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File

Name : Rear powertrain
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CALCULATION OF A CYLINDRICAL SPUR GEAR PAIR

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

Calculation method ISO 6336:2006 Method B

		------- GEAR 1	-------- GEAR 2 --
Power (kW)	[P]	25.143	
Speed (1/min)	[n]	4420.0	826.8
Torque (Nm)	[T]	60.0	320.4
Application factor	[KA]	1.18	
Required service life	[H]	100.00	
Gear driving (+) / driven (-)		+	-

1. TOOTH GEOMETRY AND MATERIAL

(geometry calculation according to DIN 3960:1987)

		------- GEAR 1	-------- GEAR 2 --
Center distance (mm)	[a]	104.000	
Centre distance tolerance	ISO 286:2010 Measure js7		
Normal module (mm)	[mn]	1.2500	
Pressure angle at normal section (°)	[alfn]	20.0000	
Helix angle at reference circle (°)	[beta]	0.0000	
Number of teeth	[z]	26	139
Facewidth (mm)	[b]	18.00	18.00
Hand of gear		Spur gear	
Accuracy grade	[Q-ISO 1328:1995]	6	6
Inner diameter (mm)	[di]	0.00	0.00
Inner diameter of gear rim (mm)	[dbi]	0.00	0.00

Material
Gear 1: (Own input) 31CrMoV9, Case-carburized steel, nitrided
ISO 6336-5 Figure 9/10 (MQ), core strength >=25HRC Jominy J=12mm<HRC28
Gear 2: (Own input) 31CrMoV9, Case-carburized steel, case-hardened
ISO 6336-5 Figure 9/10 (MQ), core strength >=25HRC Jominy J=12mm<HRC28

		------- GEAR 1	-------- GEAR 2 --
Surface hardness		HRC 62	HRC 61
Material quality according to ISO 6336:2006 Normal (Life factors ZNT and YNT >=0.85)			
Fatigue strength. tooth root stress (N/mm²)	[sigFlim]	420.00	430.00
Fatigue strength for Hertzian pressure (N/mm²)	[sigHlim]	1250.00	1250.00
Tensile strength (N/mm²)	[Rm]	900.00	900.00
Yield point (N/mm²)	[Rp]	700.00	700.00
Young's modulus (N/mm²)	[E]	206000	206000
Poisson's ratio	[ny]	0.300	0.300
Mean roughness, Ra, tooth flank (µm)	[RAH]	0.60	0.60
Mean roughness height, Rz, flank (µm)	[RZH]	4.80	4.80
Mean roughness height, Rz, root (µm)	[RZF]	20.00	20.00

Tool or reference profile of gear	1 :		
Reference profile	1.25 / 0.38 / 1.0 ISO 53.2:1997 Profil A		
Dedendum coefficient	[hfP*]		1.250
Root radius factor	[rhofP*]		0.380
Addendum coefficient	[haP*]		1.000
Tip radius factor	[rhoaP*]		0.000
Tip form height coefficient	[hFaP*]		0.000
Protuberance height factor	[hprP*]		0.000
Protuberance angle	[alfprP]		0.000
Ramp angle	[alfKP]		0.000
		not topping	

Tool or reference profile of gear	2 :		
Reference profile	1.25 / 0.38 / 1.0 ISO 53.2:1997 Profil A		
Dedendum coefficient	[hfP*]		1.250
Root radius factor	[rhofP*]		0.380
Addendum coefficient	[haP*]		1.000
Tip radius factor	[rhoaP*]		0.000
Tip form height coefficient	[hFaP*]		0.000
Protuberance height factor	[hprP*]		0.000
Protuberance angle	[alfprP]		0.000
Ramp angle	[alfKP]		0.000
		not topping	

Summary of reference profile gears:

Dedendum reference profile (in module)	[hfP*]	1.250	1.250
Root radius reference profile (in module)	[rofP*]	0.380	0.380
Addendum reference profile (in module)	[haP*]	1.000	1.000
Protuberance height coefficient (in module)	[hprP*]	0.000	0.000
Protuberance angle (°)	[alfprP]	0.000	0.000
Tip form height coefficient (in module)	[hFaP*]	0.000	0.000
Ramp angle (°)	[alfKP]	0.000	0.000

Type of profile modification:
none (only running-in)

Tip relief (µm)	[Ca]	2.0	2.0

Lubrication type		oil bath lubrication
Type of oil		Oil: ISO-VG 320
Lubricant base		Mineral-oil base
Kinem. viscosity oil at 40 °C (mm²/s)	[nu40]	320.00
Kinem. viscosity oil at 100 °C (mm²/s)	[nu100]	22.00
FZG test A/8.3/90 (ISO 14635-1:2006)	[FZGtestA]	12
Specific density at 15 °C (kg/dm³)	[roOil]	0.900
Oil temperature (°C)	[TS]	70.000

		------- GEAR 1 --------	GEAR 2 --
Overall transmission ratio	[itot]	-5.346	
Gear ratio	[u]	5.346	
Transverse module (mm)	[mt]	1.250	
Pressure angle at pitch circle (°)	[alft]	20.000	
Working transverse pressure angle (°)	[alfwt]	21.285	
	[alfwt.e/i]	21.310 /	21.260
Working pressure angle at normal section (°)	[alfwn]	21.285	
Helix angle at operating pitch circle (°)	[betaw]	0.000	
Base helix angle (°)	[betab]	0.000	

Reference centre distance (mm)	[ad]	103.125	
Sum of profile shift coefficients	[Summexi]	0.7218	
Profile shift coefficient	[x]	0.5050	0.2168
Tooth thickness (Arc) (module) (module)	[sn*]	1.9384	1.7286
Tip alteration (mm)	[k*mn]	-0.027	-0.027
Reference diameter (mm)	[d]	32.500	173.750
Base diameter (mm)	[db]	30.540	163.272
Tip diameter (mm)	[da]	36.209	176.738
(mm)	[da.e/i]	36.209 / 36.199	176.738 / 176.728
Tip diameter allowances (mm)	[Ada.e/i]	0.000 / -0.010	0.000 / -0.010
Tip form diameter (mm)	[dFa]	36.209	176.738
(mm)	[dFa.e/i]	36.209 / 36.199	176.738 / 176.728
Active tip diameter (mm)	[dNa.e/i]	36.209 / 36.199	176.738 / 176.728
Operating pitch diameter (mm)	[dw]	32.776	175.224
(mm)	[dw.e/i]	32.781 / 32.770	175.254 / 175.195
Root diameter (mm)	[df]	30.637	171.167
Generating Profile shift coefficient	[xE.e/i]	0.4457/ 0.4127	0.1124/ 0.0574
Manufactured root diameter with xE (mm)	[df.e/i]	30.489 / 30.407	170.906 / 170.769
Theoretical tip clearance (mm)	[c]	0.312	0.312
Effective tip clearance (mm)	[c.e/i]	0.534 / 0.425	0.450 / 0.369
Active root diameter (mm)	[dNf]	31.530	172.626
(mm)	[dNf.e/i]	31.561 / 31.506	172.663 / 172.594
Root form diameter (mm)	[dFf]	31.447	171.876
(mm)	[dFf.e/i]	31.346 / 31.293	171.639 / 171.516
Reserve (dNf-dFf)/2 (mm)	[cF.e/i]	0.134 / 0.080	0.574 / 0.478
Addendum (mm)	[ha=mn*(haP*+x)]	1.854	1.494
(mm)	[ha.e/i]	1.854 / 1.849	1.494 / 1.489
Dedendum (mm)	[hf=mn*(hfP*-x)]	0.931	1.292
(mm)	[hf.e/i]	1.005 / 1.047	1.422 / 1.491
Roll angle at dFa (°)	[xsi_dFa.e/i]	36.493 / 36.458	23.746 / 23.736
Roll angle to dNa (°)	[xsi_dNa.e/i]	36.493 / 36.458	23.746 / 23.736
Roll angle to dNf (°)	[xsi_dNf.e/i]	14.937 / 14.527	19.711 / 19.637
Roll angle at dFf (°)	[xsi_dFf.e/i]	13.253 / 12.800	18.577 / 18.436
Tooth height (mm)	[H]	2.786	2.785
Virtual gear no. of teeth	[zn]	26.000	139.000
Normal tooth thickness at tip cyl. (mm)	[san]	0.712	1.024
(mm)	[san.e/i]	0.658 / 0.618	0.931 / 0.876
Normal spacewidth at root cylinder (mm)	[efn]	0.966	0.869
(mm)	[efn.e/i]	0.000 / 0.000	0.880 / 0.886
Max. sliding velocity at tip (m/s)	[vga]	2.075	1.115
Specific sliding at the tip	[zetaa]	0.461	0.381
Specific sliding at the root	[zetaf]	-0.615	-0.855
Sliding factor on tip	[Kga]	0.274	0.147
Sliding factor on root	[Kgf]	-0.147	-0.274
Pitch on reference circle (mm)	[pt]	3.927	
Base pitch (mm)	[pbt]	3.690	
Transverse pitch on contact-path (mm)	[pet]	3.690	
Length of path of contact (mm)	[ga, e/i]	5.806 (5.854 / 5.736)	
Length T1-A, T2-A (mm)	[T1A, T2A]	3.920(3.871/ 3.981)	33.833(33.833/ 33.820)
Length T1-B (mm)	[T1B, T2B]	6.036(6.036/ 6.026)	31.717(31.669/ 31.775)
Length T1-C (mm)	[T1C, T2C]	5.949(5.941/ 5.957)	31.804(31.763/ 31.844)
Length T1-D (mm)	[T1D, T2D]	7.610(7.562/ 7.671)	30.143(30.143/ 30.130)
Length T1-E (mm)	[T1E, T2E]	9.726(9.726/ 9.716)	28.027(27.979/ 28.084)
Length T1-T2 (mm)	[T1T2]	37.753 (37.704 / 37.801)	
Diameter of single contact point B (mm)	[d-B]	32.839(32.839/ 32.832)	175.161(175.126/ 175.203)
Diameter of single contact point D (mm)	[d-D]	34.122(34.079/ 34.177)	174.046(174.046/ 174.037)
Addendum contact ratio	[eps]	1.023(1.026/ 1.019)	0.550(0.561/ 0.535)

Minimal length of contact line (mm)	[Lmin]	18.000
Transverse contact ratio	[eps_a]	1.573
Transverse contact ratio with allowances	[eps_a.e/m/i]	1.586 / 1.570 / 1.554
Overlap ratio	[eps_b]	0.000
Total contact ratio	[eps_g]	1.573
Total contact ratio with allowances	[eps_g.e/m/i]	1.586 / 1.570 / 1.554

2. FACTORS OF GENERAL INFLUENCE

		------- GEAR 1 -------- GEAR 2 --
Nominal circum. force at pitch circle (N)	[Ft]	3480.9
Axial force (N)	[Fa]	0.0
Radial force (N)	[Fr]	1370.9
Normal force (N)	[Fnorm]	3739.4
Tangent.load at p.c.d.per mm (N/mm) (N/mm)	[w]	170.94
Only as information: Forces at operating pitch circle:		
Nominal circumferential force (N)	[Ftw]	3432.0
Axial force (N)	[Faw]	0.0
Radial force (N)	[Frw]	1348.6
Circumferential speed pitch d.. (m/sec)	[v]	7.52
Running-in value (µm)	[yp]	0.6
Running-in value (µm)	[yf]	0.6
Correction coefficient	[CM]	0.800
Gear body coefficient	[CR]	1.000
Reference profile coefficient	[CBS]	0.975
Material coefficient	[E/Est]	1.000
Singular tooth stiffness (N/mm/µm)	[c']	15.527
Meshing stiffness (N/mm/µm)	[cgalf]	22.204
Meshing stiffness (N/mm/µm)	[cgbet]	18.874
Reduced mass (kg/mm)	[mRed]	0.00396
Resonance speed (min-1)	[nE1]	27503
Resonance ratio (-)	[N]	0.161
Subcritical range		
Running-in value (µm)	[ya]	0.6
Bearing distance l of pinion shaft (mm)	[l]	36.000
Distance s of pinion shaft (mm)	[s]	3.600
Outside diameter of pinion shaft (mm)	[dsh]	18.000
Load according to figure 13, ISO 6336-1:2006 0:a), 1:b), 2:c), 3:d), 4:e)	[-]	4
Coefficient K' according to Figure 13, ISO 6336-1:2006	[K']	-1.00
Without support effect		
Tooth trace deviation (active) (µm)	[Fby]	3.40
from deformation of shaft (µm)	[fsh*B1]	1.41
Tooth without tooth trace modification		
Position of Contact pattern: favorable		
from production tolerances (µm)	[fma*B2]	10.63
Tooth trace deviation, theoretical (µm)	[Fbx]	4.00
Running-in value (µm)	[yb]	0.60
Dynamic factor	[KV]	1.095
Face load factor - flank	[KHb]	1.145
- Tooth root	[KFb]	1.121
- Scuffing	[KBb]	1.145

Transverse load factor - flank	[KHa]	1.000	
- Tooth root	[KFa]	1.000	
- Scuffing	[KBa]	1.000	
Helical load factor scuffing	[Kbg]	1.000	
Number of load cycles (in mio.)	[NL]	26.520	4.961

3. TOOTH ROOT STRENGTH

Calculation of Tooth form coefficients according method: B
Tooth form factors calculated with manufacturing profile shift xE.e

		------- GEAR 1 --------	GEAR 2 --
Tooth form factor	[YF]	1.20	1.45
Stress correction factor	[YS]	2.26	2.12
Working angle (°)	[alfFen]	23.52	20.73
Bending lever arm (mm)	[hF]	1.26	1.60
Tooth thickness at root (mm)	[sFn]	2.77	2.87
Tooth root radius (mm)	[roF]	0.54	0.54

(hF* = 1.009/ 1.280 sFn* = 2.219/ 2.296 roF* = 0.431/ 0.432 dsFn = 30.91/ 171.39 alfsFn = 30.00/ 30.00)

Contact ratio factor	[Yeps]	1.000	
Helical load factor	[Ybet]	1.000	
Deep tooth factor	[YDT]	1.000	
Gear rim factor	[YB]	1.000	1.000
Effective facewidth (mm)	[beff]	18.00	18.00
Nominal stress at tooth root (N/mm²)	[sigF0]	370.55	420.53
Tooth root stress (N/mm²)	[sigF]	536.75	609.15
Permissible bending stress at root of Test-gear			
Support factor	[YdrelT]	1.003	1.001
Surface factor	[YRrelT]	0.982	0.957
Size coefficient (Tooth root)	[YX]	1.000	1.000
Finite life factor	[YNT]	0.957	0.990
[YdrelT*YRrelT*YX*YNT]		0.943	0.949
Alternating bending coefficient	[YM]	1.000	1.000
Stress correction factor	[Yst]	2.00	
Yst*sigFlim (N/mm²)	[sigFE]	840.00	860.00
Permissible tooth root stress (N/mm²)	[sigFP=sigFG/SFmin]	633.59	652.58
Limit strength tooth root (N/mm²)	[sigFG]	791.99	815.72
Required safety	[SFmin]	1.25	1.25
Safety for Tooth root stress	[SF=sigFG/sigF]	1.48	1.34
Transmittable power (kW)	[kWRating]	27.32	24.79

4. SAFETY AGAINST PITTING (TOOTH FLANK)

		------- GEAR 1 --------	GEAR 2 --
Zone factor	[ZH]	2.411	
Elasticity coefficient (N^.5/mm)	[ZE]	189.812	
Contact ratio factor	[Zeps]	0.899	
Helix angle factor	[Zbet]	1.000	
Effective facewidth (mm)	[beff]	18.00	
Nominal flank pressure (N/mm²)	[sigH0]	1028.51	
Surface pressure at operating pitch circle (N/mm²)			

	[sigHw]	1251.37	
Single tooth contact factor	[ZB,ZD]	1.00	1.00
Flank pressure (N/mm²)	[sigH]	1251.37	1251.37
Lubrication coefficient at NL	[ZL]	1.047	1.030
Speed coefficient at NL	[ZV]	0.992	0.995
Roughness coefficient at NL	[ZR]	0.946	0.965
Material pairing coefficient at NL	[ZW]	1.000	1.000
Finite life factor	[ZNT]	0.952	1.191
	[ZL*ZV*ZR*ZNT]	0.935	1.178
Small amount of pitting permissible (0=no, 1=yes)		0	0
Size coefficient (flank)	[ZX]	1.000	1.000
Permissible surface pressure (N/mm²)	[sigHP=sigHG/SHmin]	1516.84	1910.16
Limit strength pitting (N/mm²)	[sigHG]	1403.08	1766.90
Required safety	[SHmin]	1.12	1.12
Safety for surface pressure at operating pitch circle			
	[SHw]	1.12	1.41
Safety for stress at single tooth contact	[SHBD=sigHG/sigH]	1.12	1.41
(Safety regarding nominal torque)	[(SHBD)^2]	1.26	1.99
Transmittable power (kW)	[kWRating]	34.00	53.93

4b. MICROPITTING ACCORDING TO ISO TR 15144-1:2010

Calculation did not run. (Lubricant: Load stage micropitting test is unknown.)

5. STRENGTH AGAINST SCUFFING

Calculation method according to
ISO TR 13989:2000

Lubrication coefficient (for lubrication type)	[XS]	1.000	
Multiple meshing factor	[Xmp]	1.000	
Relative structure coefficient (Scuffing)	[XWrelT]	1.000	
Thermal contact factor (N/mm/s^.5/K)	[BM]	13.780	13.780
Relevant tip relief (µm)	[Ca]	2.00	2.00
Optimal tip relief (µm)	[Ceff]	12.99	
Ca taken as optimal in the calculation (0=no, 1=yes)		0	0
Effective facewidth (mm)	[beff]	18.000	
Applicable circumferential force/facewidth (N/mm)			
	[wBt]	253.045	
(Kbg = 1.000, wBt*Kbg = 253.045)			
Pressure angle factor (eps1: 1.023, eps2: 0.550)	[Xalfbet]	0.996	
Flash temperature-criteria			
Lubricant factor	[XL]	0.818	
Tooth mass temperature (°C)	[theMi]	75.95	
theM = theoil + XS*0.47*Xmp*theflm	[theflm]	12.67	
Scuffing temperature (°C)	[theS]	344.88	
Coordinate gamma (point of highest temp.)	[Gamma]	0.546	
[Gamma.A]=-0.341 [Gamma.E]=0.635			
Highest contact temp. (°C)	[theB]	96.32	
Flash factor (°K*N^-.75*s^.5*m^-.5*mm)	[XM]	50.058	
Approach factor	[XJ]	1.000	

Load sharing factor	[XGam]	0.416
Dynamic viscosity (mPa*s)	[etaM]	56.21 (70.0 °C)
Coefficient of friction	[mym]	0.059
Required safety	[SBmin]	2.000
Safety factor for scuffing (flash-temp)	[SB]	10.443
Integral temperature-criteria		
Lubricant factor	[XL]	1.000
Tooth mass temperature (°C)	[theM-C]	77.37
theM-C = theoil + XS*0.70*theflaint	[theflaint]	10.53
Integral scuffing temperature (°C)	[theSint]	359.60
Flash factor (°K*N^-.75*s^.5*m^-.5*mm)	[XM]	50.058
Running-in factor (well run in)	[XE]	1.000
Contact ratio factor	[Xeps]	0.244
Dynamic viscosity (mPa*s)	[etaOil]	56.21 (70.0 °C)
Averaged coefficient of friction	[mym]	0.074
Geometry factor	[XBE]	0.262
Meshing factor	[XQ]	1.000
Tip relief factor	[XCa]	1.222
Integral tooth flank temperature (°C)	[theint]	93.17
Required safety	[SSmin]	1.800
Safety factor for scuffing (intg.-temp.)	[SSint]	3.860
Safety referring to transferred torque	[SSL]	12.498

6. MEASUREMENTS FOR TOOTH THICKNESS

		------- GEAR 1 --------	GEAR 2 --
Tooth thickness deviation		DIN 3967 cd25	DIN 3967 cd25
Tooth thickness allowance (normal section) (mm)	[As.e/i]	-0.054 / -0.084	-0.095 / -0.145
Number of teeth spanned	[k]	4.000	16.000
Base tangent length (no backlash) (mm)	[Wk]	13.803	59.816
Actual base tangent length ('span') (mm)	[Wk.e/i]	13.752 / 13.724	59.727 / 59.680
Diameter of contact point (mm)	[dMWk.m]	33.488	173.845
Theoretical diameter of ball/pin (mm)	[DM]	2.397	2.114
Eff. Diameter of ball/pin (mm)	[DMeff]	2.500	2.500
Theor. dim. centre to ball (mm)	[MrK]	18.782	89.296
Actual dimension centre to ball (mm)	[MrK.e/i]	18.730 / 18.701	89.177 / 89.113
Diameter of contact point (mm)	[dMMr.m]	33.788	174.879
Diametral measurement over two balls without clearance (mm)			
	[MdK]	37.563	178.582
Actual dimension over balls (mm)	[MdK.e/i]	37.460 / 37.402	178.342 / 178.216
Diametral measurement over rolls without clearance (mm)			
	[MdR]	37.563	178.582
Actual dimension over rolls (mm)	[MdR.e/i]	37.460 / 37.402	178.342 / 178.216
Dimensions over 3 rolls without clearance (mm)	[Md3R]	0.000	178.570
Actual dimensions over 3 rolls (mm)	[Md3R.e/i]	0.000 / 0.000	178.331 / 178.204
Chordal tooth thickness (no backlash) (mm)	['sn]	2.421	2.161
Actual chordal tooth thickness (mm)	['sn.e/i]	2.367 / 2.337	2.066 / 2.016
Reference chordal height from da.m (mm)	[ha]	1.897	1.498
Tooth thickness (Arc) (mm)	[sn]	2.423	2.161
(mm)	[sn.e/i]	2.369 / 2.339	2.066 / 2.016
Backlash free center distance (mm)	[aControl.e/i]	103.806 /103.701	
Backlash free center distance, allowances (mm)	[jta]	-0.194 / -0.299	

dNf.i with aControl (mm)	[dNf0.i]	31.158	172.092
Reserve (dNf0.i-dFf.e)/2 (mm)	[cF0.i]	-0.094	0.227
Centre distance allowances (mm)	[Aa.e/i]	0.018 / -0.018	
Circumferential backlash from Aa (mm)	[jtw_Aa.e/i]	0.014 / -0.014	
Radial clearance (mm)	[jrw]	0.317 / 0.177	
Circumferential backlash (transverse section) (mm)	[jtw]	0.245 / 0.137	
Torsional angle for fixed gear 1 (°)		0.1613 / 0.0901	
Normal backlash (mm)	[jnw]	0.230 / 0.128	

7. GEAR ACCURACY

		GEAR 1	GEAR 2
According to ISO 1328:1995:			
Accuracy grade	[Q-ISO1328]	6	6
Single pitch deviation (µm)	[fpt]	7.00	8.50
Base circle pitch deviation (µm)	[fpb]	6.60	8.00
Cumulative circular pitch deviation over k/8 pitches (µm)	[Fpk/8]	10.00	17.00
Profile form deviation (µm)	[ffa]	5.50	7.50
Profile slope deviation (µm)	[fHa]	4.60	6.00
Total profile deviation (µm)	[Fa]	7.50	10.00
Helix form deviation (µm)	[ffb]	7.00	8.00
Helix slope deviation (µm)	[fHb]	7.00	8.00
Total helix deviation (µm)	[Fb]	10.00	11.00
Total cumulative pitch deviation (µm)	[Fp]	20.00	35.00
Concentricity deviation (µm)	[Fr]	16.00	28.00
Total radial composite deviation (µm)	[Fi'']	23.00	34.00
Radial tooth-to-tooth composite deviation (µm)	[fi'']	6.50	6.50
Total tangential composite deviation (µm)	[Fi']	35.00	52.00
Tangential tooth-to-tooth composite deviation (µm)	[fi']	14.00	17.00

Axis alignment tolerances (recommendation acc. ISO TR 10064:1992, Quality		6)
Maximum value for deviation error of axis (µm)	[fSigbet]	11.00 (Fb= 11.00)
Maximum value for inclination error of axes (µm)	[fSigdel]	22.00

8. ADDITIONAL DATA

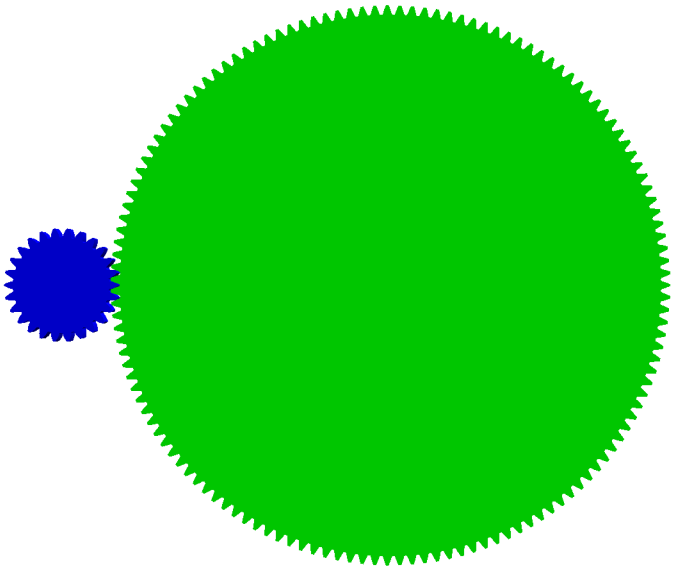
Maximal possible centre distance (eps_a=1.0)	[aMAX]	104.787	
Torsional stiffness (MNm/rad)	[cr]	0.1	2.7
Mean coeff. of friction (acc. Niemann)	[mum]	0.078	
Wear sliding coef. byNiemann	[zetw]	0.681	
Power loss from gear load (kW)	[PVZ]	0.201	
(Meshing efficiency (%)	[etaz]	99.133)	
Weight - calculated with da (kg)	[Mass]	0.145	3.458
Total weight (kg)	[Mass]	3.603	
Moment of inertia (System referenced to wheel 1):			
calculationwithout consideration of the exact tooth shape			
single gears ((da+df)/2...di) (kg*m²)	[TraeghMom]	1.707e-005	0.01262
System ((da+df)/2...di) (kg*m²)	[TraeghMom]	0.0004586	

9. DETERMINATION OF TOOTHFORM

Data for the tooth form calculation :

Data not available.

REMARKS:
- Specifications with [.e/i] imply: Maximum [e] and Minimal value [i] with consideration of all tolerances
  Specifications with [.m] imply: Mean value within tolerance
- For the backlash tolerance, the center distance tolerances and the tooth thickness deviation are taken into account. Shown is the maximal and the minimal backlash corresponding the largest resp. the smallest allowances
  The calculation is done for the Operating pitch circle..
- Details of calculation method:
  cg according to method B
  KV according to method B
  KHb, KFb according method C
  fma following equation (64), fsh following (57/58), Fbx following (52/53/57)
  KHa, KFa according to method B



da1 = 36.2035 mm, df1 = 30.4479 mm, As1 = -0.0690 mmda2 = 176.7329 mm, df2 = 170.8373 mm, As2 = -0.1200 mm
Figure: Tooth system

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