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 value for KV (2.363) as calculated according to the standard is limited to 2.000.

3-> The circumferential speed is very high (45.0189 m/s)!
You have to take adequate action to
guarantee proper lubrication.

4-> Mesh gear 1 - 2:
Pitch point C is outside the path of contact.
The calculation of scuffing or micropitting can be inaccurate!

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

6-> 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]	156.439	
Speed (1/min)	[n]	4220.0	1406.7
Torque (Nm)	[T]	354.0	1062.0
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]	25	-75
Facewidth (mm)	[b]	26.00	28.00
Hand of gear		right	right
Accuracy grade	[Q-ISO 1328:2013]	A6	A6
Inner diameter (mm)	[di]	0.00	
External diameter (mm)	[di]		787.31
Inner diameter of gear rim (mm)	[dbi]	0.00	
Outer diameter of gear rim (mm)	[dbi]		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]	3.000
Gear ratio	[u]	-3.000
Transverse module (mm)	[mt]	8.150
Transverse pressure angle (°)	[αt]	25.409
Working pressure angle (°)	[αwt]	20.124
	[αwt.e/i]	20.105 / 20.142
Working pressure angle at normal section (°)	[αwn]	19.808
Helix angle at operating pitch circle (°)	[βw]	10.592
Base helix angle (°)	[βb]	9.958
Reference center distance (mm)	[ad]	203.743
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]	0.8774
Transverse contact ratio	[εα]	1.381
Transverse contact ratio with allowances	[εα.e/m/i]	1.388 / 1.383 / 1.377
Overlap ratio	[εβ]	0.197
Total contact ratio	[εγ]	1.579
Total contact ratio with allowances	[εγ.e/m/i]	1.586 / 1.580 / 1.574
Length of path of contact (mm)	[ga, e/i]	31.946 (32.111 / 31.841)
Length T1-A (mm)	[T1A]	37.665 (37.500 / 37.732)
Length T1-B (mm)	[T1B]	46.485 (46.485 / 46.446)
Length T1-C (mm)	[T1C]	33.717 (33.750 / 33.683)
Length T1-D (mm)	[T1D]	60.792 (60.626 / 60.859)

Length T1-E (mm)	[T1E]	69.611 (69.611 / 69.573)
Length T2-A (mm)	[T2A]	105.099 (105.001 / 105.099)
Length T2-B (mm)	[T2B]	113.918 (113.985 / 113.813)
Length T2-C (mm)	[T2C]	101.151 (101.251 / 101.050)
Length T2-D (mm)	[T2D]	128.225 (128.127 / 128.225)
Length T2-E (mm)	[T2E]	137.045 (137.112 / 136.940)
Length T1-T2 (mm)	[T1T2]	67.434 (67.501 / 67.367)
Minimal length of contact line (mm)	[Lmin]	26.398

Gear 1

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]	0.724
Reference diameter (mm)	[d]	203.743
Base diameter (mm)	[db]	184.034
Tip diameter (mm)	[da]	230.763
(mm)	[da.e/i]	230.763 / 230.717
Tip diameter allowances (mm)	[Ada.e/i]	0.000 / -0.046
Tip form diameter (mm)	[dFa]	230.763
(mm)	[dFa.e/i]	230.763 / 230.717
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
Internal toothing: Calculation dFf with pinion type cutter (z0= 25 , x0=0.000)		
Involute length (mm)	[l_dFa-l_dFf]	19.425
Addendum, $m_n(h_{aP}^*+x+k)$ (mm)	[ha]	13.510
(mm)	[ha.e/i]	13.510 / 13.487
Dedendum (mm)	[hf=mn*(hfP*-x)]	5.214
(mm)	[hf.e/i]	5.316 / 5.370
Tooth height (mm)	[h]	18.724
Virtual gear no. of teeth	[zn]	26.253
Normal tooth thickness at tip circle (mm)	[san]	1.770
(mm)	[san.e/i]	1.697 / 1.607
Normal tooth thickness at tip form circle (mm)	[sFan]	1.770
(mm)	[sFan.e/i]	1.697 / 1.607
Normal space width at root circle (mm)	[efn]	3.688
(mm)	[efn.e/i]	3.711 / 3.723

Gear 2

Lead height (mm)	[pz]	9878.756
Axial pitch (mm)	[px]	131.717
Profile shift coefficient	[x]	0.2792
Tooth thickness, arc, in module	[sn*]	1.8312
Tip alteration (mm)	[k*mn]	0.000
Reference diameter (mm)	[d]	611.230
Base diameter (mm)	[db]	552.103

Tip diameter (mm)	[da]	590.763
(mm)	[da.e/i]	590.763 / 590.693
Tip diameter allowances (mm)	[Ada.e/i]	0.000 / -0.070
Tip form diameter (mm)	[dFa]	590.763
(mm)	[dFa.e/i]	590.763 / 590.693
Root diameter (mm)	[df]	626.763
Generating Profile shift coefficient	[xE.e/i]	0.2557/ 0.2450
Generated root diameter with xE (mm)	[df.e/i]	627.310 / 627.138
Root form diameter (mm)	[dFf]	623.061
(mm)	[dFf.e/i]	623.713 / 623.509
Internal toothing: Calculation dFf with pinion type cutter (z0= 24 , x0=0.000)		
Involute length (mm)	[l_dFa-l_dFf]	17.752
Addendum, $m_n(h_{aP}^*+x+k)$ (mm)	[ha]	10.234
(mm)	[ha.e/i]	10.269 / 10.234
Dedendum (mm)	[hf=mn*(hfP*-x)]	7.766
(mm)	[hf.e/i]	7.954 / 8.040
Tooth height (mm)	[h]	18.000
Virtual gear no. of teeth	[zn]	78.759
Normal tooth thickness at tip circle (mm)	[san]	5.691
(mm)	[san.e/i]	5.522 / 5.417
Normal tooth thickness at tip form circle (mm)	[sFan]	5.691
(mm)	[sFan.e/i]	5.522 / 5.417
Normal space width at root circle (mm)	[efn]	2.926
(mm)	[efn.e/i]	2.909 / 2.901

Gear specific pair data Gear pair 1, Gear 1

Operating pitch diameter (mm)	[dw]	196.000
(mm)	[dw.e/i]	195.977 / 196.023
Active tip diameter (mm)	[dNa]	230.763
(mm)	[dNa.e/i]	230.763 / 230.717
Theoretical tip clearance (mm)	[c]	2.000
Effective tip clearance (mm)	[c.e/i]	2.320 / 2.165
Active root diameter (mm)	[dNf]	198.855
(mm)	[dNf.e/i]	198.906 / 198.730
Reserve (dNf-dFf)/2 (mm)	[cF.e/i]	0.902 / 0.769
Max. sliding velocity at tip (m/s)	[vga]	10.575
Specific sliding at the tip	[ζa]	0.344
Specific sliding at the root	[ζf]	0.070
Mean specific sliding	[ζm]	0.344
Sliding factor on tip	[Kga]	-0.244
Sliding factor on root	[Kgf]	0.027
Roll angle at dFa (°)	[ξdFa.e/i]	43.344 / 43.321
Roll angle to dNa (°)	[ξdNa.e/i]	43.344 / 43.321
Roll angle to dNf (°)	[ξdNf.e/i]	23.494 / 23.350
Roll angle at dFf (°)	[ξdFf.e/i]	22.050 / 21.972
Diameter of single contact point B (mm)	[d-B]	206.184 (206.184 / 206.150)
Diameter of single contact point D (mm)	[d-D]	220.570 (220.388 / 220.644)
Addendum contact ratio	[ε]	1.381 (1.388 / 1.377)

Gear specific pair data Gear pair 1, Gear 2

Operating pitch diameter (mm)	[dw]	587.999
(mm)	[dw.e/i]	588.068 / 587.930
Active tip diameter (mm)	[dNa]	590.763

(mm)	[dNa.e/i]	590.763 / 590.693
Theoretical tip clearance (mm)	[c]	2.724
Effective tip clearance (mm)	[c.e/i]	2.903 / 2.768
Active root diameter (mm)	[dNf]	616.395
(mm)	[dNf.e/i]	616.454 / 616.301
Reserve (dNf-dFf)/2 (mm)	[cF.e/i]	3.706 / 3.527
Max. sliding velocity at tip (m/s)	[vga]	-1.163
Specific sliding at the tip	[ζa]	-0.075
Specific sliding at the root	[ζf]	-0.524
Mean specific sliding	[ζm]	0.344
Sliding factor on tip	[Kga]	-0.027
Sliding factor on root	[Kgf]	0.244
Roll angle at dFa (°)	[ξdFa.e/i]	21.793 / 21.814
Roll angle to dNa (°)	[ξdNa.e/i]	21.793 / 21.814
Roll angle to dNf (°)	[ξdNf.e/i]	28.423 / 28.458
Roll angle at dFf (°)	[ξdFf.e/i]	30.068 / 30.113
Diameter of single contact point B (mm)	[d-B]	597.266 (597.317 / 597.186)
Diameter of single contact point D (mm)	[d-D]	608.757 (608.674 / 608.757)
Addendum contact ratio	[ε]	0.000 (0.000 / 0.000)

General influence factors

		------- Gear 1 --------	Gear 2 --
Nominal circum. force at pitch circle (N)	[Ft]	3475.0	
Axial force (N)	[Fa]	675.5	
Radial force (N)	[Fr]	1650.7	
Normal force (N)	[Fnorm]	3906.0	
Nominal circumferential force per mm (N/mm)	[w]	133.65	
Only as information: Forces at operating pitch circle:			
Nominal circumferential force (N)	[Ftw]	3612.2	
Axial force (N)	[Faw]	675.5	
Radial force (N)	[Frw]	1323.6	
Circumferential speed reference circle (m/s)	[v]	45.02	
Circumferential speed operating pitch circle (m/s)	[v(dw)]	43.31	
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']	17.475	
Meshing stiffness (N/mm/µm)	[cγα]	22.474	
Meshing stiffness (N/mm/µm)	[cγβ]	19.103	
Reduced mass (kg/mm)	[mRed]	0.14565	
Resonance speed (min-1)	[nE1]	4745	
Resonance ratio (-)	[N]	0.889	
Range of the main resonance!			
Running-in value (µm)	[yα]	0.8	
Bearing distance l of pinion shaft (mm)	[l]	52.000	
Distance s of pinion shaft (mm)	[s]	5.200	
Outside diameter of pinion shaft (mm)	[dsh]	26.000	
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]	4.25	

from deformation of shaft (µm)	[fsh*B1]		5.08
fsh (µm) = 5.08 , B1=1.00 , fHβ5 (µm) = 7.00			
Tooth without tooth trace modification			
Position of contact pattern:		favorable	
from production tolerances (µm)	[fmα*B2]		13.45
B2= 1.00			
Tooth trace deviation, theoretical (µm)	[Fβx]		5.00
Running-in value (µm)	[yβ]		0.75
Dynamic factor	[Kv]		2.000
Note: Kv is limited by preset Kv <= Kvmax = 2.00			
Face load factor - flank	[KHβ]		1.072
- Tooth root	[KFβ]		1.050
- 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]	2532.000	844.000

Tooth root load capacity

Calculation of Tooth form coefficients according method: B

Internal toothing: Calculation of YF, YS with pinion type cutter, z0= 24 , x0= 0.000 , ρaP0*= 0.380

		Gear 1	Gear 2
Calculated with generating profile shift coefficient	[xE.i]	0.5788	0.2450
Tooth form factor	[YF]	1.12	1.08
Stress correction factor	[YS]	2.34	2.74
Load application angle (°)	[αFen]	30.39	22.94
Load distribution influence factor	[fε]	0.970	
Load application diameter (mm)	[d_{en}]	219.785	-597.788
Bending moment arm (mm)	[hF]	9.89	12.49
Tooth thickness at root (mm)	[sFn]	19.75	23.45
Tooth root radius (mm)	[ρF]	3.24	2.47
Bending moment arm (-)	[hF/mn]	1.236	1.561
Tooth thickness at root (-)	[sFn/mn]	2.469	2.931
Tooth root radius (-)	[ρF/mn]	0.405	0.308
Calculation cross section diameter (mm)	[d_{sFn}]	195.597	-626.637
Tangents on calculation cross section (°)	[α_{sFn}]	30.000	60.000
Notch parameter	[q_s]	3.047	4.750
Helix angle factor	[Yβ]	1.038	
Deep tooth factor	[YDT]	1.000	
Gear rim factor	[YB]	1.00	1.00
Effective facewidth (mm)	[beff]	26.00	28.00
Nominal stress at tooth root (N/mm²)	[σF0]	45.60	47.41
Tooth root stress (N/mm²)	[σF]	201.00	208.99
Permissible bending stress at root of Test-gear			
Notch sensitivity factor	[YdrelT]	1.005	1.018
Surface factor	[YRrelT]	0.957	0.957
Size factor, tooth root	[YX]	0.970	0.970
Finite life factor	[YNT]	0.874	0.893

$Y_{drelT}*Y_{RrelT}*Y_X*Y_{NT}$		0.815	0.844
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]	437.98	453.67
Limit strength tooth root (N/mm²)	[σFG]	700.77	725.87
Required safety	[SFmin]	1.60	1.60
Safety for tooth root stress	[SF=σFG/σF]	3.49	3.47
Transmittable power (kW)	[kWRating]	340.89	339.59

Flank safety

		------- Gear 1 --------	Gear 2 --
Zone factor	[ZH]	2.567	
Elasticity factor (√N/mm²)	[ZE]	189.812	
Contact ratio factor	[Zε]	0.918	
Helix angle factor	[Zβ]	1.009	
Effective facewidth (mm)	[beff]	26.00	
Nominal contact stress (N/mm²)	[σH0]	298.68	
Contact stress at operating pitch circle (N/mm²)	[σHw]	633.85	
Coefficient [fZCa] 1.20 (Helical gear sets without flank modifications)			
Single tooth contact factor	[ZB,ZD]	1.00	1.00
Contact stress (N/mm²)	[σHB, σHD]	633.85	633.85
Lubrication factor for NL	[ZL]	1.020	1.020
Speed factor for NL	[ZV]	1.044	1.044
Roughness factor for NL	[ZR]	1.006	1.006
Material hardening factor for NL	[ZW]	1.000	1.000
Finite life factor	[ZNT]	0.887	0.917
	[ZL*ZV*ZR*ZNT]	0.949	0.982
Limited pitting is permitted: No			
Size factor (flank)	[ZX]	1.000	1.000
Permissible contact stress, σHG/SHmin (N/mm²)	[σHP]	1095.39	1132.93
Pitting stress limit (N/mm²)	[σHG]	1424.00	1472.81
Required safety	[SHmin]	1.30	1.30
Safety factor for contact stress at operating pitch circle	[SHw]	2.25	2.32
Safety against pressure, σHG/σHBD Single contact	[SHBD]	2.25	2.32
Safety regarding transmittable torque	[(SHBD)^2]	5.05	5.40
Transmittable power (kW)	[kWRating]	467.20	499.78

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]	12.49	
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]	601.933	
KBγ = 1.000 , wBt*KBγ = 601.933			
Angle factor	[Xαβ]	0.985	
ε1: 1.381 , ε2: 0.000			
Flash temperature-criteria			
Lubricant factor	[XL]	0.830	
Tooth mass temperature (°C)	[θMi]	82.74	
θMi = θoil + XS*0.47*Xmp*θflm			
Average flash temperature (°C)	[θflm]	22.58	
Scuffing temperature (°C)	[θS]	348.80	
Γ coordinates (point of highest temperature)	[Γ]	0.797	
[Γ.A]= 0.117 [Γ.E]= 1.065			
Highest contact temp. (°C)	[θB]	121.14	
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]	5.452	
Integral temperature-criteria			
Lubricant factor	[XL]	1.000	
Tooth mass temperature (°C)	[θMC]	76.60	
θMC = θoil + XS*0.70*θflaint			
Mean flash temperature (°C)	[θflaint]	7.85	
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]	0.387	
Dynamic viscosity (mPa*s)	[ηOil]	41.90	(70.0 °C)
Mean coefficient of friction	[μ_m]	0.022	
Geometry factor	[XBE]	0.116	
Meshing factor	[XQ]	1.000	
Tip relief factor	[XCa]	1.372	
Integral tooth flank temperature (°C)	[θint]	88.38	
Required safety	[SSmin]	1.800	
Safety factor for scuffing (intg.-temp.)	[SSint]	4.082	
Safety referring to transmittable torque	[SSL]	15.822	

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	-0.175 /-0.255
Number of teeth spanned	[k]	5.000	-0.000
For internal toothing: k = measurement gap number			
Base tangent length (no backlash) (mm)	[Wk]	112.266	-0.000
Base tangent length with allowance (mm)	[Wk.e/i]	112.180 /112.135	-0.000 / -0.000

(mm)	[ΔWk.e/i]	-0.086 / -0.131	0.000 / 0.000
Diameter of measuring circle (mm)	[dMWk.m]	214.643	-0.000
Theoretical diameter of ball/pin (mm)	[DM]	16.233	13.518
Effective diameter of ball/pin (mm)	[DMeff]	18.000	14.000
Radial single-ball measurement backlash free (mm)	[MrK]	121.493	293.058
Radial single-ball measurement (mm)	[MrK.e/i]	121.417 /121.377	293.356 /293.263
Diameter of measuring circle (mm)	[dMMr.m]	215.103	606.181
Diametral measurement over two balls without clearance (mm)	[MdK]	242.542	585.984
Diametral two ball measure (mm)	[MdK.e/i]	242.390 /242.310	586.580 /586.394
Diametral measurement over pins without clearance (mm)	[MdR]	242.986	-0.000
Measurement over pins according to DIN 3960 (mm)	[MdR.e/i]	242.834 /242.754	-0.000 / -0.000
Measurement over 2 pins, free, according to AGMA 2002 (mm)	[dk2f.e/i]	242.369 /242.289	0.000 / 0.000
Measurement over 3 pins, axial, according to AGMA 2002 (mm)	[dk3A.e/i]	242.834 /242.754	-0.000 / -0.000

Note: Internal gears with helical teeth cannot be measured with rollers.

Chordal tooth thickness (no backlash) (mm)	[sc]	17.011	14.648
Normal chordal tooth thickness with allowance (mm)	[sc.e/i]	16.919 / 16.871	14.471 / 14.390
Reference chordal height from da.m (mm)	[ha]	13.841	10.167
Tooth thickness, arc (mm)	[sn]	17.029	14.649
(mm)	[sn.e/i]	16.934 / 16.884	14.474 / 14.394

Backlash free center distance (mm)	[aControl.e/i]	196.358 /196.529
Backlash free center distance, allowances (mm)	[jta]	0.359 / 0.530
dNf.i with aControl (mm)	[dNf0.i]	197.648 617.756
Reserve (dNf0.i-dFf.e)/2 (mm)	[cF0.i]	0.228 2.876
Tip clearance (mm)	[c0.i(aControl)]	1.658 2.262
Center distance allowances (mm)	[Aa.e/i]	-0.023 / 0.023
Circumferential backlash from Aa (mm)	[jtw_Aa.e/i]	0.017 / -0.017
Radial backlash (mm)	[jrw.e/i]	0.553 / 0.336
Circumferential backlash (transverse section) (mm)	[jtw.e/i]	0.409 / 0.248
Normal backlash (mm)	[jn.e/i]	0.382 / 0.225
Torsional angle on input with output fixed:		
Total torsional angle (°)	[j.tSys]	0.2390/0.1448

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	11.30
Sector pitch deviation over k/8 pitches (µm)	[Fpk/8T]	24.00	28.00
Profile form deviation (µm)	[ffαT]	13.00	13.00
Profile slope deviation (µm)	[fHαT]	10.00	11.00
Total profile deviation (µm)	[FαT]	17.00	17.00
Helix form deviation (µm)	[ffβT]	10.00	11.00
Helix slope deviation (µm)	[fHβT]	9.00	10.00
Total helix deviation (µm)	[FβT]	14.00	15.00
Total cumulative pitch deviation (µm)	[FpT]	37.00	46.00
Adjacent pitch difference (µm)	[fuT]	17.00	18.00
Runout (µm)	[FrT]	33.00	41.00
Single flank composite, total (µm)	[FisT]	48.00	57.00
Single flank composite, tooth-to-tooth (µm)	[fisT]	11.00	11.00
Radial composite, total (µm)	[FidT]	64.00	83.00
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)

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Maximum value for deviation error of axis (µm)	[fΣβ]	15.00	(Fβ=	15.00)
Maximum value for inclination error of axes (µm)	[fΣδ]	30.00		

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]	7.189	14.585
Total mass (kg)	[mGes]	21.773	
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]	0.04040	1.50568
System (da+df)/2...di (kg*m²)	[J]	0.20770	
Torsional stiffness at driving gear with fixed driven gear:			
Torsional stiffness (MNm/rad)	[cr]	4.371	
Torsion when subjected to nominal torque (°)	[δcr]	0.005	
Mean coefficient of friction (as defined in Niemann)	[μ_m]	0.024	
Wear sliding coef. by Niemann	[ζw]	0.475	
Loss factor	[HV]	0.130	
Gear power loss (kW)	[PVZ]	0.486	
Meshing efficiency (%)	[ηz]	99.690	
Sound pressure level according to Masuda, without contact analysis			
	[dB(A)]	102.1	
Oil requirement for injection lubrication (l/min)	[Voil]	1.516	
with oil cooler, for assumed difference in temperature of oil (°C):			

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Service life, damage

Required safety for tooth root	[SFmin]	1.60	
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..

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