

Spur Gears Component Generator (Version: 2017 (Build 210142000, 142))

8. 6. 2018

☐ Project Info

☐ Guide

Design Guide - Module

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

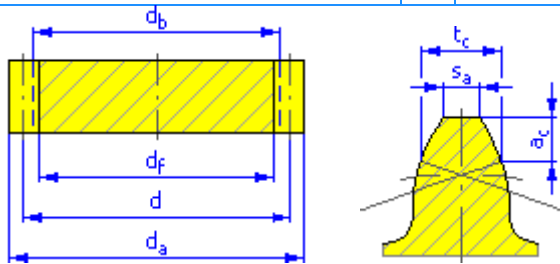
☐ Common Parameters

Gear Ratio	i	1,0000 ul
Desired Gear Ratio	lin	1,0000 ul
Module	m	3,000 mm
Helix Angle	β	0,0000 deg
Pressure Angle	α	20,0000 deg
Center Distance	aw	120,000 mm
Product Center Distance	a	120,000 mm
Total Unit Correction	Σx	0,0000 ul
Circular Pitch	p	9,425 mm
Base Circular Pitch	ptb	8,856 mm
Operating Pressure Angle	α_w	20,0000 deg
Contact Ratio	ϵ	1,7135 ul
Limit Deviation of Axis Parallelity	fx	0,0120 mm
Limit Deviation of Axis Parallelity	fy	0,0060 mm

☐ Gears

		Gear 1	Gear 2
Type of model		Component	Component
Number of Teeth	z	40 ul	40 ul
Unit Correction	x	0,0000 ul	0,0000 ul
Pitch Diameter	d	120,000 mm	120,000 mm
Outside Diameter	da	126,000 mm	126,000 mm
Root Diameter	df	112,500 mm	112,500 mm
Base Circle Diameter	db	112,763 mm	112,763 mm
Work Pitch Diameter	dw	120,000 mm	120,000 mm
Facewidth	b	24,000 mm	24,000 mm
Facewidth Ratio	br	0,2000 ul	0,2000 ul
Addendum	a*	1,0000 ul	1,0000 ul
Clearance	c*	0,2500 ul	0,2500 ul
Root Fillet	rf*	0,3500 ul	0,3500 ul
Tooth Thickness	s	4,712 mm	4,712 mm
Tangential Tooth Thickness	st	4,712 mm	4,712 mm

Chordal Thickness	t_c	4,161 mm	4,161 mm
Chordal Addendum	a_c	2,243 mm	2,243 mm
Chordal Dimension	W	41,534 mm	41,534 mm
Chordal Dimension Teeth	z_w	5,000 ul	5,000 ul
Dimension Over (Between) Wires	M	130,117 mm	130,117 mm
Wire Diameter	d_M	6,000 mm	6,000 mm
Limit Deviation of Helix Angle	F_β	0,0120 mm	0,0120 mm
Limit Circumferential Run-out	F_r	0,0210 mm	0,0210 mm
Limit Deviation of Axial Pitch	f_{pt}	0,0085 mm	0,0085 mm
Limit Deviation of Basic Pitch	f_{pb}	0,0080 mm	0,0080 mm
Virtual Number of Teeth	z_v	40,000 ul	40,000 ul
Virtual Pitch Diameter	d_n	120,000 mm	120,000 mm
Virtual Outside Diameter	d_{an}	126,000 mm	126,000 mm
Virtual Base Circle Diameter	d_{bn}	112,763 mm	112,763 mm
Unit Correction without Tapering	x_z	-0,1588 ul	-0,1588 ul
Unit Correction without Undercut	x_p	-1,3198 ul	-1,3198 ul
Unit Correction Allowed Undercut	x_d	-1,4898 ul	-1,4898 ul
Addendum Truncation	k	0,0000 ul	0,0000 ul
Unit Outside Tooth Thickness	s_a	0,7607 ul	0,7607 ul
Tip Pressure Angle	α_a	26,4986 deg	26,4986 deg



▣ Loads

		Gear 1	Gear 2
Power	P	0,500 kW	0,490 kW
Speed	n	46,67 rpm	46,67 rpm
Torque	T	102,307 N m	100,260 N m
Efficiency	η	0,980 ul	
Radial Force	F_r	620,609 N	
Tangential Force	F_t	1705,110 N	
Axial Force	F_a	0,000 N	
Normal Force	F_n	1814,540 N	
Circumferential Speed	v	0,293 mps	
Resonance Speed	n_{E1}	6972,404 rpm	

▣ Material

		Gear 1	Gear 2
		User material	User material
Ultimate Tensile Strength	S_u	700 MPa	700 MPa

Yield Strength	Sy	340 MPa	340 MPa
Modulus of Elasticity	E	206000 MPa	206000 MPa
Poisson's Ratio	μ	0,300 ul	0,300 ul
Bending Fatigue Limit	σ_{Flim}	352,0 MPa	352,0 MPa
Contact Fatigue Limit	σ_{Hlim}	1140,0 MPa	1140,0 MPa
Hardness in Tooth Core	JHV	210 ul	210 ul
Hardness in Tooth Side	VHV	600 ul	600 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	6,0 ul	6,0 ul
Wöhler Curve Exponent for Contact	q _H	10,0 ul	10,0 ul
Type of Treatment	type	2 ul	2 ul

Strength Calculation

Factors of Additional Load

Application Factor	KA	1,200 ul	
Dynamic Factor	K _{Hv}	1,014 ul	1,014 ul
Face Load Factor	K _{Hβ}	1,497 ul	1,322 ul
Transverse Load Factor	K _{Hα}	1,163 ul	1,163 ul
One-time Overloading Factor	K _{AS}	1,000 ul	

Factor of Safety from Pitting	S _H	1,770 ul	1,770 ul
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Factors for Contact			
Elasticity Factor	ZE	189,812 ul	
Zone Factor	ZH	2,495 ul	
Contact Ratio Factor	Zε	0,873 ul	
Single Pair Tooth Contact Factor	ZB	1,002 ul	1,002 ul
Life Factor	ZN	1,136 ul	1,136 ul
Lubricant Factor	ZL	0,962 ul	
Roughness Factor	ZR	1,000 ul	
Speed Factor	Zv	0,932 ul	
Helix Angle Factor	Zβ	1,000 ul	
Size Factor	ZX	1,000 ul	1,000 ul
Work Hardening Factor	ZW	1,000 ul	

Factors for Bending

Form Factor	YFa	2,416 ul	2,416 ul
Stress Correction Factor	YSa	1,687 ul	1,687 ul
Teeth with Grinding Notches Factor	YSag	1,000 ul	1,000 ul
Helix Angle Factor	Yβ	1,000 ul	
Contact Ratio Factor	Yε	0,688 ul	
Alternating Load Factor	YA	1,000 ul	1,000 ul
Production Technology Factor	YT	1,000 ul	1,000 ul
Life Factor	YN	1,000 ul	1,000 ul
Notch Sensitivity Factor	Yδ	1,173 ul	1,173 ul
Size Factor	YX	1,000 ul	1,000 ul
Tooth Root Surface Factor	YR	1,000 ul	

Results

Factor of Safety from Tooth Breakage	SF	3,326 ul	3,326 ul
Static Safety in Contact	SHst	1,451 ul	1,451 ul
Static Safety in Bending	SFst	7,086 ul	7,086 ul
Check Calculation	Positive		

Summary of Messages

18:19:27 Design: Numbers of teeth are commensurable - shots of the same teeth are taken relatively regularly
 18:19:27 Calculation: Calculation indicates design compliance!