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-> Gear pair 1 - 2:
The dynamic factor Kv is very high.
The formulae in the standard probably do not suit this case.

3-> The circumferential speed is very high (45.0206 m/s)!
You have to take adequate action to
guarantee proper lubrication.

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

5-> 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]	156.255	
Speed (1/min)	[n]	5024.0	4220.2
Torque (Nm)	[T]	297.0	353.6
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]	196.000	
Center distance tolerance	ISO 286:2010 Measure js7		

Normal module (mm)	[mn]	8.0000	
Normal pressure angle (°)	[αn]	25.0000	
Helix angle at reference circle (°)	[β]	11.0000	
Number of teeth	[z]	21	25
Facewidth (mm)	[b]	28.00	26.00
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]	-1.190
Gear ratio	[u]	1.190
Transverse module (mm)	[mt]	8.150
Transverse pressure angle (°)	[αt]	25.409
Working pressure angle (°)	[αwt]	30.250
	[αwt.e/i]	30.262 / 30.239
Working pressure angle at normal section (°)	[αwn]	29.748
Helix angle at operating pitch circle (°)	[βw]	11.489
Base helix angle (°)	[βb]	9.958
Reference center distance (mm)	[ad]	187.444
Pitch on reference circle (mm)	[pt]	25.603
Base pitch (mm)	[pbt]	23.126
Transverse pitch on contact-path (mm)	[pet]	23.126
Sum of profile shift coefficients	[Σxi]	1.1672
Transverse contact ratio	[εα]	1.190
Transverse contact ratio with allowances	[εα.e/m/i]	1.192 / 1.188 / 1.185
Overlap ratio	[εβ]	0.197
Total contact ratio	[εγ]	1.387
Total contact ratio with allowances	[εγ.e/m/i]	1.389 / 1.386 / 1.382
Length of path of contact (mm)	[ga, e/i]	27.518 (27.564 / 27.395)
Length T1-A (mm)	[T1A]	31.654 (31.608 / 31.738)
Length T1-B (mm)	[T1B]	36.045 (36.045 / 36.007)
Length T1-C (mm)	[T1C]	45.077 (45.056 / 45.098)
Length T1-D (mm)	[T1D]	54.780 (54.734 / 54.865)
Length T1-E (mm)	[T1E]	59.172 (59.172 / 59.134)

Length T2-A (mm)	[T2A]	67.087 (67.087 / 67.048)
Length T2-B (mm)	[T2B]	62.695 (62.650 / 62.779)
Length T2-C (mm)	[T2C]	53.663 (53.639 / 53.688)
Length T2-D (mm)	[T2D]	43.960 (43.960 / 43.921)
Length T2-E (mm)	[T2E]	39.569 (39.523 / 39.653)
Length T1-T2 (mm)	[T1T2]	98.741 (98.695 / 98.786)
Minimal length of contact line (mm)	[Lmin]	26.398

Gear 1

Lead height (mm)	[pz]	2766.052
Axial pitch (mm)	[px]	131.717
Profile shift coefficient	[x]	0.5690
Tooth thickness, arc, in module	[sn*]	2.1015
Tip alteration (mm)	[k*mn]	-0.781
Reference diameter (mm)	[d]	171.144
Base diameter (mm)	[db]	154.589
Tip diameter (mm)	[da]	194.686
(mm)	[da.e/i]	194.686 / 194.640
Tip diameter allowances (mm)	[Ada.e/i]	0.000 / -0.046
Tip form diameter (mm)	[dFa]	194.686
(mm)	[dFa.e/i]	194.686 / 194.640
Root diameter (mm)	[df]	160.248
Generating Profile shift coefficient	[xE.e/i]	0.5563/ 0.5496
Generated root diameter with xE (mm)	[df.e/i]	160.045 / 159.937
Root form diameter (mm)	[dFf]	164.495
(mm)	[dFf.e/i]	164.334 / 164.249
Involute length (mm)	[l_dFa-l_dFf]	17.537
Addendum, $m_n(h_{aP}^*+x+k)$ (mm)	[ha]	11.771
(mm)	[ha.e/i]	11.771 / 11.748
Dedendum (mm)	[hf=mn*(hfP*-x)]	5.448
(mm)	[hf.e/i]	5.550 / 5.603
Tooth height (mm)	[h]	17.219
Virtual gear no. of teeth	[zn]	22.053
Normal tooth thickness at tip circle (mm)	[san]	3.700
(mm)	[san.e/i]	3.626 / 3.536
Normal tooth thickness at tip form circle (mm)	[sFan]	3.700
(mm)	[sFan.e/i]	3.626 / 3.536
Normal space width at root circle (mm)	[efn]	3.858
(mm)	[efn.e/i]	3.888 / 3.904

Gear 2

Lead height (mm)	[pz]	3292.919
Axial pitch (mm)	[px]	131.717
Profile shift coefficient	[x]	0.5982
Tooth thickness, arc, in module	[sn*]	2.1287
Tip alteration (mm)	[k*mn]	-0.781
Reference diameter (mm)	[d]	203.743
Base diameter (mm)	[db]	184.034
Tip diameter (mm)	[da]	227.753
(mm)	[da.e/i]	227.753 / 227.707
Tip diameter allowances (mm)	[Ada.e/i]	0.000 / -0.046
Tip form diameter (mm)	[dFa]	227.753

(mm)	[dFa.e/i]	227.753 / 227.707
Root diameter (mm)	[df]	193.315
Generating Profile shift coefficient	[xE.e/i]	0.5855/ 0.5788
Generated root diameter with xE (mm)	[df.e/i]	193.111 / 193.004
Root form diameter (mm)	[dFf]	197.363
(mm)	[dFf.e/i]	197.192 / 197.102
Involute length (mm)	[l_dFa-l_dFf]	17.550
Addendum, $m_n(h_{aP}^*+x+k)$ (mm)	[ha]	12.005
(mm)	[ha.e/i]	12.005 / 11.982
Dedendum (mm)	[hf=mn*(hfP*-x)]	5.214
(mm)	[hf.e/i]	5.316 / 5.370
Tooth height (mm)	[h]	17.219
Virtual gear no. of teeth	[zn]	26.253
Normal tooth thickness at tip circle (mm)	[san]	3.918
(mm)	[san.e/i]	3.845 / 3.757
Normal tooth thickness at tip form circle (mm)	[sFan]	3.918
(mm)	[sFan.e/i]	3.845 / 3.757
Normal space width at root circle (mm)	[efn]	3.688
(mm)	[efn.e/i]	3.711 / 3.723

Gear specific pair data Gear pair 1, Gear 1

Operating pitch diameter (mm)	[dw]	178.957
(mm)	[dw.e/i]	178.978 / 178.936
Active tip diameter (mm)	[dNa]	194.686
(mm)	[dNa.e/i]	194.686 / 194.640
Theoretical tip clearance (mm)	[c]	2.000
Effective tip clearance (mm)	[c.e/i]	2.201 / 2.079
Active root diameter (mm)	[dNf]	167.049
(mm)	[dNf.e/i]	167.114 / 167.015
Reserve (dNf-dFf)/2 (mm)	[cF.e/i]	1.432 / 1.341
Max. sliding velocity at tip (m/s)	[vga]	13.644
Specific sliding at the tip	[ζa]	0.438
Specific sliding at the root	[ζf]	-0.780
Mean specific sliding	[ζm]	0.438
Sliding factor on tip	[Kga]	0.290
Sliding factor on root	[Kgf]	-0.276
Roll angle at dFa (°)	[ξdFa.e/i]	43.862 / 43.834
Roll angle to dNa (°)	[ξdNa.e/i]	43.862 / 43.834
Roll angle to dNf (°)	[ξdNf.e/i]	23.527 / 23.430
Roll angle at dFf (°)	[ξdFf.e/i]	20.662 / 20.569
Diameter of single contact point B (mm)	[d-B]	170.572 (170.572 / 170.540)
Diameter of single contact point D (mm)	[d-D]	189.476 (189.423 / 189.574)
Addendum contact ratio	[ε]	0.609 (0.610 / 0.607)

Gear specific pair data Gear pair 1, Gear 2

Operating pitch diameter (mm)	[dw]	213.044
(mm)	[dw.e/i]	213.069 / 213.019
Active tip diameter (mm)	[dNa]	227.753
(mm)	[dNa.e/i]	227.753 / 227.707
Theoretical tip clearance (mm)	[c]	2.000
Effective tip clearance (mm)	[c.e/i]	2.201 / 2.079
Active root diameter (mm)	[dNf]	200.328
(mm)	[dNf.e/i]	200.394 / 200.292
Reserve (dNf-dFf)/2 (mm)	[cF.e/i]	1.646 / 1.550

Max. sliding velocity at tip (m/s)	[vga]	12.995
Specific sliding at the tip	[ζa]	0.438
Specific sliding at the root	[ζf]	-0.780
Mean specific sliding	[ζm]	0.438
Sliding factor on tip	[Kga]	0.276
Sliding factor on root	[Kgf]	-0.290
Roll angle at dFa (°)	[ξdFa.e/i]	41.773 / 41.748
Roll angle to dNa (°)	[ξdNa.e/i]	41.773 / 41.748
Roll angle to dNf (°)	[ξdNf.e/i]	24.690 / 24.610
Roll angle at dFf (°)	[ξdFf.e/i]	22.050 / 21.972
Diameter of single contact point B (mm)	[d-B]	222.691 (222.640 / 222.786)
Diameter of single contact point D (mm)	[d-D]	203.958 (203.958 / 203.924)
Addendum contact ratio	[ε]	0.580 (0.582 / 0.578)

General influence factors

		------- Gear 1 -------- Gear 2 --
Nominal circum. force at pitch circle (N)	[Ft]	3470.8
Axial force (N)	[Fa]	674.6
Radial force (N)	[Fr]	1648.7
Normal force (N)	[Fnorm]	3901.2
Nominal circumferential force per mm (N/mm)	[w]	133.49
Only as information: Forces at operating pitch circle:		
Nominal circumferential force (N)	[Ftw]	3319.2
Axial force (N)	[Faw]	674.6
Radial force (N)	[Frw]	1935.7
Circumferential speed reference circle (m/s)	[v]	45.02
Circumferential speed operating pitch circle (m/s)	[v(dw)]	47.08
Running-in value (µm)	[yp]	0.8
Running-in value (µm)	[yf]	1.0
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']	15.836
Meshing stiffness (N/mm/µm)	[cγα]	18.092
Meshing stiffness (N/mm/µm)	[cγβ]	15.378
Reduced mass (kg/mm)	[mRed]	0.07439
Resonance speed (min-1)	[nE1]	7091
Resonance ratio (-)	[N]	0.708
Subcritical range		
Running-in value (µm)	[yα]	0.8
Bearing distance l of pinion shaft (mm)	[l]	56.000
Distance s of pinion shaft (mm)	[s]	5.600
Outside diameter of pinion shaft (mm)	[dsh]	28.000
Load in accordance with Figure 13, ISO 6336-1:2006	[-]	4
0:a), 1:b), 2:c), 3:d), 4:e)		
Coefficient K' according to Figure 13, ISO 6336-1:2006	[K']	-1.00
Without stiffening		
Tooth trace deviation (active) (µm)	[Fβy]	3.83
from deformation of shaft (µm)	[fsh*B1]	3.15
fsh (µm) = 3.15 , B1=1.00 , fHβ5 (µm) = 6.50		
Tooth without tooth trace modification		
Position of contact pattern:	favorable	
from production tolerances (µm)	[fmα*B2]	12.73
B2=		

1.00			
Tooth trace deviation, theoretical (µm)	[Fβx]		4.50
Running-in value (µm)	[yβ]		0.67
Dynamic factor	[Kv]		1.453
Face load factor - flank	[KHβ]		1.072
- Tooth root	[KFβ]		1.049
- Scuffing	[KBβ]		1.072
Transverse load factor - flank	[KHα]		1.000
- Tooth root	[KFα]		1.000
- Scuffing	[KBα]		1.000
Number of load cycles (in mio.)	[NL]	3014.400	2532.096

Tooth root load capacity

Calculation of Tooth form coefficients according method: B

		------- Gear 1 --------	Gear 2 --
Calculated with generating profile shift coefficient	[xE.i]	0.5496	0.5788
Tooth form factor	[YF]	1.29	1.28
Stress correction factor	[YS]	2.19	2.22
Load application angle (°)	[αFen]	32.20	31.55
Load distribution influence factor	[fε]	0.982	
Load application diameter (mm)	[d_{en}]	188.664	221.902
Bending moment arm (mm)	[hF]	11.20	11.25
Tooth thickness at root (mm)	[sFn]	19.51	19.75
Tooth root radius (mm)	[ρF]	3.30	3.24
Bending moment arm (-)	[hF/mn]	1.400	1.406
Tooth thickness at root (-)	[sFn/mn]	2.438	2.469
Tooth root radius (-)	[ρF/mn]	0.412	0.405
Calculation cross section diameter (mm)	[d_{sFn}]	162.460	195.597
Tangents on calculation cross section (°)	[α_{sFn}]	30.000	30.000
Notch parameter	[q_s]	2.958	3.047
Helix angle factor	[Yβ]	1.038	
Deep tooth factor	[YDT]	1.000	
Gear rim factor	[YB]	1.00	1.00
Effective facewidth (mm)	[beff]	28.00	26.00
Nominal stress at tooth root (N/mm²)	[σF0]	45.61	49.18
Tooth root stress (N/mm²)	[σF]	146.07	157.52
Permissible bending stress at root of Test-gear			
Notch sensitivity factor	[YdrelT]	1.004	1.005
Surface factor	[YRrelT]	0.957	0.957
Size factor, tooth root	[YX]	0.970	0.970
Finite life factor	[YNT]	0.871	0.874
$Y_{drelT}*Y_{RrelT}*Y_X*Y_{NT}$		0.811	0.815
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]	436.12	437.98
Limit strength tooth root (N/mm²)	[σFG]	697.79	700.77
Required safety	[SFmin]	1.60	1.60
Safety for tooth root stress	[SF=σFG/σF]	4.78	4.45
Transmittable power (kW)	[kWRating]	466.53	434.46

Flank safety

		------- Gear 1	-------- Gear 2 --
Zone factor	[ZH]	2.035	
Elasticity factor (√N/mm²)	[ZE]	189.812	
Contact ratio factor	[Zε]	0.958	
Helix angle factor	[Zβ]	1.009	
Effective facewidth (mm)	[beff]	26.00	
Nominal contact stress (N/mm²)	[σH0]	447.35	
Contact stress at operating pitch circle (N/mm²)	[σHw]	809.25	
Coefficient [fZCa] 1.20 (Helical gear sets without flank modifications)			
Single tooth contact factor	[ZB,ZD]	1.05	1.02
Contact stress (N/mm²)	[σHB, σHD]	846.97	825.95
Lubrication factor for NL	[ZL]	1.020	1.020
Speed factor for NL	[ZV]	1.044	1.044
Roughness factor for NL	[ZR]	0.986	0.986
Material hardening factor for NL	[ZW]	1.000	1.000
Finite life factor	[ZNT]	0.882	0.887
	[ZL*ZV*ZR*ZNT]	0.926	0.931
Limited pitting is permitted: No			
Size factor (flank)	[ZX]	1.000	1.000
Permissible contact stress, σHG/SHmin (N/mm²)	[σHP]	1068.69	1074.42
Pitting stress limit (N/mm²)	[σHG]	1389.30	1396.75
Required safety	[SHmin]	1.30	1.30
Safety factor for contact stress at operating pitch circle	[SHw]	1.72	1.73
Safety against pressure, σHG/σHBD Single contact	[SHBD]	1.64	1.69
Safety regarding transmittable torque	[(SHBD)^2]	2.69	2.86
Transmittable power (kW)	[kWRating]	248.77	264.41

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]	15.49	
Ca taken as optimal in the calculation (0=no, 1=yes)		0	0
Effective facewidth (mm)	[beff]	26.000	
Applicable circumferential force/facewidth (N/mm)	[wBt]	436.828	
KBγ = 1.000 , wBt*KBγ = 436.828			
Angle factor	[Xαβ]	1.130	

ε1: 0.609 , ε2: 0.580

Flash temperature-criteria			
Lubricant factor	[XL]	0.830	
Tooth mass temperature (°C)	[θMi]	83.32	
θMi = θoil + XS*0.47*Xmp*θflm			
Average flash temperature (°C)	[θflm]	23.61	
Scuffing temperature (°C)	[θS]	348.80	
Γ coordinates (point of highest temperature)	[Γ]	0.214	
[Γ.A]= -0.298 [Γ.E]= 0.313			
Highest contact temp. (°C)	[θB]	125.09	
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]	5.061	
Integral temperature-criteria			
Lubricant factor	[XL]	1.000	
Tooth mass temperature (°C)	[θMC]	85.47	
θMC = θoil + XS*0.70*θflaint			
Mean flash temperature (°C)	[θflaint]	18.41	
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]	0.374	
Dynamic viscosity (mPa*s)	[ηOil]	41.90	(70.0 °C)
Mean coefficient of friction	[μ_m]	0.027	
Geometry factor	[XBE]	0.209	
Meshing factor	[XQ]	1.000	
Tip relief factor	[XCa]	1.091	
Integral tooth flank temperature (°C)	[θint]	113.08	
Required safety	[SSmin]	1.800	
Safety factor for scuffing (intg.-temp.)	[SSint]	3.190	
Safety referring to transmittable torque	[SSL]	6.749	

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]	-0.095 /-0.145	-0.095 /-0.145
Number of teeth spanned	[k]	4.000	5.000
Base tangent length (no backlash) (mm)	[Wk]	88.376	112.266
Base tangent length with allowance (mm)	[Wk.e/i]	88.289 / 88.244	112.180 /112.135
(mm)	[ΔWk.e/i]	-0.086 / -0.131	-0.086 / -0.131
Diameter of measuring circle (mm)	[dMWk.m]	177.358	214.643
Theoretical diameter of ball/pin (mm)	[DM]	16.594	16.233
Effective diameter of ball/pin (mm)	[DMeff]	18.000	18.000
Radial single-ball measurement backlash free (mm)	[MrK]	104.806	121.493
Radial single-ball measurement (mm)	[MrK.e/i]	104.732 /104.693	121.417 /121.377
Diameter of measuring circle (mm)	[dMMr.m]	181.535	215.103
Diametral measurement over two balls without clearance (mm)	[MdK]	209.077	242.542
Diametral two ball measure (mm)	[MdK.e/i]	208.929 /208.852	242.390 /242.310
Diametral measurement over pins without clearance (mm)	[MdR]	209.613	242.986

Measurement over pins according to DIN 3960 (mm)	[MdR.e/i]	209.465 /209.387	242.834 /242.754
Measurement over 2 pins, free, according to AGMA 2002 (mm)	[dk2f.e/i]	208.903 /208.825	242.369 /242.289
Measurement over 3 pins, axial, according to AGMA 2002 (mm)	[dk3A.e/i]	209.465 /209.387	242.834 /242.754

Chordal tooth thickness (no backlash) (mm)	[sc]	16.787	17.011
Normal chordal tooth thickness with allowance (mm)	[sc.e/i]	16.695 / 16.647	16.919 / 16.871
Reference chordal height from da.m (mm)	[ha]	12.157	12.336
Tooth thickness, arc (mm)	[sn]	16.812	17.029
(mm)	[sn.e/i]	16.717 / 16.667	16.934 / 16.884

Backlash free center distance (mm)	[aControl.e/i]	195.827 /195.735
Backlash free center distance, allowances (mm)	[jta]	-0.174 / -0.265
dNf.i with aControl (mm)	[dNf0.i]	166.652 / 199.914
Reserve (dNf0.i-dFf.e)/2 (mm)	[cF0.i]	1.159 / 1.361
Tip clearance (mm)	[c0.i(aControl)]	1.836 / 1.836
Center distance allowances (mm)	[Aa.e/i]	0.023 / -0.023

Circumferential backlash from Aa (mm)	[jtw_Aa.e/i]	0.027 / -0.027
Radial backlash (mm)	[jrw.e/i]	0.288 / 0.151
Circumferential backlash (transverse section) (mm)	[jtw.e/i]	0.336 / 0.176
Normal backlash (mm)	[jn.e/i]	0.282 / 0.153
Torsional angle on input with output fixed:		
Total torsional angle (°)	[j.tSys]	0.2150/0.1124

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]	12.00	12.00
Base circle pitch deviation (µm)	[fpbT]	10.70	10.70
Sector pitch deviation over k/8 pitches (µm)	[Fpk/8T]	25.00	24.00
Profile form deviation (µm)	[ffαT]	13.00	13.00
Profile slope deviation (µm)	[fHαT]	10.00	10.00
Total profile deviation (µm)	[FαT]	17.00	17.00
Helix form deviation (µm)	[ffβT]	10.00	10.00
Helix slope deviation (µm)	[fHβT]	9.00	9.00
Total helix deviation (µm)	[FβT]	14.00	14.00
Total cumulative pitch deviation (µm)	[FpT]	36.00	37.00
Adjacent pitch difference (µm)	[fuT]	17.00	17.00
Runout (µm)	[FrT]	32.00	33.00
Single flank composite, total (µm)	[FisT]	47.00	48.00
Single flank composite, tooth-to-tooth (µm)	[fisT]	11.00	11.00
Radial composite, total (µm)	[FidT]	64.00	64.00
Radial composite, tooth-to-tooth (µm)	[fidT]	34.00	34.00

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) 6

Maximum value for deviation error of axis (µm)	[fΣβ]	15.08	(Fβ= 14.00)
Maximum value for inclination error of axes (µm)	[fΣδ]	30.15	

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]	5.422	7.087
Total mass (kg)	[mGes]	12.509	
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]	0.02135	0.03927
System (da+df)/2...di (kg*m²)	[J]	0.04905	
Torsional stiffness at driving gear with fixed driven gear:			
Torsional stiffness (MNm/rad)	[cr]	2.284	
Torsion when subjected to nominal torque (°)	[δcr]	0.007	
Mean coefficient of friction (as defined in Niemann)	[μ_m]	0.027	
Wear sliding coef. by Niemann	[ζw]	0.522	
Loss factor	[HV]	0.145	
Gear power loss (kW)	[PVZ]	0.606	
Meshing efficiency (%)	[ηz]	99.612	
Sound pressure level according to Masuda, without contact analysis			
	[dB(A)]	89.6	
Oil requirement for injection lubrication (l/min)	[Voil]	1.890	
with oil cooler, for assumed difference in temperature of oil (°C):			
	10		

Service life, damage

Required safety for tooth root	[SFmin]	1.60	
Required safety for tooth flank	[SHmin]	1.30	
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..

End of Report lines: 630
