn]	7.905	
Crown to crossing point (mm)	[txo]	86.324	29.809
Front crown to crossing point (mm)	[txi]	63.394	22.117
Pitch apex beyond crossing point (mm)	[tz]	0.000	-0.000
Face apex beyond crossing point (mm)	[tzF]	-9.919	-1.506
Root apex beyond crossing point (mm)	[tzR]	2.090	3.999
Pitch cone outside to pitch apex (mm)	[ye]	88.447	31.750
Face cone outside to pitch apex (mm)	[yae]	86.324	29.809
Face cone inside to pitch apex (mm)	[yai]	63.394	22.117

5.4 Manufacturing

Manufacture process:	ground/hard-cut	
Spiral toothing		
Face milling (single indexing method)		
Cutter radius (mm)	[rc0]	114.30
Ratio involute/outer cone	[inv/Re]	1.58
Ratio involute/mean cone	[inv/Rm]	1.83

6 Virtual cylindrical gear toothing

6.1 Virtual cylindrical gear at midface

		------- Gear 1 ----------	Gear 2 -------
Normal module (mm)	[mn]	3.2133	
Transverse module (mm)	[mvt]	3.9227	
Normal pressure angle (°)	[αe,αvn]	20.0000	
Transverse pressure angle (°)	[αvt]	23.9568	
Helix angle at reference circle (°)	[βv]	35.0000	
Base helix angle (°)	[βvb]	32.6146	
Virtual center distance (mm)	[av]	255.577	
Working pressure angle (°)	[αvwt]	23.9568	
Number of teeth	[zv]	14.875	115.431
Gear ratio	[uv]	7.760	
Profile shift coefficient	[xv]	0.5052	-0.5052
Profile shift (mm)	[xv*mn]	1.6234	-1.6234
Generating profile shift coefficient	[xvE.e/i]	0.5052/0.5052	-0.5052/-0.5052
Theoretical tip clearance (mm)	[c]	0.803	0.803
Effective tip clearance (mm)	[c.e/i]	0.803 /0.803	0.803 /0.803
Reference diameter (mm)	[dv]	58.350	452.804
Base diameter (mm)	[dvb]	53.323	413.796
Tip diameter (mm)	[dva]	68.023	455.984
Tip form diameter (mm)	[dvFa]	68.023	455.984
Active tip diameter (mm)	[dvNa]	68.023	455.984
Operating pitch diameter (mm)	[dvw]	58.350	452.804
Root diameter (mm)	[dvf]	53.563	441.524
Root form diameter (mm)	[dvFf]	55.258	443.641

Active root diameter (mm)	[dvNf]	55.670	445.598
Reserve (dNf-dFf)/2 (mm)	[cF]	0.206	0.978
Normal tooth thickness at tip circle (mm)	[svan]	2.083	2.345
Normal tooth thickness at tip form circle (mm)	[svFan]	2.083	2.345
Virtual gear no. of teeth	[zvn]	25.594	198.613
Pitch on reference circle (mm)	[pvt]	12.324	
Base pitch (mm)	[pvbt]	11.262	
Transverse pitch on contact-path (mm)	[pvet]	11.262	

6.1.1 Contact ratios

Length of path of contact (mm)	[gva]	13.120
Virtual cylindrical gear toothing (ISO 10300:2023, Annex A):		
Referenced to facewidth	[bveff]	21.590
Transverse contact ratio	[εvα]	1.165
Contact ratio in normal section	[εvαn]	1.642
Overlap ratio	[εvβ]	1.227
Total contact ratio	[εvγ]	2.392

6.2 Contact lines

Auxiliary values for the tooth flank:				
Distance from center (mm)	[ft,fm,fr]	9.486	0.000	-9.486
Length of contact line (mm)	[lbt,lbm,lbr]	3.917	22.442	3.917
Related tooth contact area (mm)	[A*t,A*m,A*r]	1.277	17.626	1.277
Profile crowning (depth crowning): low	[e]	3.000		
Fractions of line load (%)	[flct,flcm,flcr]	6.330	87.340	6.330
Auxiliary values for the tooth root:				
Distance from center (mm)	[ft,fm,fr]	9.486	0.000	-9.486
Length of contact line (mm)	[lbt,lbm,lbr]	3.917	22.442	3.917
Angle of contact lines (°)	[βB]	13.4678		

7 General influence factors

7.1 Forces and circumferential speed

		Gear 1	Gear 2
Nominal circum. force at pitch circle (N)	[Fmt]	10925.3	10925.3
Nominal circumferential force of virtual cylindrical gear (N)	[Fvmt]	10925.3	
Drive side			
Axial force (N)	[Fa]	8840.3	1984.3
Radial force (N)	[Fr]	1984.3	8840.3
Normal force (N)	[Fnorm]	14193.3	14193.3
Axial force (%)	[Fa/Ft]	80.915	18.162
Radial force (%)	[Fr/Ft]	18.162	80.915
Remarks:			
Forces if rotation goes in opposite direction (coast-sided):			
Axial force (N)	[Fa]	-5560.0	7153.6
Radial force (N)	[Fr]	7153.6	-5560.0
Normal force (N)	[Fnorm]	14193.3	14193.3
Axial force (%)	[Fa/Ft]	-50.891	65.477
Radial force (%)	[Fr/Ft]	65.477	-50.891
Normal circumferential force on reference circle per mm (N/mm)			
	[w]	430.13 *	
$w = F_{vmt}/b_v$			
Circumferential speed reference circle (m/s)	[v]	3.45	3.45
Compound velocity in direction of tooth height (m/s)	[vΣvert]	2.80	
Sliding velocity in direction of contact lines (m/s)	[vgpar]	0.00	
Compound velocity (m/s)	[vΣ]	4.41	
Sliding velocity (m/s)	[vg]	0.00	

7.2 General

		Gear 1	Gear 2
Drive side			
Single stiffness (N/mm/µm)	[c']	14.00	
Meshing stiffness (N/mm/µm)	[cg]	20.00	
Single pitch deviation (µm)	[fp]	12.00	26.00

Running-in value y_α (µm)	[yα]	1.95
Reduced mass (kg/mm)	[mRed]	0.009
Resonance speed (min-1)	[nE1]	31686
Resonance ratio (-)	[N]	0.038
Subcritical range		

7.3 K factors

Dynamic factor	[Kv]	1.02
Cutter radius (mm)	[rc0]	114.30
Coefficient	[KF0]	1.00
Mounting factor	[KHβbe]	1.10
Face load factors		
- Flank	[KHβ]	1.65
- Tooth root	[KFβ]	1.65
- Scuffing	[KBβ]	1.65
Transverse load factors		
- Flank	[KHα]	1.16
- Tooth root	[KFα]	1.16
- Scuffing	[KBα]	1.16
Helical load factor for scuffing	[KBγ]	1.20
Application factor	[KA]	1.100

8 Calculation of tooth root strength (fracture)

		Gear 1	Gear 2
Calculation of tooth form coefficients according to method: B1 (ISO 10300-3:2023)			
Manufacture process: generated			
Calculation with drive side			
Calculated with profile shift coefficient	[x]	0.51	-0.51
Tooth form factor	[YF]	2.03	2.48
Stress correction factor	[YS]	2.02	1.71
Load application angle (°)	[αh]	31.53	20.56
Bending moment arm (mm)	[hFe]	6.41	6.14
(-)	[hFe*]	1.99	1.91
Tooth root thickness at critical cross section (mm)	[sFn]	7.42	6.90
(-)	[sFn*]	2.31	2.15
Root fillet radius at critical cross section (mm)	[ρF]	1.02	1.59
(-)	[ρF*]	0.32	0.50
Contact ratio factor	[Yε]	0.63	
Load distribution coefficient	[YLS]	0.87	
Effective facewidth (mm)	[bv]	25.40	25.40
Bevel gear factor, root	[YBS (YK)]	1.054	
Nominal stress at tooth root (N/mm²)	[σF0]	316.56	325.82
Tooth root stress (N/mm²)	[σF]	680.37	700.28
Permissible bending stress at root of Test-gear			
Notch sensitivity factor	[YδrelT]	1.010	0.997
Surface factor	[YRrelT]	0.972	0.972
Size factor, tooth root	[YX]	1.000	1.000
Life factor	[YNT]	1.000	1.000
$Y_{\delta relT} \cdot Y_{RrelT} \cdot Y_X \cdot Y_{NT}$		0.981	0.969
Alternating bending factor, mean stress influence coefficient			
	[YM]	1.000	1.000
Stress correction factor	[YST]	2.00	
$Y_{ST} \cdot \sigma_{Flim}$ (N/mm²)	[σFE]	960.00	960.00
Permissible tooth root stress (N/mm²)	[σFP]	942.01	929.84
Required safety	[SFmin]	1.40	1.40
Safety for tooth root stress	[SF=σFP/σF]	1.38	1.33

9 Calculation of flank strength (pitting)

		Gear 1	Gear 2
Normal force (N)	[Fn]	14193.32	
Normal force calculated without coefficient of friction			

Relative radius of curvature (mm)	[ρ.rel]	12.459	
Elasticity coefficient (√N/mm)	[ZE]	191.65	
Load distribution coefficient	[ZLS]	0.935	
Medium length of contact lines (mm)	[lbm]	22.44	
Projected m. length of contact lines (mm)	[lbm']	18.90	
Effective facewidth (mm)	[b=lbm]	22.44	
Mid-zone factor	[ZM-B]	0.916	
Nominal contact stress (N/mm²)	[σH0]	1168.50	
Effective contact stress (N/mm²)	[σH]	1713.07	
Hypoid factor	[Zhyp]	1.000	1.000
Bevel gear factor, flank	[ZKP]	1.200	
Lubricant coefficient for N_L	[ZL]	0.992	0.992
Speed factor at N_L	[ZV]	0.974	0.974
Roughness factor for N_L	[ZR]	0.930	0.930
Material hardening factor for N_L	[ZW]	1.000	1.000
Life factor	[ZNT]	1.000	1.000
Size factor (flank)	[ZX]	1.000	1.000
$Z_L \cdot Z_V \cdot Z_R \cdot Z_{NT} \cdot Z_X$		0.899	0.899
Limited pitting is permissible: No			
Permissible contact stress (N/mm²)	[σHP]	1617.80	1617.80
Required safety	[SHmin]	1.00	1.00
Safety factor for contact stress	[SH=σHP/σH]	0.94	0.94

10 Scuffing load capacity according to ISO/TS 10300-20:2021

10.1 Flash temperature-criteria

		------- Gear 1	---------- Gear 2 -------
Tooth mass temperature (°C)	[θMB]	109.73	
Lubrication coefficient for lubrication type	[XS]	1.200	
Surface roughness structure factor	[C_{RS}]	1.005 *	

*ISO 10300-20: $C_{RS}=1+(0.3 \cdot \mathrm{Sin}(\beta_b))^{\varepsilon}$, ε = 2.0 for ground surfaces

Calculation at critical point g_Y=7.96 mm			
Local coefficient of friction	[μ_Y]	0.096	
Maximum flash temperature (°C)	[θflamax]	150.48	
Scuffing temperature (°C)	[θS]	458.09	
Required safety	[SBmin]	2.000	
Margin of safety for scuffing, flash temperature	[SB]	2.163	

(Intermediate results are listed under “Special reports”)

11 Allowances for tooth thickness

		------- Gear 1	---------- Gear 2 -------
Tooth thickness tolerance		No allowance	No allowance
Tooth thickness allowance (normal section) (mm)	[Asn.e/i]	0.000 /0.000	0.000 /0.000
The following data apply on the middle of the facewidth (ISO 23509)			
Tooth thickness, arc, middle (mm)	[smn]	6.463	3.512
(mm)	[smn.e/i]	6.463 /6.463	3.512 /3.512
Tooth thickness, arc, middle (mm)	[smt]	7.890	4.288
(mm)	[smt.e/i]	7.890 /7.890	4.288 /4.288
Tooth thickness in reference circle, chord (mm)	[smnc]	6.456	3.512
(mm)	[smnc.e/i]	6.456 /6.456	3.512 /3.512
Chordal height from d_{am} (mm)	[hamc]	4.964	1.595
Tooth thickness, arc, Gleason (mm)	[stm.i]	7.890	4.288
Theoretical tooth thickness at tip, middle, AGMA 929 (mm)	[tLNP/G]	2.036	2.346

11.1 Backlash

		------- Gear 1	---------- Gear 2 -------
Circumferential backlash, middle (mm)	[jmt]	0.146 /0.146	
Circumferential backlash, outside (mm)	[jet]	0.169 /0.169	
Normal backlash, middle (mm)	[jmn]	0.112 /0.112	
Normal backlash, outside (mm)	[jen]	0.127 /0.127	

Axial displacement for the predefined backlash:			
Required backlash due to axial displacement (mm)	[Δj]	0.064	
Additional backlash per gear (mm)	[Δj1,2]	0.007	0.057
Required axial displacement per gear (mm)	[α1,2]	0.030	0.083
Backlash for the predefined axial displacement:			
Change of mounting distance (mm)	[α1,2]	0.100	0.100
Additional backlash per gear (mm)	[Δj1,2]	0.025	0.069

12 Toothing tolerances

		------- Gear 1	---------- Gear 2 -------
According to	ISO 17485:2006		
Accuracy grade	[Q-ISO17485]	6	8
Diameter (mm)	[dT]	58.70	151.63
Single pitch deviation (µm)	[fpT]	12.00	26.00
Total cumulative pitch deviation (µm)	[FpT]	43.00	95.00
Runout (µm)	[FrT]	34.00	76.00
Single flank composite, tooth-to-tooth (µm)	[fisT.e/i]	20.00 /0.00	33.00 /0.00
f_{isTmax}, f_{isTmin}: ISO 17485:2006, Table B1, q=2			
Single flank composite, total (µm)	[FisT]	63.00	128.00

13 Modifications and determination of the tooth form

13.1 Data for the tooth form calculation

Data not available.
Please run the calculation in the "Tooth form" tab and open the main report again.

14 Supplementary data

14.1 Input data for calculating the gear dimensions according to ISO 23509:2019

Type 1 data, according to table 3, ISO 23509:
x_{hm1}=0.5052, k_{hap}=1.0000, k_{hfp}=1.2500, x_{smn}=0.0364

Type 2 data, according to table 3, ISO 23509:
c_{ham}=0.2474, k_d=2.0000, k_c=0.1250, k_t=0.0728

14.2 Gear power loss and coefficient of friction

ISO/TS 10300-20:2021:		
Gear power loss (kW)	[PVZ]	0.702
Average coefficient of friction	[μ_m]	0.093
The coefficient of friction μ_m can vary depending on calculation method.		
Meshing efficiency (%)	[ηz]	98.137

14.3 Masses and moment of inertia

		------- Gear 1	---------- Gear 2 -------
Weight - approximate calculation with pitch cone (kg)	[m]	0.478	2.617
Moment of inertia			
Approximate calculation with pitch cone (kg*m²)	[J]	1.9112e-04	1.0027e-02

15 Service life, damage

Required safety for tooth root	[S_{Fmin}]	1.4000
Required safety for tooth flank	[S_{Hmin}]	1.0000
Required service life	[H]	20000.0000
Service life (calculated with required safeties):		
System service life (h)	[H_{att}]	37.8217

		------- Gear 1	---------- Gear 2 -------
Tooth root service life (h)	[H_{Fatt}]	37.82	73.09

Tooth flank service life (h)	[H_{Hatt}]	325.9	907.8

15.1 Damage

Damage relative to the required service life (H, 20000.0 h)

F_1 (%)	F_2 (%)	H_1 (%)	H_2 (%)
9999.9999	9999.9999	6137.2180	2203.1039

Damage relative to the system service life (H_{att}, 37.8 h)

F_1 (%)	F_2 (%)	H_1 (%)	H_2 (%)
100.0000	51.7449	11.6060	4.1663

16 Remarks

16.1 Conventions

- Specifications with **.e/i** mean: Maximum value **.e** and Minimum value **.i**, taking all tolerances into account.
- Specifications with **.m** mean: Mean value within tolerance.

- The positive sign set for the apexes (t_{zF}, t_{zR}) means: apex before the center line, according to ISO 23509.

16.2 Calculations and factors

K_v, $K_{H\alpha}$, $K_{F\alpha}$ according to Method B
$K_{H\beta}$, $K_{F\beta}$ according to Method C
$Y_{\delta rel}$, Y_R according to Method B1
Z_L, Z_V, Z_R according to Method B
The logarithmically interpolated value must be entered for factors Z_L, Z_V, Z_R, Z_W, Z_X, $Y_{\delta relT}$, Y_{RrelT} and Y_X. This value is calculated from the infinite life strength and static strength values, based on the number of load cycles.

End of report (lines: 563)