WORM GEAR ANALYSIS

Drawing or article number:
Worm: 0.000.0
Gear: 0.000.0

Calculation method DIN 3996:2012
(Geometry: DIN 3975:2002)
Geometry calculation from axial module

Power (kW) [P] 4.500
Worm driving
Power (kW) [P] 5.302
Speed (1/min) [n] 1500.0
Torque (Nm) [T] 33.754
Application factor [KA] 1.00
Required service life [H] 25000.00
Number of starts (1/h) [Ns] 0.00

1. TOOTH GEOMETRY AND MATERIAL

Shape of flank: ZI (ISO/DTR 10828.2:2011)

Center distance (mm) [a] 100.000
Centre distance tolerance ISO 286:2010 Measure js7
Shaft angle (°) [Sigma] 90.0000
Transverse module (mm) [mt] 4.0000
Normal module (mm) [mn] 3.9047
Axial module (mm) [mx] 4.0000
Pressure angle at normal section (°) [alfn] 20.0000
Mean lead angle (°) [gamma] 12.5288
Hand of gear left left
Number of teeth [z] 2 41
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facewidth (mm)</td>
<td>60.00</td>
<td></td>
</tr>
<tr>
<td>Wheel rim width b2R (mm)</td>
<td></td>
<td>31.00</td>
</tr>
<tr>
<td>Wheel width b2H (mm)</td>
<td></td>
<td>31.00</td>
</tr>
<tr>
<td>Facewidth for calculation (mm)</td>
<td>60.00</td>
<td>30.83</td>
</tr>
<tr>
<td>Accuracy grade (manufacturing)</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>Internal diameter gearbody (mm)</td>
<td></td>
<td>134.40</td>
</tr>
</tbody>
</table>

**Material**

Worm: 16 MnCr 5 (1), Case-carburized steel, case-hardened
ISO 6336-5 Figure 9/10 (MQ), core strength >=25HRC Jominy

J=12mm<HRC28

Gear 2: CuSn12Ni2-C-GZ, Bronze, untreated
DIN 3996:2005

<table>
<thead>
<tr>
<th>Surface hardness</th>
<th>HRC 59</th>
<th>HBW 95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulsating shear strength (N/mm²)</td>
<td>[tauFlim]</td>
<td>430.00</td>
</tr>
<tr>
<td>Fatigue strength for Hertzian pressure (N/mm²)</td>
<td>[sigHlim]</td>
<td>1500.00</td>
</tr>
<tr>
<td>Material Coefficient YW</td>
<td>[YW]</td>
<td>0.95</td>
</tr>
<tr>
<td>Material lubrication coefficient</td>
<td>[WML_PolyG]</td>
<td>1.75</td>
</tr>
<tr>
<td>Tensile strength (N/mm²)</td>
<td>[Rm]</td>
<td>1000.00</td>
</tr>
<tr>
<td>Yield point (N/mm²)</td>
<td>[Rp]</td>
<td>695.00</td>
</tr>
<tr>
<td>Young's modulus (N/mm²)</td>
<td>[E]</td>
<td>206000</td>
</tr>
<tr>
<td>Poisson's ratio</td>
<td>[ny]</td>
<td>0.300</td>
</tr>
<tr>
<td>Roughness average value DS, flank (µm)</td>
<td>[RAH]</td>
<td>0.50</td>
</tr>
<tr>
<td>Roughness average value DS, root (µm)</td>
<td>[RAF]</td>
<td>0.50</td>
</tr>
<tr>
<td>Mean roughness height, Rz, flank (µm)</td>
<td>[RZH]</td>
<td>3.00</td>
</tr>
<tr>
<td>Mean roughness height, Rz, root (µm)</td>
<td>[RZF]</td>
<td>3.00</td>
</tr>
</tbody>
</table>

**Gear reference profile 1:**
Reference profile 1.20 / 0.20 / 1.0 DIN 867:1986

- Dedendum coefficient: hfP* = 1.200
- Root radius factor: rhofP* = 0.200 (rhofPmax* = 0.498)
- Addendum coefficient: haP* = 1.000
- Tip radius factor: rhoaP* = 0.000
- Protuberance height factor: hprP* = 0.000
- Protuberance angle: alfprP = 0.000
- Tip form height coefficient: hFaP* = 0.000
- Ramp angle: alfKP = 0.000

**Gear reference profile 2:**
Reference profile 1.20 / 0.20 / 1.0 DIN 867:1986

- Dedendum coefficient: hfP* = 1.200
Root radius factor \[\text{rhofP}^*\] 0.200 (\text{rhofPmax}^* = 0.498)

Addendum coefficient \[\text{haP}^*\] 1.000

Tip radius factor \[\text{rhoaP}^*\] 0.000

Protuberance height factor \[\text{hprP}^*\] 0.000

Protuberance angle \[\text{alfprP}\] 0.000

Tip form height coefficient \[\text{hFaP}^*\] 0.000

Ramp angle \[\text{alfKP}\] 0.000

not topping

Summary of reference profile gears:

<table>
<thead>
<tr>
<th>Description</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedendum reference profile [\text{hfP}^*]</td>
<td>1.200</td>
<td>1.200</td>
</tr>
<tr>
<td>Tooth root radius Refer. profile [\text{rofP}^*]</td>
<td>0.200</td>
<td>0.200</td>
</tr>
<tr>
<td>Addendum Reference profile [\text{haP}^*]</td>
<td>1.000</td>
<td>1.000</td>
</tr>
<tr>
<td>Protuberance height factor [\text{hprP}^*]</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Protuberance angle (°) [\text{alfprP}]</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Tip form height coefficient [\text{hFaP}^*]</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Ramp angle (°) [\text{alfKP}]</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Type of profile modification:

none (only running-in)

Tip relief (µm) \[\text{Ca}\] 0.0 0.0

Lubrication type oil bath lubrication
Type of oil (Own input) Öl: ISO-VG 220
Lubricant base Synthetic oil based on Polyglycol

Kinem. viscosity oil at 40 °C (mm²/s) \[\text{nu40}\] 220.00
Kinem. viscosity oil at 100 °C (mm²/s) \[\text{nu100}\] 37.00

Specific density at 15 °C (kg/dm³) \[\text{roOil}\] 1.020
Oil temperature (°C) \[\text{TS}\] 73.226
Ambient temperature (°C) \[\text{TU}\] 20.000

--------- WORM---------------- WHEEL -----

Generating angle (°) \[\text{alfa0}\] 20.000
Pressure angle at normal section (°) \[\text{alfn}\] 20.000

Indications for the manufacture of the worm wheel according to ISO 14521:
(Only valid for worm wheels which are manufactured with a hob similar to the worm.)

Mean lead angle of the worm (°) \[\text{gamma}\] 12.5288
Transverse module (mm) \[\text{mt}\] 4.0000
Reference diameter (mm) \[\text{d}\] 164.000
Reference operating diameter (mm) \[\text{dm}\] 164.000
Throat radius (mm) \[\text{rk}\] 14.000
Throat center distance (mm) \[\text{a_rk}\] 100.000
**Facewidth chamfer angle (mm)** [\(\theta\)] \(0.000\)  
**Chamfering center distance (mm)** [\(a_\theta\)] \(100.000\)  
**External diameter (mm)** [\(d_e\)] \(181.410\)  
**Tip diameter (mm)** [\(d_a\)] \(172.000\)  
**Profile shift coefficient** [\(x\)-worm] \(0.0000\)  
**Pitch on reference circle (mm)** [\(p_2\)] \(12.566\)

**Indications for the manufacture of the worm wheel as a cylindrical gear**

(This specification is only a suggestion. It is necessary to do a calculation of the exact geometry using the crossed-helical calculation!)

<table>
<thead>
<tr>
<th>Description</th>
<th>Value 1</th>
<th>Value 2</th>
<th>Value 3</th>
<th>Value 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure angle at Transverse section (°) [(\alpha_{lf})]</td>
<td>(59.205)</td>
<td>20.448</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pressure angle at axial section (°) [(\alpha_{lx})]</td>
<td>(20.448)</td>
<td>59.205</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helix angle at reference circle (°) [(\beta)]</td>
<td>(77.471)</td>
<td>12.529</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead angle at reference diameter (°) [(\gamma)]</td>
<td>(12.529)</td>
<td>77.471</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transverse module (mm) [(m_t)]</td>
<td>(18.000)</td>
<td>4.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Axial module (mm) [(m_x)]</td>
<td>(4.000)</td>
<td>18.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Helix angle at operating pitch circle (°) [(\beta_{as})]</td>
<td>(77.471)</td>
<td>12.529</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operating pitch diameter (mm) [(d_w)]</td>
<td>(36.000)</td>
<td>164.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profile shift coefficient [(x)-DIN3960]</td>
<td>(0.0000)</td>
<td>0.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall transmission ratio [(i_{tot})]</td>
<td>-20.500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gear ratio [(u)]</td>
<td>20.500</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Base helix angle (°) [(\beta_{b})]</td>
<td></td>
<td></td>
<td></td>
<td>11.762</td>
</tr>
<tr>
<td>Reference centre distance (mm) [(d_a)]</td>
<td></td>
<td></td>
<td></td>
<td>100.000</td>
</tr>
<tr>
<td>Diametral factor q [(q)]</td>
<td></td>
<td></td>
<td></td>
<td>9.000</td>
</tr>
<tr>
<td>Sum of profile shift coefficients [(\sum_{x_{n}})]</td>
<td></td>
<td></td>
<td></td>
<td>0.0000</td>
</tr>
<tr>
<td>Profile shift coefficient [(x)-worm]</td>
<td>0.0000</td>
<td>0.0000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Profile shift ((x^m)) (mm)</td>
<td>0.0000</td>
<td>0.0000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(The profile shift is related to the axial module of the worm subject to ISO TR 14521:2010/DIN 3975:2002.)

<table>
<thead>
<tr>
<th>Description</th>
<th>Value 1</th>
<th>Value 2</th>
<th>Value 3</th>
<th>Value 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tip alteration (mm) [(k^m)]</td>
<td>0.000</td>
<td>0.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Theoretical tip clearance (mm) [(c)]</td>
<td>0.800</td>
<td>0.800</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Effective tip clearance (mm) [(c_{e/i})]</td>
<td>1.059/</td>
<td>0.963/</td>
<td>0.877/</td>
<td>0.782</td>
</tr>
<tr>
<td>Reference operating diameter (mm) [(d_m)]</td>
<td>36.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reference diameter (mm) [(d)]</td>
<td></td>
<td></td>
<td></td>
<td>164.000</td>
</tr>
<tr>
<td>Base diameter (mm) [(d_b)]</td>
<td></td>
<td></td>
<td></td>
<td>153.666</td>
</tr>
<tr>
<td>Tip diameter (mm) [(d_a)]</td>
<td>44.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tip form diameter (mm) [(d_Fa)]</td>
<td>44.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tip diameter allowances (mm) [(Ada_{e/i})]</td>
<td>0.000/</td>
<td>-0.010</td>
<td>0.000/</td>
<td>-0.010</td>
</tr>
<tr>
<td>Root diameter (mm) [(d_f)]</td>
<td>26.400</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Generating Profile shift coefficient [(x_{E,e/i})]</td>
<td>-0.0450/</td>
<td>-0.0591</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Manufactured root diameter with xE (mm) [(d_F.e/i)]</td>
<td>26.400/</td>
<td>26.290</td>
<td>154.040</td>
<td>153.927</td>
</tr>
<tr>
<td>Lead height (mm) [(p_z)]</td>
<td>25.133</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4/10
Axial pitch (mm) \[px\] 12.566
Transverse contact ratio (approximate value following Thomas-Charchut) \[\varepsilon_a\] 1.911

For ZI-worms:
Base diameter (mm) \[db\] 18.431
Base lead angle (°) \[gamb\] 23.463
Base pitch (mm) \[pb\] 11.527

2. FACTORS OF GENERAL INFLUENCE

<table>
<thead>
<tr>
<th></th>
<th>WORM</th>
<th>WHEEL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nominal circum. force at pitch circle (N) [Ft]</td>
<td>1875.2</td>
<td>7162.0</td>
</tr>
<tr>
<td>Axial force (N) [Fa]</td>
<td>-7162.0</td>
<td>-1875.2</td>
</tr>
<tr>
<td>Radial force (N) [Fr]</td>
<td>2847.3</td>
<td>-2847.3</td>
</tr>
<tr>
<td>Normal force (N) [Fn]</td>
<td>8343.7</td>
<td></td>
</tr>
<tr>
<td>Circumferential speed reference circle (m/s) [v]</td>
<td>2.827</td>
<td>0.628</td>
</tr>
<tr>
<td>Sliding velocity an mean circle (m/s) [vgm]</td>
<td>2.896</td>
<td></td>
</tr>
<tr>
<td>Number of load cycles (in mio.) [NL]</td>
<td>2249.999</td>
<td>109.756</td>
</tr>
</tbody>
</table>

Data of reference gearbox:
Equivalent Young's modulus (N/mm²) \[E_{redT}\] 150622.00
Surface roughness of worm (µm) \[RaT\] 0.500
Center distance (mm) \[aT\] 100.000
Transmission ratio \[uT\] 20.500
Reference operating diameter (mm) \[dm_{1T}\] 36.000 164.000
Characteristic value for mean Hertzian pressure \[p_{mT^*}\] 0.962
Characteristic value for mean lubricant gap thickness \[h_{T^*}\] 0.070
Characteristic value for mean sliding path \[s_{T^*}\] 30.800

Physical characteristic values:
Characteristic value for mean lubrication Space width \[h^*\] 0.0692
Characteristic value for mean Hertzian pressure \[p_{m^*}\] 0.9470
Characteristic value for mean sliding path \[s^*\] 30.2850

Efficiency according method C:
Rolling bearing with set support
Bearing loss-power (kW) \[PV_{LP}\] 0.126
Number of sealings (worm-shaft) \[n_{VD}\] 2
Sealing power loss (kW) \[PV_{DV}\] 0.046
Idle power loss (kW) \[PV_{0}\] 0.153
Base friction number \[\mu_{OT}\] 0.0245
Size factor \[YS\] 1.000
Geometry factor \[YG\] 1.006
Roughness factor \[YR\] 1.000
Material Coefficient YW \([YW]\) \(0.950\)
Mean tooth friction number \([muzm]\) \(0.0234\)
Tooth friction angle (°) \([roz]\) \(1.341\)
Meshing efficiency (%) \([etaz]\) \(90.002\)
Meshing power loss (kW) \([PVZ]\) \(0.477\)
Total power loss (kW) \([PV]\) \(0.802\)
Total efficiency (%) \([etaGes]\) \(84.872\)

Wheel bulk temperature:
Lubrication type oil bath lubrication
Worm submerges into lubricant
Cooling area of wheel-pair \((cm^2)\) \([AR]\) \(50.840\)
Heat-transfer coefficient wheels \((W/m^2/K)\) \([alfL]\) \(24439.990\)
Wheel bulk temperature \((°C)\) \([theM]\) \(77.1\)
Oil sump temperature \((°C)\) \([theS]\) \(73.2\)

3. WEAR SUPPORT CAPABILITY ACCORDING METHOD B,C

Mean lubricant gap thickness (µm) \([hminm]\) \(0.2480\)
(hminm calculated with \(\eta_0 M = 0.0642 \text{Ns/m}^2\) \(\text{the} M = 77.1^\circ\))
Pressure factor \([WH]\) \(1.0000\)
Factor for lubricant structure \([WS]\) \(2.6140\)
Factor for start \([WNS]\) \(1.0000\)
Characteristic value \([Kw]\) \(0.6484\)
Wear intensity \([JOT]\) \(5.10181e-010\)
Wear intensity \([Jw]\) \(8.92817e-010\)
Wear path (m) \([sWm]\) \(815829\)
Wear removal (mm) \([delWn]\) \(0.728\)
Permissible tooth thickness reduction (coefficient in module) \([DeltaS]\) \(0.300\)
Permissible mass decrease (kg)
Normal-tooth thickness at tip circle (mm) \([san]\) \(2.907\)
\(\text{san.e/i}\) \(2.778/ 2.731\)
Permissible wear on flanc (mm) \([delWlimn]\) \(1.171\)
Limited by: Permissible tooth thickness decrease
Safety against wear \([SW]\) \(1.608\)
Required safety \([SWmin]\) \(1.100\)
As information:
Achievable service life (with \(SW = 1.100\)) \((h)\) \([Lh]\) \(36551.07\)

4. PITTING SUPPORT CAPABILITY ACCORDING METHOD B,C

--- WORM----------- WHEEL -----
Equivalent Young’s modulus \((N/mm^2)\) \([Ered]\) \(149673.38\)
Mean flank pressure (N/mm²) [sigHm] 367.36
Life coefficient [Zh] 1.000
Speed factor [ZV] 0.851
Size factor [ZS] 1.000
Lubrication factor [Zoil] 1.000
Ratio factor [Zu] 1.000
Boundary value of average flank pressure (N/mm²) [sigHG] 442.766
Safety for surface pressure on flank [SH] 1.205
Required safety [SHmin] 1.000
As information:
Achievable service life (with SHmin = 1.000) (h) [Lh] 76640.67

5. BENDING SAFETY

Bearing distance l1 (mm) [l1] 150.000
Distance l11 (mm) [l11] 75.000
Deflection (mm) [delm] 0.030
Boundary value bending (mm) [dellim] 0.080
Safety for bending [Sdel] 2.632
Required safety [Sdelmin] 1.000

6. TOOTH ROOT SUPPORT CAPABILITY ACCORDING METHOD C

Calculation taking into account the decrease of the tooth thickness due to wear
(with minimum (delWn, delWlimn))
Tooth thickness at root (mm) [sft2] 9.663
Tooth form factor [YF2] 1.200
Contact ratio factor [Yeps] 0.500
Lead coefficient [Ygam] 1.024
Rim thickness (mm) [sk2] 10.000
Rim thickness coefficient [YK2] 1.000
Nominal shear stress at tooth root (N/mm²) [tauF2] 35.51
No Quality reduction by small plastic deformation is accepted.
Life coefficient [YNL] 1.000
Boundary value of shear stress at tooth root (N/mm²) [tauFG] 90.00
Safety for Tooth root stress [SF] 2.534
Required safety [SFmin] 1.100

7. TEMPERATURE SAFETY ACCORDING METHOD C

Housing with cooler
Ambient temperature (°C) [TU] 20.0
8. ALLOWANCES FOR TOOTH THICKNESS

Tooth thickness deviation

<table>
<thead>
<tr>
<th>Component</th>
<th>Value 1</th>
<th>Value 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worm:</td>
<td>Own Input</td>
<td>Own Input</td>
</tr>
<tr>
<td>Gear:</td>
<td>Own Input</td>
<td>Own Input</td>
</tr>
</tbody>
</table>

-------- WORM----------- WHEEL ----

Tooth thickness allowance (normal section) (mm) [As.e/i] 0.000/ -0.040 -0.128/ -0.168

Backlash free center distance (mm) [aControl] 99.820/ 99.707
Backlash free center distance, allowances (mm) [jta] -0.180/ -0.293

Number of teeth spanned [k] 5.000
Base tangent length (mm) [Wk] 54.275
Actual base tangent length ('span') (mm) [Wk.e/i] 54.155/ 54.117
Diameter of contact point (mm) [dMWk.m] 162.549
Base tangent length (span): Can only be measured, if the worm-wheel is manufactured like a cylindrical gear!

Theoretical diameter of ball/pin (mm) [dm] 6.545 6.615
Eff. Diameter of ball/pin (mm) [DMeff] 7.000 7.000
Radial one ball mass (mm) [MrK] 87.190
Actual dimension centre to ball (mm) [MrK.e/i] 87.034/ 86.985
Diameter of contact point (mm) [dMMr.m] 37.166 164.455
Diametral two ball measure (mm) [MdK] 174.257
Actual dimension over balls (mm) [MdK.e/i] 173.946/ 173.848
Theoretical dim. over 3 wires (mm) [Md3R] 46.559
Actual diametral dimensions over 3 rolls (mm) [Md3R.e/i] 46.559/ 46.452

Normal tooth thickness (chord) in the reference circle (mm) ['sn] 6.133 6.132
Tooth thickness in the transverse section (chord) in the reference circle (mm) ['st] 6.282
Tooth thickness in the transverse section (Arc) (mm) [st] 6.283
Tooth thickness on axial cut (mm) [smx] 6.283
Tooth space in axial cut (mm) [emx] 6.283
Reference chordal height from da.m (mm) [ham1, ha2] 3.997

Centre distance allowances (mm) [Aa.e/i] 0.018/ -0.018
Circumferential backlash (transverse section) (mm) [jt] 0.226/ 0.118
Normal backlash (mm) [jn] 0.207/ 0.108

9. GEAR ACCURACY

According to DIN 3974:1995:
Accuracy grade[Vqual] 6 7
Single pitch deviation (µm) [fpx, fp2] 8.50 13.00
Adjacent pitch difference (µm) [fux, fu2] 11.00 16.00
Total deviation of the slope (µm) [Fpz] 11.00
Total cumulative pitch deviation (µm) [Fp2] 51.00
Profile slope deviation (µm) [fHa] 7.50 11.00
Profile form deviation (µm) [ffa] 11.00 15.00
Total profile deviation (µm) [Fa] 13.00 19.00
Runout (µm) [Fr] 18.00 35.00
Single flank composite, total (µm) [F'i] 29.00 56.00
Single flank composite, tooth-to-tooth (µm) [f'i] 15.00 22.00

10. ADDITIONAL DATA

Weight - calculated with da (kg) [Mass] 0.714 2.455
Start under load:
Tooth friction number (acc. Niemann) [muzm_S] 0.140
Torque (Nm) [T1_S] 48.195 587.282

11. SERVICE LIFE, DAMAGE

Required safety for tooth root [SFmin] 1.10
Required safety for tooth flank [SHmin] 1.00

Service life (calculated with required safeties):
System service life (h) [Hatt] 36551
Tooth root service life (h) [HFatt] 1e+006 1e+006
Tooth flank service life (h) [HHatt] 1e+006 1e+006

Note: The entry 1e+006 h means that the Service life > 1,000,000 h.
Damage calculated on basis of required service life

\[ H \] (25000.0 h)

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

Damage calculated on basis of system service life

\[ H_{att} \] (36551.1 h)

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

REMARKS:
- Specifications with [..] imply: Maximum [e] and Minimal value [i] with consideration of all tolerances
- The specification of circumferential backlash (as well as the backlash-free distance for the tooth thickness check) is not yet fully checked, and serves only as a guide.
- The details of the chordal tooth thickness are imprecise and merely an indication (The calculation is done according to ISO TR 14521:2010/DIN 3975:2002, without taking into account the exact shape of flank.).
- In ISO14521 and DIN3996, the necessary data for each material are not always complete. In such a case you get the message: "Not calculated (material data missing)"

End of Report

lines:
425