

KISSsoft - Release 03-2012E

FEES Verzahnungstechnik GmbH

File

Name : spurgear\_t8\_approx

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## CALCULATION OF A CYLINDRICAL SPUR GEAR PAIR

### 1. TOOTH GEOMETRY

		----- GEAR 1 -----	----- GEAR 2 -----
Center distance (mm)	[a]	8.731	
Normal module (mm)	[mn]	0.5292	
Pressure angle at normal section (°)	[alfn]	20.0000	
Helix angle at reference circle (°)	[beta]	0.0000	
Number of teeth	[z]	8	25
Facewidth (mm)	[b]	3.20	3.00
Hand of gear		Geradverzahnt	
Overall transmission ratio	[itot]	-3.125	
Dedendum reference profile (module)	[hfP*]	1.2500	1.2500
Tooth root rad. Refer. profile (module)	[rofP*]	0.3800	0.3800
Addendum Reference profile (module)	[haP*]	1.0000	1.0000
Working transverse pressure angle (°)	[alfwt]	20.0000	
Profile shift coefficient	[x]	0.5292	-0.5292
Tooth thickness (Arc) (module)	[sn*]	1.9560	1.1856
Normal Tooth thickness at Tip cyl. (mm)	[san]	0.0227	0.4390
Reference diameter (mm)	[d]	4.2334	13.2293
Base diameter (mm)	[dB]	3.9781	12.4314
Operating pitch diameter (mm)	[dw]	4.2334	13.2293
Tip diameter (mm)	[da]	5.8518	13.7275
Root diameter (mm)	[df]	3.4705	11.3463
Theoretical tip clearance (mm)	[c]	0.1323	0.1323
Specific sliding at the tip	[zetaa]	0.8665	0.7524
Specific sliding at the root	[zetaf]	-3.0395	-6.4924
Transverse contact ratio	[eps_a]	1.2087	

## 2. MEASUREMENTS FOR TOOTH THICKNESS

		----- GEAR 1 -----	----- GEAR 2 -----
		DIN 58405:1972	DIN 58405:1972
Tooth thickness deviation			
Tooth thickness allowance (normal section) (mm)	[As.e/i]	-0.0383 / -0.0628	-0.0479 / -0.0798
Chordal tooth thickness (no backlash) (mm)	['sn]	1.0248	0.6271
<b>Actual chordal tooth thickness (mm)</b>	<b>['sn.e/i]</b>	<b>0.9865 / 0.9620</b>	0.5792 / 0.5473
Tooth thickness (Arc) (mm)	[sn]	1.0351	0.6274
	(mm) [sn.e/i]	0.9968 / 0.9723	0.5795 / 0.5476
Generating Profile shift coefficient	[xE.e/i]	0.4297 / 0.3662	-0.6535 / -0.7364
Number of teeth spanned	[k]	2.0000	2.0000
Base tangent length (no backlash) (mm)	[Wk]	2.5941	2.3370
Actual base tangent length ('span') (mm)	[Wk.e/i]	2.5581 / 2.5351	2.2920 / 2.2620
Eff. Diameter of ball/pin (mm)	[DMeff]	1.5000	0.8950
Diametral measurement over two balls without clearance (mm)	[MdK]	7.2877	13.8531
Actual dimension over balls (mm)	[MdK.e/i]	7.2380 / 7.2060	13.6846 / 13.5489
Theor. dimension over two pins (mm)	[MdR]	7.2877	13.8531
Actual dimension over rolls (mm)	[MdR.e/i]	7.2380 / 7.2060	13.6846 / 13.5489

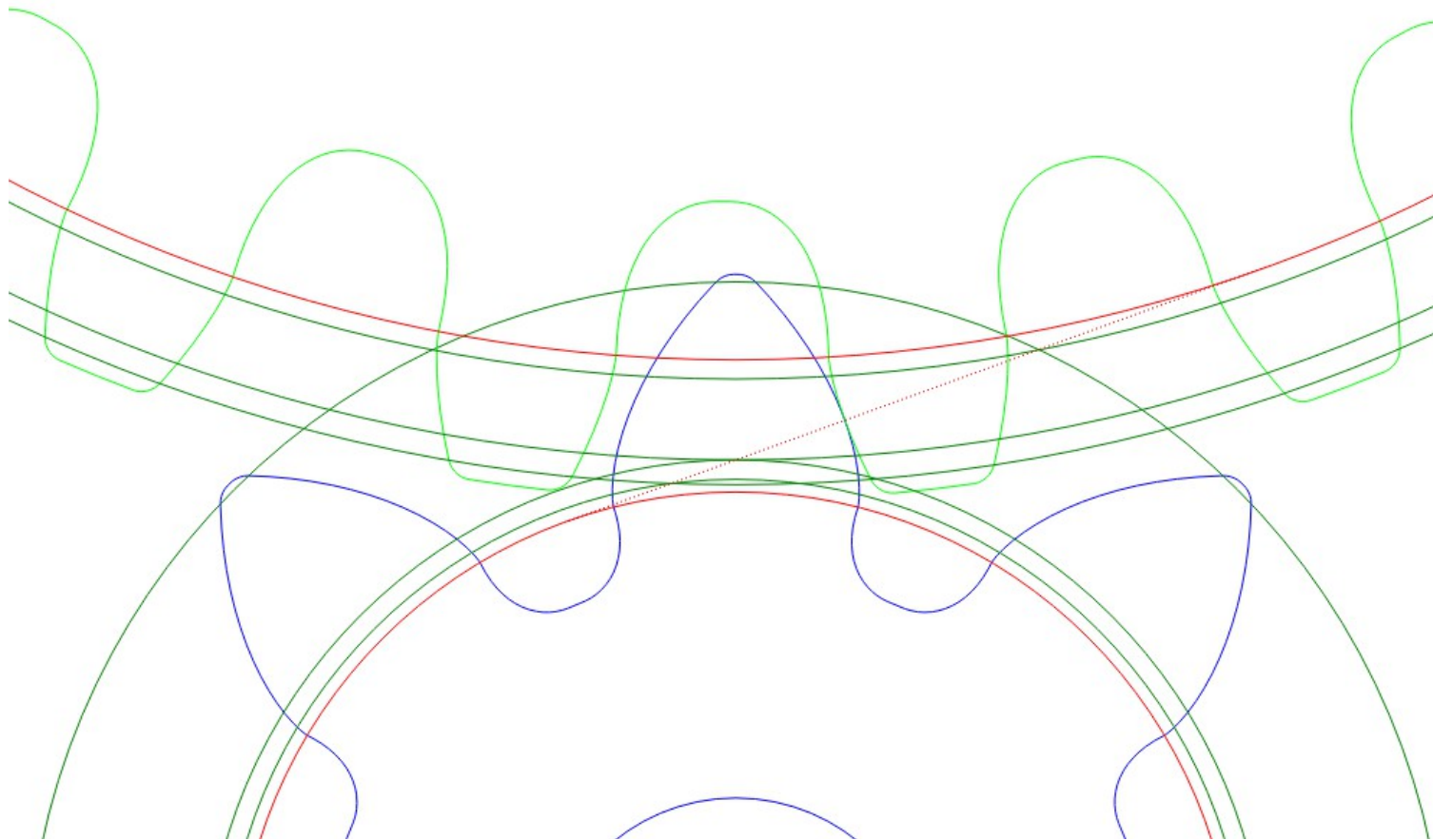
## 3. Gearmesh at max. and min. flankclearance

<b>Tip diameter eff. (mm)</b>	<b>[da.e/i]</b>	<b>5.7465 / 5.6793</b>	13.5959 / 13.5082
Tip diameter allowances (mm)	[Ada.e/i]	-0.1053 / -0.1725	-0.1316 / -0.2193
<b>Effective root diameter (mm)</b>	<b>[df.e/i]</b>	<b>3.3653 / 3.2980</b>	11.2147 / 11.1270
Root diameter allowances (mm)	[Adf.e/i]	-0.1053 / -0.1725	-0.1316 / -0.2193
Tip form diameter eff. (mm)	[dFa.e/i]	5.6903 / 5.6231	13.4760 / 13.3883
Active root diameter eff. (mm)	[dNf.e/i]	4.2743 / 3.9812	12.6923 / 12.4983
Centre distance allowances (mm)	[Aa.e/i]	0.1000 / -0.1000	
Effective tip clearance (mm)	[c.e/i]	0.4282 / 0.1507	0.4282 / 0.1507
Circumferential backlash from Aa (mm)	[jt_Aa.e/i]	0.0728 / -0.0728	
Radial clearance (mm)	[jr]	0.3187 / 0.0256	
Circumferential backlash (transverse section) (mm)	[jt]	0.2154 / 0.0134	
Torsional angle using fixed values gear 1 (°)		1.8657 / 0.1161	
Normal backlash (mm)	[jn]	0.2024 / 0.0126	
Transverse contact ratio with allowances [eps_a.e/m/i]		1.2518 / 1.0117 / 0.7715	

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#### 4. TOLERANCES

		----- GEAR 1 -----	----- GEAR 2 -----
According to DIN 3961:			
Accuracy grade	[Q-DIN3961]	9	9
Profile deviation ( $\mu\text{m}$ )	[ff]	13.00	13.00
Profile angular deviation ( $\mu\text{m}$ )	[fHa]	12.00	12.00
Profile total deviation ( $\mu\text{m}$ )	[Ff]	18.00	18.00
Helix form deviation ( $\mu\text{m}$ )	[ffb]	14.00	14.00
Helix slope deviation ( $\mu\text{m}$ )	[fHb]	25.00	25.00
Tooth helix deviation ( $\mu\text{m}$ )	[Fb]	28.00	28.00
Single pitch deviation ( $\mu\text{m}$ )	[fpe]	17.00	17.00
Single normal pitch deviation ( $\mu\text{m}$ )	[fp]	17.00	17.00
Difference between adjacent pitches ( $\mu\text{m}$ )	[fu]	21.00	22.00
Total cumulative pitch deviation ( $\mu\text{m}$ )	[Fp]	33.00	46.00
Cumulative circular pitch deviation over $z/8$ pitches ( $\mu\text{m}$ )	[Fpz/8]	21.00	29.00
Runout tolerance ( $\mu\text{m}$ )	[Fr]	23.00	29.00
Tooth Thickness Variation ( $\mu\text{m}$ )	[Rs]	14.00	17.00
Total radial composite tolerance ( $\mu\text{m}$ )	[Fi"]	31.00	40.00
Tooth-to-tooth radial composite tolerance ( $\mu\text{m}$ )	[fi"]	10.00	15.00
Total tangential composite deviation ( $\mu\text{m}$ )	[Fi']	41.00	51.00
Tooth-to-tooth tangential composite deviation ( $\mu\text{m}$ )	[fi']	24.00	24.00
According to DIN 58405 (Precision Mechanics):			
Tooth-to-tooth composite error ( $\mu\text{m}$ )	[fi"]	12.00	16.00
Composite error ( $\mu\text{m}$ )	[Fi"]	36.00	45.00
Axis alignment error ( $\mu\text{m}$ )	[fp]	3.14	3.14
Flank direction error ( $\mu\text{m}$ )	[fbeta]	11.00	11.00



Gearmesh with centered tolerances