

Spur Gears Component Generator (Version: 2013 (Build 170138000, 138))

26. 5. 2014

☒ Project Info

☒ Guide

Design Guide - Center Distance

Unit Corrections Guide - User

Type of Load Calculation - Torque calculation for the specified power and speed

Type of Strength Calculation - Check Calculation

Method of Strength Calculation - ISO 6336:1996

☒ Common Parameters

Gear Ratio	i	7,9565 ul
Desired Gear Ratio	i _{in}	7,9630 ul
Module	m	6,000 mm
Helix Angle	β	19,5283 deg
Pressure Angle	α	20,0000 deg
Center Distance	a _w	655,719 mm
Product Center Distance	a	655,719 mm
Total Unit Correction	Σx	0,0000 ul
Circular Pitch	p	18,850 mm
Base Circular Pitch	p _{tb}	18,657 mm
Operating Pressure Angle	α _w	20,0000 deg
Tangential Pressure Angle	α _t	21,1158 deg
Tangential Operating Pressure Angle	α _{tw}	21,1158 deg
Base Helix Angle	β _b	18,3073 deg
Tangential Module	m _t	6,366 mm
Tangential Circular Pitch	p _t	20,000 mm
Contact Ratio	ε	2,4948 ul
Transverse Contact Ratio	ε _α	1,5194 ul
Overlap Ratio	ε _β	0,9754 ul
Limit Deviation of Axis Parallelity	f _x	0,0150 mm
Limit Deviation of Axis Parallelity	f _y	0,0075 mm

☒ Gears

		Gear 1	Gear 2
Type of model		Component	Component
Number of Teeth	z	23 ul	183 ul
Unit Correction	x	0,3500 ul	-0,3500 ul
Pitch Diameter	d	146,423 mm	1165,016 mm
Outside Diameter	d _a	162,623 mm	1172,816 mm
Root Diameter	d _f	135,623 mm	1145,816 mm

Tangential Force	F_t	24689,402 N
Axial Force	F_a	8756,718 N
Normal Force	F_n	27877,531 N
Circumferential Speed	v	2,147 mps
Resonance Speed	n_{E1}	6738,090 rpm

☐ Material

		Gear 1	Gear 2
		16MnCr5	16MnCr5
Ultimate Tensile Strength	S_u	785 MPa	785 MPa
Yield Strength	S_y	588 MPa	588 MPa
Modulus of Elasticity	E	206000 MPa	206000 MPa
Poisson's Ratio	μ	0,300 ul	0,300 ul
Bending Fatigue Limit	σ_{Flim}	700,0 MPa	700,0 MPa
Contact Fatigue Limit	σ_{Hlim}	1270,0 MPa	1270,0 MPa
Hardness in Tooth Core	JHV	210 ul	210 ul
Hardness in Tooth Side	VHV	650 ul	650 ul
Base Number of Load Cycles in Bending	N_{Flim}	3000000 ul	3000000 ul
Base Number of Load Cycles in Contact	N_{Hlim}	100000000 ul	100000000 ul
Wöhler Curve Exponent for Bending	q_F	9,0 ul	9,0 ul
Wöhler Curve Exponent for Contact	q_H	10,0 ul	10,0 ul
Type of Treatment	type	4 ul	4 ul

☐ Strength Calculation

☐ Factors of Additional Load

Application Factor	K_A	1,200 ul
Dynamic Factor	K_{Hv}	1,016 ul
Face Load Factor	$K_{H\beta}$	1,111 ul
Transverse Load Factor	K_{Ha}	1,082 ul
One-time Overloading Factor	K_{AS}	1,000 ul

☐ Factors for Contact

Elasticity Factor	Z_E	189,812 ul
Zone Factor	Z_H	2,377 ul
Contact Ratio Factor	Z_ϵ	0,814 ul
Single Pair Tooth Contact Factor	Z_B	1,000 ul
Life Factor	Z_N	1,000 ul
Lubricant Factor	Z_L	0,967 ul
Roughness Factor	Z_R	1,000 ul
Speed Factor	Z_V	0,965 ul
Helix Angle Factor	Z_β	0,971 ul
Size Factor	Z_X	1,000 ul

Work Hardening Factor	Z_W	1,000 ul
-----------------------	-------	----------

▣ Factors for Bending

Form Factor	Y_{Fa}	2,250 ul	2,182 ul
Stress Correction Factor	Y_{Sa}	1,791 ul	1,833 ul
Teeth with Grinding Notches Factor	Y_{Sag}	1,000 ul	1,000 ul
Helix Angle Factor	Y_{β}	0,841 ul	
Contact Ratio Factor	Y_{ϵ}	0,695 ul	
Alternating Load Factor	Y_A	1,000 ul	1,000 ul
Production Technology Factor	Y_T	1,000 ul	1,000 ul
Life Factor	Y_N	1,000 ul	1,000 ul
Notch Sensitivity Factor	Y_{δ}	1,179 ul	1,176 ul
Size Factor	Y_X	1,000 ul	1,000 ul
Tooth Root Surface Factor	Y_R	1,000 ul	

▣ Results

Factor of Safety from Pitting	S_H	1,478 ul	1,612 ul
Factor of Safety from Tooth Breakage	S_F	3,598 ul	3,315 ul
Static Safety in Contact	S_{Hst}	3,147 ul	3,149 ul
Static Safety in Bending	S_{Fst}	7,631 ul	7,050 ul
Check Calculation		Positive	

▣ Summary of Messages

19:40:36 Calculation: Calculation indicates design compliance!