Important hint: At least one warning has occurred during the calculation:

1-> Mesh load factor Kγ = 1.200000
This input is unusual and will result in faulty results.
Please check if you have entered it deliberately!

2-> The circumferential speed is very high (130.4219 m/s)!
This causes the following:
The lubrication is no longer guaranteed.
The calculation is not intended for this case!

3-> Calculation of scuffing:
The entered gear pair data is outside the boundary of the calculation method!

The application of ISO/TS 6336-21 has following limitations:

1.0 m/s <= v(=130.4 m/s) <= 50.0 m/s

4-> Notice to gear 1:
NOT POSSIBLE TO MEASURE BASE TANGENT LENGTH!
The width of the gear is too small, hence the tooth thickness too big,
so that the required length for the measurement exceeds the facewidth.

5-> Notice concerning gear 1:
Dimension over pins is not measurable (facewidth is too small)!

6-> Notice to gear 2:
NOT POSSIBLE TO MEASURE BASE TANGENT LENGTH!
The width of the gear is too small, hence the tooth thickness too big,
so that the required length for the measurement exceeds the facewidth.

7-> Notice concerning gear 2:
Dimension over pins is not measurable (facewidth is too small)!

Calculation of a helical-toothed cylindrical gear pair

Drawing or article number:		
Gear 1:		0.000.0
Gear 2:		0.000.0
Calculation method		ISO 6336:2019

		------- Gear 1	-------- Gear 2 --
Power (kW)	[P]	186.872	
Speed (1/min)	[n]	21500.0	16722.2
Torque (Nm)	[T]	83.0	106.7
Application factor	[KA]	1.75	
Distribution factor	[Kγ]	1.20	

Required service life (h)	[H]	10000.00
Gear driving (+) / driven (-)		+ -
Working flank gear 1:		Right flank
Gear 1 direction of rotation:		Clockwise

Tooth geometry and material

Geometry calculation according to ISO 21771:2007

		------- Gear 1	-------- Gear 2 --
Center distance (mm)	[a]	133.838	
Center distance tolerance	ISO 286:2010 Measure js7		
Normal module (mm)	[mn]	5.0000	
Normal pressure angle (°)	[αn]	25.0000	
Helix angle at reference circle (°)	[β]	25.0000	
Number of teeth	[z]	21	27
Facewidth (mm)	[b]	15.87	22.00
Hand of gear		right	left
Accuracy grade	[Q-ISO 1328:2013]	A6	A6
Inner diameter (mm)	[di]	0.00	0.00
Inner diameter of gear rim (mm)	[dbi]	0.00	0.00

Material

Gear 1
18CrNiMo7-6, Case-carburized steel, case-hardened
ISO 6336-5 Figure 9/10 (MQ), Core hardness >=25HRC Jominy J=12mm<HRC28

Gear 2
18CrNiMo7-6, Case-carburized steel, case-hardened
ISO 6336-5 Figure 9/10 (MQ), Core hardness >=25HRC Jominy J=12mm<HRC28

		------- Gear 1	-------- Gear 2 --
Surface hardness		HRC 61	HRC 61
Material treatment according to ISO 6336:2006 Normal, life factors ZNT and YNT >=0.85			
Fatigue strength. tooth root stress (N/mm²)	[σFlim]	430.00	430.00
Fatigue strength for Hertzian pressure (N/mm²)	[σHlim]	1500.00	1500.00
Tensile strength (N/mm²)	[σB]	1200.00	1200.00
Yield point (N/mm²)	[σS]	850.00	850.00
Young's modulus (N/mm²)	[E]	206000	206000
Poisson's ratio	[v]	0.300	0.300
Roughness average value DS, flank (µm)	[RAH]	0.60	0.60
Roughness average value DS, root (µm)	[RAF]	3.00	3.00
Mean roughness height, Rz, flank (µm)	[RZH]	4.80	4.80
Mean roughness height, Rz, root (µm)	[RZF]	20.00	20.00

Gear reference profile
1:

Reference profile	1.25 / 0.38 / 1.0 ISO 53:1998 Profil A		
Dedendum coefficient	[hfP*]	1.250	
Root radius factor	[ρfP*]	0.380	(ρfPmax*= 0.318)
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	
Gear reference profile 2:			
Reference profile		1.25 / 0.38 / 1.0 ISO 53:1998 Profil A	
Dedendum coefficient	[hfP*]	1.250	
Root radius factor	[ρfP*]	0.380	(ρfPmax*= 0.318)
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	

Information on final machining

Dedendum reference profile	[hfP*]	1.250	1.250
Tooth root radius Refer. profile	[ρfP*]	0.380	0.380
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
Lubrication type		Oil injection lubrication	
Type of oil		ISO-VG 220	
Lubricant base		Mineral-oil base	
Oil nominal kinematic viscosity at 40°C (mm²/s)	[v40]	220.00	
Oil nominal kinematic viscosity at 100°C (mm²/s)	[v100]	17.50	
Specific density at 15°C (kg/dm³)	[ρ]	0.895	
Oil temperature (°C)	[TS]	70.000	

Gear pair

Overall transmission ratio	[itot]	-1.286	
Gear ratio	[u]	1.286	
Transverse module (mm)	[mt]	5.517	
Transverse pressure angle (°)	[αt]	27.226	
Working pressure angle (°)	[αwt]	28.395	
	[αwt.e/i]	28.411 /	28.379
Working pressure angle at normal section (°)	[αwn]	26.058	
Helix angle at operating pitch circle (°)	[βw]	25.237	
Base helix angle (°)	[βb]	22.521	
Reference center distance (mm)	[ad]	132.405	
Pitch on reference circle (mm)	[pt]	17.332	
Base pitch (mm)	[pbt]	15.412	
Transverse pitch on contact-path (mm)	[pet]	15.412	
Sum of profile shift coefficients	[Σxi]	0.2922	
Transverse contact ratio	[εα]	1.226	
Transverse contact ratio with allowances	[εα.e/m/i]	1.229 /	1.224 / 1.219

Overlap ratio	[εβ]	0.427
Total contact ratio	[εγ]	1.653
Total contact ratio with allowances	[εγ.e/m/i]	1.656 / 1.651 / 1.646
Length of path of contact (mm)	[ga, e/i]	18.895 (18.937 / 18.783)
Length T1-A (mm)	[T1A]	18.709 (18.667 / 18.787)
Length T1-B (mm)	[T1B]	22.193 (22.193 / 22.159)
Length T1-C (mm)	[T1C]	27.845 (27.827 / 27.864)
Length T1-D (mm)	[T1D]	34.121 (34.079 / 34.198)
Length T1-E (mm)	[T1E]	37.604 (37.604 / 37.570)
Length T2-A (mm)	[T2A]	44.937 (44.937 / 44.902)
Length T2-B (mm)	[T2B]	41.454 (41.412 / 41.530)
Length T2-C (mm)	[T2C]	35.801 (35.778 / 35.825)
Length T2-D (mm)	[T2D]	29.526 (29.526 / 29.490)
Length T2-E (mm)	[T2E]	26.042 (26.000 / 26.118)
Length T1-T2 (mm)	[T1T2]	63.647 (63.605 / 63.689)
Minimal length of contact line (mm)	[Lmin]	17.182

Gear 1

Lead height (mm)	[pz]	780.532
Axial pitch (mm)	[px]	37.168
Profile shift coefficient	[x]	0.1754
Tooth thickness, arc, in module	[sn*]	1.7344
Tip alteration (mm)	[k*mn]	-0.029
Reference diameter (mm)	[d]	115.855
Base diameter (mm)	[db]	103.019
Tip diameter (mm)	[da]	127.551
(mm)	[da.e/i]	127.551 / 127.511
Tip diameter allowances (mm)	[Ada.e/i]	0.000 / -0.040
Tip form diameter (mm)	[dFa]	127.551
(mm)	[dFa.e/i]	127.551 / 127.511
Root diameter (mm)	[df]	105.109
Generating Profile shift coefficient	[xE.e/i]	0.1604/ 0.1518
Generated root diameter with xE (mm)	[df.e/i]	104.959 / 104.873
Root form diameter (mm)	[dFf]	108.582
(mm)	[dFf.e/i]	108.479 / 108.421
Involute length (mm)	[l_dFa-l_dFf]	10.869
Addendum, $m_n(h_{aP}^*+x+k)$ (mm)	[ha]	5.848
(mm)	[ha.e/i]	5.848 / 5.828
Dedendum (mm)	[hf=mn*(hfP*-x)]	5.373
(mm)	[hf.e/i]	5.448 / 5.491
Tooth height (mm)	[h]	11.221
Virtual gear no. of teeth	[zn]	27.155
Normal tooth thickness at tip circle (mm)	[san]	2.550
(mm)	[san.e/i]	2.500 / 2.431
Normal tooth thickness at tip form circle (mm)	[sFan]	2.550
(mm)	[sFan.e/i]	2.500 / 2.431
Normal space width at root circle (mm)	[efn]	2.942
(mm)	[efn.e/i]	2.975 / 2.995

Gear 2

Lead height (mm)	[pz]	1003.542
Axial pitch (mm)	[px]	37.168
Profile shift coefficient	[x]	0.1168
Tooth thickness, arc, in module	[sn*]	1.6797
Tip alteration (mm)	[k*mn]	-0.029
Reference diameter (mm)	[d]	148.956
Base diameter (mm)	[db]	132.452
Tip diameter (mm)	[da]	160.066
(mm)	[da.e/i]	160.066 / 160.026
Tip diameter allowances (mm)	[Ada.e/i]	0.000 / -0.040
Tip form diameter (mm)	[dFa]	160.066
(mm)	[dFa.e/i]	160.066 / 160.026
Root diameter (mm)	[df]	137.624
Generating Profile shift coefficient	[xE.e/i]	0.0964/ 0.0857
Generated root diameter with xE (mm)	[df.e/i]	137.420 / 137.313
Root form diameter (mm)	[dFf]	140.942
(mm)	[dFf.e/i]	140.790 / 140.711
Involute length (mm)	[l_dFa-l_dFf]	10.865
Addendum, $m_n(h_{aP}^*+x+k)$ (mm)	[ha]	5.555
(mm)	[ha.e/i]	5.555 / 5.535
Dedendum (mm)	[hf=mn*(hfP*-x)]	5.666
(mm)	[hf.e/i]	5.768 / 5.821
Tooth height (mm)	[h]	11.221
Virtual gear no. of teeth	[zn]	34.913
Normal tooth thickness at tip circle (mm)	[san]	2.744
(mm)	[san.e/i]	2.667 / 2.590
Normal tooth thickness at tip form circle (mm)	[sFan]	2.744
(mm)	[sFan.e/i]	2.667 / 2.590
Normal space width at root circle (mm)	[efn]	2.777
(mm)	[efn.e/i]	2.810 / 2.828

Gear specific pair data Gear pair 1, Gear 1

Operating pitch diameter (mm)	[dw]	117.108
(mm)	[dw.e/i]	117.126 / 117.091
Active tip diameter (mm)	[dNa]	127.551
(mm)	[dNa.e/i]	127.551 / 127.511
Theoretical tip clearance (mm)	[c]	1.250
Effective tip clearance (mm)	[c.e/i]	1.446 / 1.332
Active root diameter (mm)	[dNf]	109.604
(mm)	[dNf.e/i]	109.657 / 109.575
Reserve (dNf-dFf)/2 (mm)	[cF.e/i]	0.618 / 0.548
Max. sliding velocity at tip (m/s)	[vga]	39.061
Specific sliding at the tip	[ζa]	0.461
Specific sliding at the root	[ζf]	-0.868
Mean specific sliding	[ζm]	0.463
Sliding factor on tip	[Kga]	0.296
Sliding factor on root	[Kgf]	-0.277
Roll angle at dFa (°)	[ξdFa.e/i]	41.829 / 41.791
Roll angle to dNa (°)	[ξdNa.e/i]	41.829 / 41.791
Roll angle to dNf (°)	[ξdNf.e/i]	20.897 / 20.764
Roll angle at dFf (°)	[ξdFf.e/i]	18.901 / 18.797
Diameter of single contact point B (mm)	[d-B]	112.174 (112.174 / 112.147)
Diameter of single contact point D (mm)	[d-D]	123.571 (123.524 / 123.657)
Addendum contact ratio	[ε]	0.633 (0.634 / 0.630)

Gear specific pair data Gear pair 1, Gear 2

Operating pitch diameter (mm)	[dw]	150.567
(mm)	[dw.e/i]	150.590 / 150.545
Active tip diameter (mm)	[dNa]	160.066
(mm)	[dNa.e/i]	160.066 / 160.026
Theoretical tip clearance (mm)	[c]	1.250
Effective tip clearance (mm)	[c.e/i]	1.408 / 1.305
Active root diameter (mm)	[dNf]	142.325
(mm)	[dNf.e/i]	142.381 / 142.294
Reserve (dNf-dFf)/2 (mm)	[cF.e/i]	0.835 / 0.752
Max. sliding velocity at tip (m/s)	[vga]	36.569
Specific sliding at the tip	[ζa]	0.465
Specific sliding at the root	[ζf]	-0.857
Mean specific sliding	[ζm]	0.463
Sliding factor on tip	[Kga]	0.277
Sliding factor on root	[Kgf]	-0.296
Roll angle at dFa (°)	[ξdFa.e/i]	38.878 / 38.847
Roll angle to dNa (°)	[ξdNa.e/i]	38.878 / 38.847
Roll angle to dNf (°)	[ξdNf.e/i]	22.596 / 22.494
Roll angle at dFf (°)	[ξdFf.e/i]	20.647 / 20.545
Diameter of single contact point B (mm)	[d-B]	156.260 (156.216 / 156.341)
Diameter of single contact point D (mm)	[d-D]	145.020 (145.020 / 144.991)
Addendum contact ratio	[ε]	0.593 (0.594 / 0.589)

General influence factors

		------- Gear 1 -------- Gear 2 --
Nominal circum. force at pitch circle (N)	[Ft]	1432.8
Axial force (N)	[Fa]	668.1
Radial force (N)	[Fr]	737.2
Normal force (N)	[Fnorm]	1744.4
Nominal circumferential force per mm (N/mm)	[w]	90.27
Only as information: Forces at operating pitch circle:		
Nominal circumferential force (N)	[Ftw]	1417.5
Axial force (N)	[Faw]	668.1
Radial force (N)	[Frw]	766.3
Circumferential speed reference circle (m/s)	[v]	130.42
Circumferential speed operating pitch circle (m/s)	[v(dw)]	131.83
Running-in value (µm)	[yp]	0.7
Running-in value (µm)	[yf]	0.8
Correction factor	[CM]	0.800
Gear blank factor	[CR]	1.000
Basic rack factor	[CBS]	1.073
Material coefficient	[E/Est]	1.000
Singular tooth stiffness (N/mm/µm)	[c']	13.493
Meshing stiffness (N/mm/µm)	[cγα]	15.781
Meshing stiffness (N/mm/µm)	[cγβ]	13.413
Reduced mass (kg/mm)	[mRed]	0.03282
Resonance speed (min-1)	[nE1]	9971
Resonance ratio (-)	[N]	2.156
Overcritical range		
Running-in value (µm)	[yα]	0.7
Bearing distance l of pinion shaft (mm)	[l]	31.740
Distance s of pinion shaft (mm)	[s]	3.174

Outside diameter of pinion shaft (mm)	[dsh]	15.870	
Load in accordance with 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 Without stiffening	[K']	-1.00	
Tooth trace deviation (active) (µm)	[Fβy]	3.61	
from deformation of shaft (µm) fsh (µm) = 2.37 , B1=1.00 , fHβ5 (µm) = 6.00	[fsh*B1]	2.37	
Tooth without tooth trace modification			
Position of contact pattern:	favorable		
from production tolerances (µm) B2= 1.00	[fmα*B2]	11.67	
Tooth trace deviation, theoretical (µm)	[Fβx]	4.25	
Running-in value (µm)	[yβ]	0.64	
Dynamic factor	[Kv]	1.383	
Face load factor - flank	[KHβ]	1.092	
- Tooth root	[KFβ]	1.063	
- Scuffing	[KBβ]	1.092	
Transverse load factor - flank	[KHα]	1.000	
- Tooth root	[KFα]	1.000	
- Scuffing	[KBα]	1.000	
Number of load cycles (in mio.)	[NL]	12900.000	10033.333

Tooth root load capacity

Calculation of Tooth form coefficients according method: B

		------- Gear 1	-------- Gear 2 --
Calculated with generating profile shift coefficient	[xE.i]	0.1518	0.0857
Tooth form factor	[YF]	1.21	1.22
Stress correction factor	[YS]	2.06	2.05
Load application angle (°)	[αFen]	26.72	26.26
Load distribution influence factor	[fε]	0.933	
Load application diameter (mm)	[d_{en}]	121.079	153.869
Bending moment arm (mm)	[hF]	5.83	5.99
Tooth thickness at root (mm)	[sFn]	11.53	11.66
Tooth root radius (mm)	[ρF]	2.52	2.55
Bending moment arm (-)	[hF/mn]	1.165	1.198
Tooth thickness at root (-)	[sFn/mn]	2.305	2.333
Tooth root radius (-)	[ρF/mn]	0.504	0.511
Calculation cross section diameter (mm)	[d_{sFn}]	106.819	139.322
Tangents on calculation cross section (°)	[α_{sFn}]	30.000	30.000
Notch parameter	[q_s]	2.286	2.284
Helix angle factor	[Yβ]	1.224	
Deep tooth factor	[YDT]	1.000	
Gear rim factor	[YB]	1.00	1.00
Effective facewidth (mm)	[beff]	15.87	22.00
Nominal stress at tooth root (N/mm²)	[σF0]	55.18	39.89
Tooth root stress (N/mm²)	[σF]	170.37	123.18
Permissible bending stress at root of Test-gear			
Notch sensitivity factor	[YdrelT]	0.998	0.998
Surface factor	[YRrelT]	0.957	0.957

Size factor, tooth root	[YX]	1.000	1.000
Finite life factor	[YNT]	0.850	0.850
$Y_{drelT}*Y_{RrelT}*Y_X*Y_{NT}$		0.812	0.812
Alternating bending factor, mean stress influence coefficient			
	[YM]	1.000	1.000
Stress correction factor	[Yst]	2.00	
Yst*σFlim (N/mm²)	[σFE]	860.00	860.00
Permissible tooth root stress σFG/SFmin (N/mm²)	[σFP]	498.53	498.52
Limit strength tooth root (N/mm²)	[σFG]	697.94	697.92
Required safety	[SFmin]	1.40	1.40
Safety for tooth root stress	[SF=σFG/σF]	4.10	5.67
Transmittable power (kW)	[kWRating]	546.82	756.30

Flank safety

		------- Gear 1 --------	Gear 2 --
Zone factor	[ZH]	2.079	
Elasticity factor (√N/mm²)	[ZE]	189.812	
Contact ratio factor	[Zε]	0.937	
Helix angle factor	[Zβ]	1.050	
Effective facewidth (mm)	[beff]	15.87	
Nominal contact stress (N/mm²)	[σH0]	457.17	
Contact stress at operating pitch circle (N/mm²)	[σHw]	814.32	
Coefficient [fZCa] 1.20 (Helical gear sets without flank modifications)			
Single tooth contact factor	[ZB,ZD]	1.06	1.04
Contact stress (N/mm²)	[σHB, σHD]	866.62	845.06
Lubrication factor for NL	[ZL]	1.020	1.020
Speed factor for NL	[ZV]	1.067	1.067
Roughness factor for NL	[ZR]	0.975	0.975
Material hardening factor for NL	[ZW]	1.000	1.000
Finite life factor	[ZNT]	0.850	0.850
	[ZL*ZV*ZR*ZNT]	0.902	0.902
Limited pitting is permitted: No			
Size factor (flank)	[ZX]	1.000	1.000
Permissible contact stress, σHG/SHmin (N/mm²)	[σHP]	1352.44	1352.44
Pitting stress limit (N/mm²)	[σHG]	1352.44	1352.44
Required safety	[SHmin]	1.00	1.00
Safety factor for contact stress at operating pitch circle	[SHw]	1.66	1.66
Safety against pressure, σHG/σHBD Single contact	[SHBD]	1.56	1.60
Safety regarding transmittable torque	[(SHBD)^2]	2.44	2.56
Transmittable power (kW)	[kWRating]	455.11	478.64

Micropitting according to **ISO/TS 6336-22:2018**

Calculation has not been carried out, lubricant: Load stage micropitting test not known

Scuffing load capacity

Calculation method according to	ISO/TS 6336-20/21:2017	
Helical load factor for scuffing	[KBγ]	1.000

Lubrication coefficient for lubrication type	[XS]	1.200		
Scuffing test and load stage	[FZGtest]	FZG - Test A / 8.3 / 90 (ISO 14635 - 1)	12	
Multiple meshing factor	[Xmp]	1.000		
Relative structural factor, 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]	12.01		
Ca taken as optimal in the calculation (0=no, 1=yes)		0	0	
Effective facewidth (mm)	[beff]	15.872		
Applicable circumferential force/facewidth (N/mm)	[wBt]	286.419		
KBγ = 1.000 , wBt*KBγ = 286.419				
Angle factor	[Xαβ]	1.091		
ε1: 0.633 , ε2: 0.593				
Flash temperature-criteria				
Lubricant factor	[XL]	0.830		
Tooth mass temperature (°C)	[θMi]	88.28		
θMi = θoil + XS*0.47*Xmp*θflm				
Average flash temperature (°C)	[θflm]	32.42		
Scuffing temperature (°C)	[θS]	531.65		
Contact time (µsec)	[tc]	7.84		
theS increased because of short contact time by (°C)		182.85		
Γ coordinates (point of highest temperature)	[Γ]	0.220		
[Γ.A]= -0.328 [Γ.E]= 0.350				
Highest contact temp. (°C)	[θB]	142.87		
Flash factor (°K*N^-.75*s^.5*m^-.5*mm)	[XM]	50.058		
Approach factor	[XJ]	1.000		
Load sharing factor	[XΓ]	1.000		
Dynamic viscosity (mPa*s)	[ηM]	41.90	(70.0	°C)
Coefficient of friction	[μ_m]	0.032		
Required safety	[SBmin]	2.000		
Margin of safety for scuffing, flash temperature	[SB]	6.336		
Integral temperature-criteria				
Lubricant factor	[XL]	1.000		
Tooth mass temperature (°C)	[θMC]	92.28		
θMC = θoil + XS*0.70*θflaint				
Mean flash temperature (°C)	[θflaint]	26.52		
Integral scuffing temperature (°C)	[θSint]	360.78		
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	[Xε]	0.355		
Dynamic viscosity (mPa*s)	[ηOil]	41.90	(70.0	°C)
Mean coefficient of friction	[μ_m]	0.029		
Geometry factor	[XBE]	0.225		
Meshing factor	[XQ]	1.000		
Tip relief factor	[XCa]	1.111		
Integral tooth flank temperature (°C)	[θint]	132.07		
Required safety	[SSmin]	1.800		
Safety factor for scuffing (intg.-temp.)	[SSint]	2.732		
Safety referring to transmittable torque	[SSL]	4.685		

Measurements for tooth thickness

		------- Gear 1 --------	Gear 2 --
Tooth thickness tolerance		DIN 3967 cd25	DIN 3967 cd25
Tooth thickness allowance (normal section) (mm)	[As.e/i]	-0.070 /-0.110	-0.095 /-0.145

Number of teeth spanned	[k]	4.000	6.000
Base tangent length (no backlash) (mm)	[Wk]	54.310	83.604
Base tangent length with allowance (mm)	[Wk.e/i]	54.247 / 54.210	83.518 / 83.473
(mm)	[ΔWk.e/i]	-0.063 / -0.100	-0.086 / -0.131
Diameter of measuring circle (mm)	[dMWk.m]	114.552	153.272

> Gear 1 base tangent length cannot be measured (gear too thin)
> Gear 2 base tangent length cannot be measured (gear too thin).

Theoretical diameter of ball/pin (mm)	[DM]	9.157	8.971
Effective diameter of ball/pin (mm)	[DMeff]	10.000	9.000
Radial single-ball measurement backlash free (mm)	[MrK]	66.788	81.624
Radial single-ball measurement (mm)	[MrK.e/i]	66.726 / 66.691	81.533 / 81.485
Diameter of measuring circle (mm)	[dMMr.m]	118.581	149.945
Diametral measurement over two balls without clearance (mm)	[MdK]	133.231	162.987
Diametral two ball measure (mm)	[MdK.e/i]	133.107 /133.036	162.805 /162.709
Diametral measurement over pins without clearance (mm)	[MdR]	133.577	163.247
Measurement over pins according to DIN 3960 (mm)	[MdR.e/i]	133.452 /133.381	163.065 /162.969
Measurement over 2 pins, free, according to AGMA 2002 (mm)	[dk2f.e/i]	132.995 /132.924	162.726 /162.630
Measurement over 2 pins, transverse, according to AGMA 2002 (mm)	[dk2t.e/i]	0.000 / 0.000	163.320 /163.223
Measurement over 3 pins, axial, according to AGMA 2002 (mm)	[dk3A.e/i]	133.452 /133.381	163.065 /162.969

Chordal tooth thickness (no backlash) (mm)	[sc]	8.666	8.396
Normal chordal tooth thickness with allowance (mm)	[sc.e/i]	8.598 / 8.559	8.303 / 8.254
Reference chordal height from da.m (mm)	[ha]	5.971	5.642
Tooth thickness, arc (mm)	[sn]	8.672	8.399
(mm)	[sn.e/i]	8.602 / 8.562	8.304 / 8.254

Backlash free center distance (mm)	[aControl.e/i]	133.667 /133.574	
Backlash free center distance, allowances (mm)	[jta]	-0.171 / -0.264	
dNf.i with aControl (mm)	[dNf0.i]	109.228	141.921
Reserve (dNf0.i-dFf.e)/2 (mm)	[cF0.i]	0.375	0.566
Tip clearance (mm)	[c0.i(aControl)]	1.088	1.062
Center distance allowances (mm)	[Aa.e/i]	0.020 / -0.020	

Circumferential backlash from Aa (mm)	[jtw_Aa.e/i]	0.022 / -0.022
Radial backlash (mm)	[jrw.e/i]	0.284 / 0.151
Circumferential backlash (transverse section) (mm)	[jtw.e/i]	0.306 / 0.162
Normal backlash (mm)	[jn.e/i]	0.248 / 0.133
Torsional angle on input with output fixed:		
Total torsional angle (°)	[j.tSys]	0.2995/0.1589

Toothing tolerances

		------- Gear 1 --------	Gear 2 --
According to ISO 1328-1:2013, ISO 1328-2:1997			
Accuracy grade	[Q]	A6	A6
Single pitch deviation (µm)	[fptT]	10.00	10.00
Base circle pitch deviation (µm)	[fpbT]	8.90	9.00
Sector pitch deviation over k/8 pitches (µm)	[Fpk/8T]	22.00	20.00
Profile form deviation (µm)	[ffαT]	11.00	11.00
Profile slope deviation (µm)	[fHαT]	8.50	8.50
Total profile deviation (µm)	[FαT]	14.00	14.00
Helix form deviation (µm)	[ffβT]	9.50	10.00
Helix slope deviation (µm)	[fHβT]	8.50	9.00
Total helix deviation (µm)	[FβT]	12.00	13.00
Total cumulative pitch deviation (µm)	[FpT]	31.00	32.00

Adjacent pitch difference (µm)	[fuT]	14.00	14.00
Runout (µm)	[FrT]	28.00	29.00
Single flank composite, total (µm)	[FisT]	40.00	42.00
Single flank composite, tooth-to-tooth (µm)	[fisT]	9.50	9.50
Radial composite, total (µm)	[FidT]	44.00	51.00
Radial composite, tooth-to-tooth (µm)	[fidT]	22.00	22.00

FidT (Fi''), fidT (fi'') according to ISO 1328:1997 calculated with the geometric mean values for mn and d

Axis alignment tolerances (recommendation acc. to ISO TR 10064-3:1996, Quality)

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Maximum value for deviation error of axis (µm)	[fΣβ]	13.00	(Fβ=	13.00)
Maximum value for inclination error of axes (µm)	[fΣδ]	26.00		

Modifying and defining the tooth form

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

Supplementary data

Mass (kg)	[m]	1.321	2.997
Total mass (kg)	[mGes]	4.318	
Moment of inertia for system, relative to the input:			
calculation without consideration of the exact tooth shape			
Single gears, (da+df)/2...di (kg*m²)	[J]	0.00223	0.00830
System (da+df)/2...di (kg*m²)	[J]	0.00726	
Torsional stiffness at driving gear with fixed driven gear:			
Torsional stiffness (MNm/rad)	[cr]	0.559	
Torsion when subjected to nominal torque (°)	[δcr]	0.009	
Mean coefficient of friction (as defined in Niemann)	[μ_m]	0.032	
Wear sliding coef. by Niemann	[ζw]	0.568	
Loss factor	[HV]	0.152	
Gear power loss (kW)	[PVZ]	0.893	
Meshing efficiency (%)	[ηz]	99.522	
Sound pressure level according to Masuda, without contact analysis			
	[dB(A)]	86.5	
Oil requirement for injection lubrication (l/min)	[Voil]	2.788	
with oil cooler, for assumed difference in temperature of oil (°C):			

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Service life, damage

Required safety for tooth root	[SFmin]	1.40	
Required safety for tooth flank	[SHmin]	1.00	

Service life (calculated with required safeties):

System service life (h)	[Hatt]	>	1000000
Tooth root service life (h)	[HFatt]	1e+06	1e+06
Tooth flank service life (h)	[HHatt]	1e+06	1e+06

Note: The entry 1e+006 h means that the Service life > 1,000,000 h.

Damage calculated on the basis of the required service life [H] (10000.0 h)

F1%	F2%	H1%	H2%
0.00	0.0000	0.0000	0.0000

Remarks:

- Specifications with [.e/i] imply: Maximum [e] and minimum value [i] for
  Taking all tolerances into account
  Specifications with [.m] imply: Mean value within tolerance
- For the backlash tolerance, the center distance tolerances and the tooth thickness allowance are taken into account.
  The maximum and minimum clearance according to
  the largest or smallest allowances are defined..
  The calculation is performed for the operating pitch circle.
- Calculation of Zbet according to Corrigendum 1 ISO 6336-2:2008 with Zβ = 1/(COS(β)^0.5)
- Details of calculation method:
  cγ according to Method B
  Kv according to Method B
  KHβ and KFβ according to Method C
  fmα according to Equation 64, fsh according to 57/58, Fβx according to 52/53/54
  KHα, KFα according to Method B
- The logarithmically interpolated value taken from the values for the fatigue strength and the static strength, based on the number of load cycles, is used for coefficients ZL, ZV, ZR, ZW, ZX, YdrelT, YRrelT and YX..

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