



# Spur gearing, Helical gearing [mm/ISO]

<b>i</b>	<b>Calculation without errors.</b>	<b>Pinion</b>	<b>Gear</b>	
----------	------------------------------------	---------------	-------------	--

<b>ii</b>	<input type="checkbox"/> <b>Project information</b>			
-----------	---	--	--	--

## ? Input section

### 1.0 Options of basic input parameters

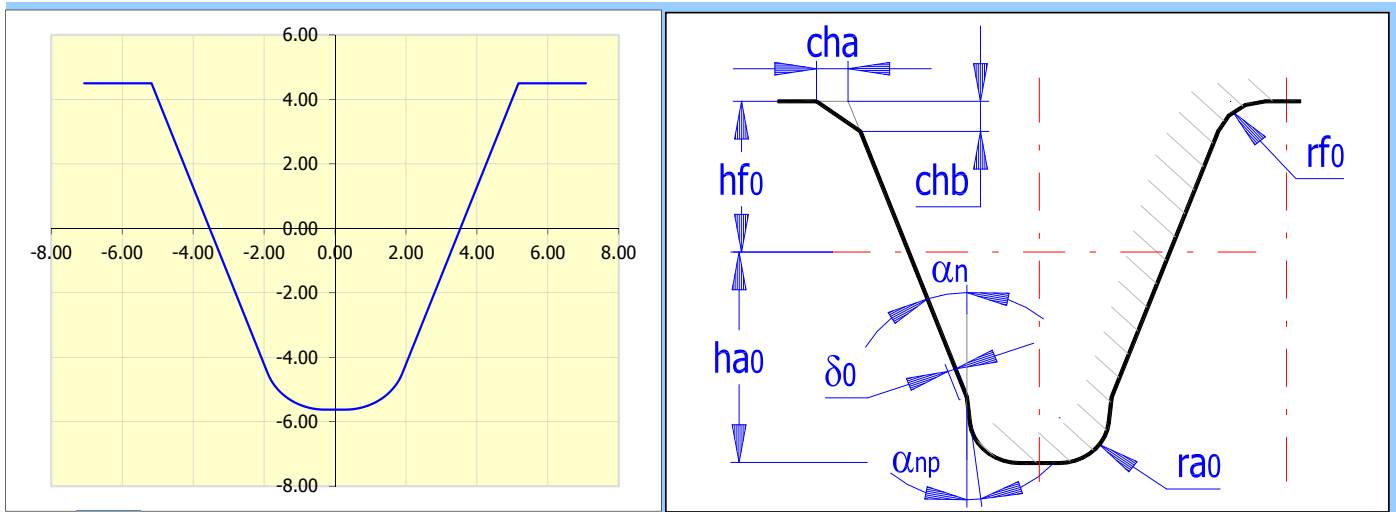
1.1	Transferred power	Pw [kW]	100.000	99.050	
1.2	Speed (Pinion / Gear)	n [/min]	1000.00	395.8	[/min]
1.3	Torsional moment (Pinion / Gear)	Mk [Nm]	955.00	2389.72	[Nm]
1.4	Transmission ratio / from table	i	2.500		
1.5	Actual transmission ratio / deviation	i	2.526	1.04%	

### 2.0 Options of material, loading conditions, operational and production parameters

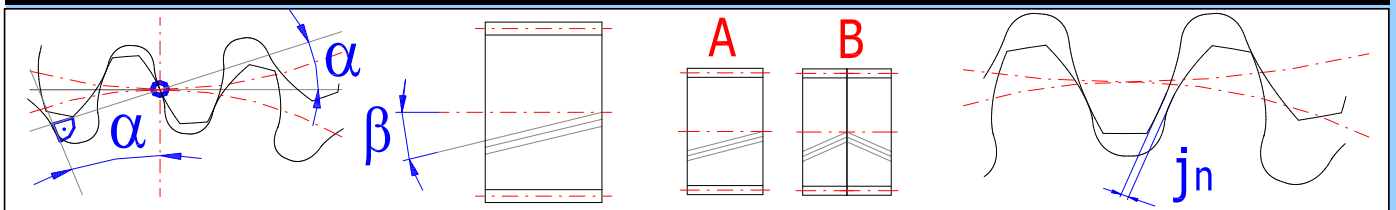
2.1	Material identification according standard :	ISO			
2.2	Material of the pinion :	E,F...Alloy structural steel T2(683/7-70) (Rm=785 MPa) tooth face hard.			
2.3	Material of the gear :	E,F...Alloy structural steel T2(683/7-70) (Rm=785 MPa) tooth face hard.			
2.4	Loading of the gearbox, driving machine - examples	A...Continuous			
2.5	Loading of gearbox, driven machine - examples	A...Continuous			
2.6	Type of gearing mounting	A. Double-sided symmetrically supported gearing - type 1			
2.7	Accuracy grade - ISO1328  Ra max v max	6.....(Ra max.= 0.8 / v max.= 15)			
2.8	Coefficient of one-off overloading	KAS	2.00		
2.9	Desired service life	Lh	20000		[h]
2.10	Coefficient of safety (contact/bend)	SH / SF	1.30	1.60	
2.11	Automatic design				

### 3.0 Parameters of the cutting tool and tooth profile

3.1	Standardized tool	1. DIN 867 (a=20deg, ha0=1.25, hf0=1.0, ra0=0.38, d0=0, anp=0deg, ca=0.25)			
3.2	Addendum of tool	ha0*	1.250	1.250	[modul]
3.3	Dedendum of tool	hf0*	1.000	1.000	[modul]
3.4	Fillet radius of tool	ra0*	0.380	0.380	[modul]
3.5	Root fillet radius of tool	rf0*	0.000	0.000	[modul]
3.6	Chamfer of root	cha*	0.000	0.000	[modul]
3.7	Chamfer of root	chb*	0.000	0.000	[modul]
3.8	Protuberance hight	δ0*	0.000	0.000	[modul]
3.9	Protuberance angle	αnp	0.000	0.000	[°]
3.10	Min. unit head clearance	ca*min	0.2500	0.2500	[modul]
3.11	Unit head clearance	ca*	0.2500	0.2500	[modul]

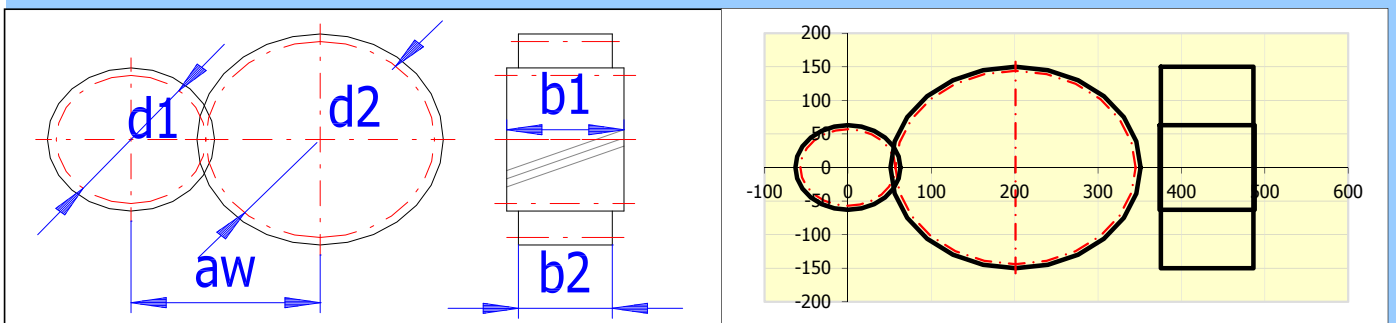


**4.0**  **Design of a module and geometry of toothing**



- 4.1 Number of teeth Pinion / Gear
- 4.2 Normal pressure angle
- 4.3 Base helix angle
- 4.4 Setting of the ratio of the width of the pinion to its diameter
- 4.5 The ratio of the pinion width to its diameter
- 4.6 Module / Standardized value
- 4.7 Reference diameter Pinion / Gear
- 4.8 Recommended width of gearing
- 4.9 Face width (Pinion / Gear)
- 4.10 Working face width
- 4.11 The ratio of the pinion width to its diameter
- 4.12 Working center distance
- 4.13 Approximate weight of the gearing
- 4.14 Minimum coefficient of safety

z	19	48	
$\alpha$	20		[°]
$\beta$	0		[°]
$\Psi_d / \max$	1.00	< 1.1	
mn [mm]	6		[mm]
d1/d2	114.00	288.00	[mm]
	67 - 125		[mm]
b1/b2	114.00	111.00	[mm]
bw	111		<input checked="" type="checkbox"/> [mm]
$\Psi_d / \max$	1.00	< 1.1	
aw	201.000		[mm]
m	65.235		[kg]
SH / SF	1.40	3.61	



**4.15 Normal backlash**

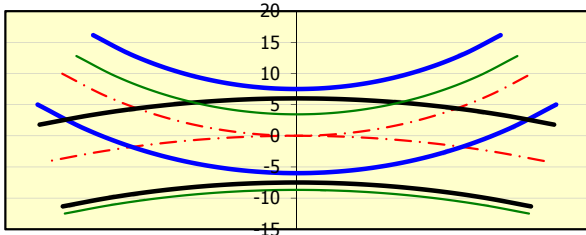
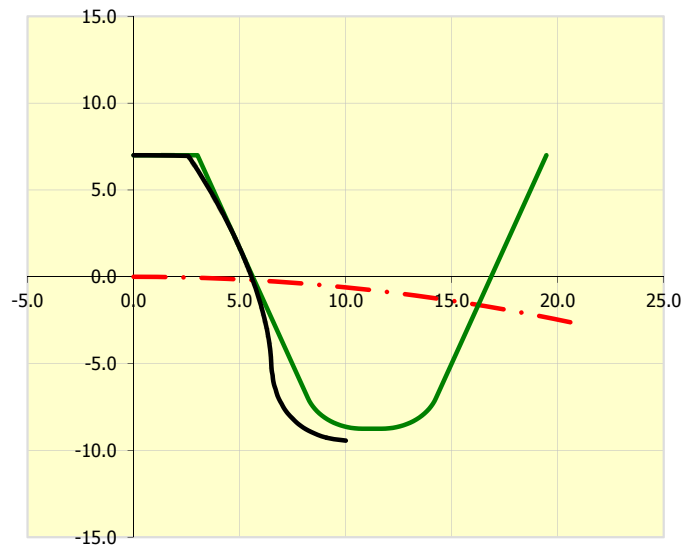
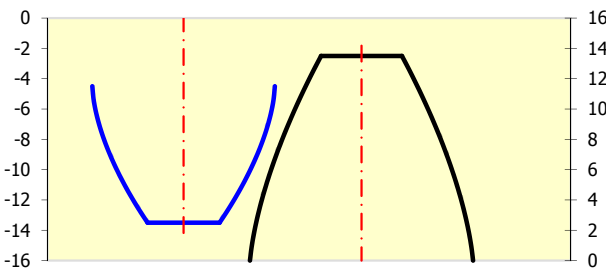
4.16 - Recommended min.   max. value	0.085	0.340	[mm]
4.17 - Selected normal backlash	j_n = 0.0000		[mm]

## 5.0 Correction of toothing (Addendum modification)

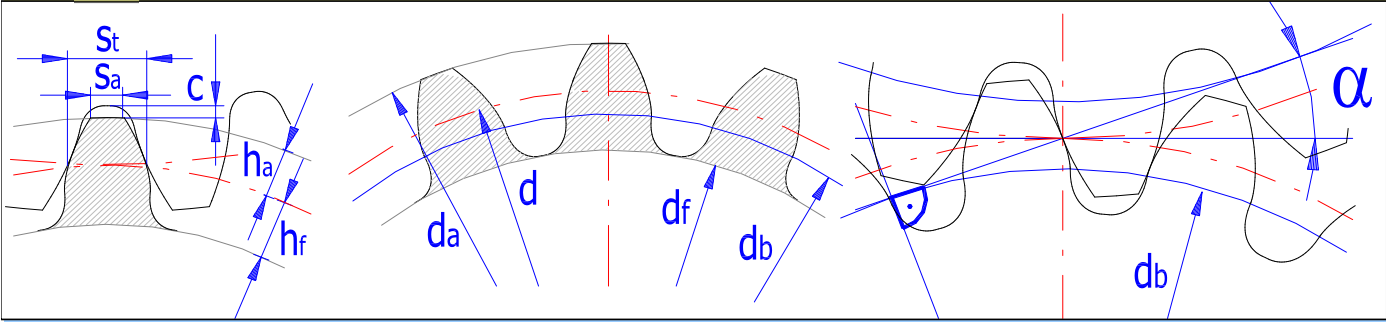
### 5.1 Types

- 5.2 - Permissible undercutting of teeth (min. value)
- 5.3 - Preventing undercutting of teeth (min. value)
- 5.4 - Prevents tapering of teeth (min. value)
- 5.5 Pinion addendum modification coefficient setting
- 5.6 Addendum modification coefficient Pinion / Gear
- 5.7 Sum of addendum modification coefficients | min. value
- 5.8 Transverse / Total contact ratio
- 5.9 Unit tooth thickness on the tip diameter
- 5.10 Specific sliding on tooth root
- 5.11 Specific sliding on tooth tip
- 5.12 Sum of all specific slidings
- 5.13 Safety coefficient for surface durability
- 5.14 Safety coefficient for bending durability
- 5.15 Display of tooth and tool turn for:

	-0.263	-0.708	$\Sigma=$	-0.971
	-0.105	-0.646	$\Sigma=$	-0.751
	0.194	-1.683	$\Sigma=$	-1.488
	◀   ▶			
x	0.0000	0.0000		[modul]
$\Sigma x$	0.0000	> -1.372		[modul]
$\epsilon\alpha/\epsilon\gamma$	1.6456	1.6456		
sa*	0.6886	0.7729		
$\vartheta A1/\vartheta E2$	-5.3758	-1.3551		
$\vartheta E1/\vartheta A2$	0.5754	0.8432		
Sum  $\vartheta$	8.1494			
SH	1.40	1.64		
SF	3.61	3.85		
	◀   ▶			
				0 [°]



6.0  Basic dimensions of gearing

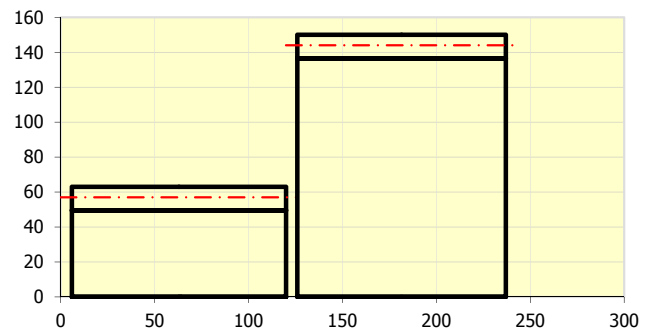
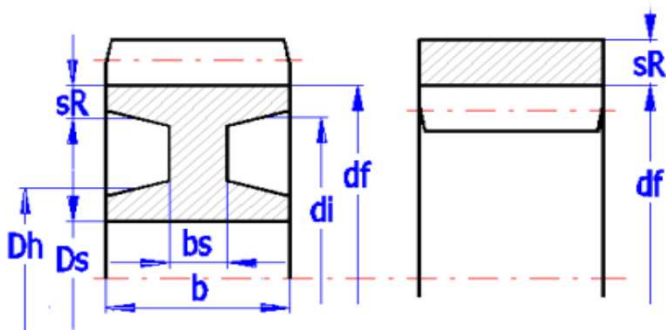


6.1	Number of teeth Pinion / Gear	z	19	48	
6.2	Face width (Pinion / Gear)	b	114	111	[mm]
6.3	Normal module	mn	6		[mm]
6.4	Transverse module	mt	6.0000		[mm]
6.5	Circular pitch	p	18.850		[mm]
6.6	Transverse circular pitch	pt	18.850		[mm]
6.7	Base circular pitch	ptb	17.713		[mm]
6.8	Center distance (pitch)	a	201.0000		[mm]
6.9	Center distance (production)	av	201.0000		[mm]
6.10	Center distance (working)	aw	201.0000		[mm]
6.11	Pressure angle	$\alpha$	20.00		[°]
6.12	Transverse pressure angle	$\alpha_t$	20.0000		[°]
6.13	Pressure angle at the pitch cylinder	$\alpha_{wn}$	20.0000		[°]
6.14	Transverse pressure angle at the pitch cylinder	$\alpha_{wt}$	20.0000		[°]
6.15	Helix angle	$\beta$	0.00		[°]
6.16	Base helix angle	$\beta_b$	0.0000		[°]
6.17	Tip diameter	da	126.0000	300.0000	[mm]
6.18	Reference diameter	d	114.0000	288.0000	[mm]
6.19	Base diameter	db	107.1250	270.6315	[mm]
6.20	Root diameter	df	99.0000	273.0000	[mm]
6.21	Operating pitch diameter	dw	114.0000	288.0000	[mm]
6.22	Addendum	ha	6.0000	6.0000	[mm]
6.23	Dedendum	hf	7.5000	7.5000	[mm]
6.24	Tooth thickness on the tip diameter	sna	4.1314	4.6375	[mm]
6.25	Tooth thickness on the tip diameter (transverse)	sta	4.1314	4.6375	[mm]
6.26	Tooth thickness on the pitch diameter	sn	9.4248	9.4248	[mm]
6.27	Tooth thickness on the pitch diameter (transverse)	st	9.4248	9.4248	[mm]
6.28	Tooth thickness on the root diameter	sb	9.6602	13.0028	[mm]
6.29	Unit tooth thickness on the tip diameter	sa*	0.6886	0.7729	[modul]
6.30	Unit correction	dY	0.0000		[modul]
6.31	Total unit correction	x1+x2	0.0000		[modul]
6.32	Addendum modification coefficient	x	0.0000	0.0000	[modul]
6.33	<b>Achieve the requested tip diameter with change the unit head clearance ca* [3.11]</b>				
6.34	Unit head clearance	ca*	0.2500	0.2500	[modul]
6.35	Tip diameter can be varied from-to	da min/max	123/126	297/300	[mm]
6.36	Requested tip diameter	da req	124.000	298.000	

## 7.0 Supplemental parameters of gearing

7.1	Number of teeth	z	19	48
7.2	Virtual number of teeth of a helical gear	zn	19.000	48.000
<b>Minimum number of teeth:</b>				
7.3	- Permissible undercutting	zmin1	14	14
7.4	- Without undercutting	zmin2	17	17
7.5	- Without tapering	zmin3	22	22

## 8.0 Qualitative indices of gearing



8.1 Transverse contact ratio / overlap ratio

$\varepsilon_\alpha$   $\varepsilon_\beta$	1.6456	0.0000
$\varepsilon_\gamma$	1.6456	

8.2 Total contact ratio

### 8.3 Definition of wheel dimensions

8.4	Recommended minimum diameter of the shaft	$D_{s_{min}}$	56.60	76.90	[mm]
8.5	Recommended minimum outer diameter of the hub	$D_{h_{min}}$	74.60	94.90	[mm]
8.6	Shaft diameter (max)	$D_{s_{max}}$	87.00	261.00	[mm]
8.7	Shaft diameter	$D_s$	0.00	0.00	<input checked="" type="checkbox"/> [mm]
8.8	Outer diameter of the hub	$D_h$	0.00	0.00	[mm]
8.9	Coefficient of gear unloading (0 - 100)	di/df	0%	0%	[%df]
8.10	Central web thickness in % of the gear width (20-100)	bs	100%	100%	[%b]
8.11	Gear rim thickness	sR	49.50	136.50	[mm]
8.12	Central web thickness	bs	114.00	111.00	[mm]
8.13	Gear weight	m	8.918	56.317	[kg]
8.14	Relative individual gear mass per unit face width	$m^*$	4.3138E-02	2.8430E-01	[kg/mm]
8.15	Moment of inertia	J	1.4109E-02	5.7782E-01	[kg*mm <sup>2</sup> ]
8.16	Moment of inertia per unit face width	$J^*$	1.2376E+02	5.2056E+03	[kg*mm <sup>2</sup> /mm]
8.17	Reduced mass of gear set	mred	0.037455076		[kg/mm]
8.18	Peripheral speed on the pitch diameter	v   v <sub>max</sub>	5.97	< 15	[m/s]
8.19	Tangential load per unit tooth width	wt	150.94	158.06	[N/mm]
8.20	Resonance speed	nE1 [ /min]	11333.14		[ /min]
8.21	Resonance ratio / lover limit	N   NS	0.088	0.850	
8.22	Approximate weight of the gearing	m	65.2348		[kg]
8.23	Efficiency of the gearing	$\mu$	99.05%		

## 9.0 Coefficients for safety calculation

### 9.1 Setting the parameters for calculation

9.2 Dynamic factor KV (max. value)	KV <sub>max</sub>	5.00	KV (B) ..2006	▼
9.3 Face load factor contact stress KHbeta (max. value)	KHβ <sub>max</sub>	5.00	Calculation ISO6336-1(2006)	▼
9.4 Reversals of the load (factor YA)		Without reversals (YA=1)		
9.5 Calculation of "Work hardening factor ZW"		Automatic		
9.6 Tooth profile modification (KHalfa, KHbeta)		Optimum profile modification		
9.7 Oil type (ZL)		Synthetic oil		
9.8 Used / Recomendated lubricant viscosity	v50	178	178	<input checked="" type="checkbox"/> [mm <sup>2</sup> /sec]
9.9 Tooth roughness (factor ZR)	Ra	Auto (0.8)	Auto (0.8)	[μm]
9.10 Roughness in the tooth root fillets (factor YR)	Ra	Auto (1.6)	Auto (1.6)	[μm]

### 9.11 Common for the gearing

9.12 Theoretical single stiffness	C' <sub>th</sub>	16.451	[N/(μm*mm)]
9.13 Stiffness of a tooth pair (single stiffness)	c'	12.832	[N/(μm*mm)]
9.14 Meshing stiffness per unit face width	C <sub>γα</sub>	19.045	[N/(μm*mm)]
9.15 Application factor	KA	1.000	
9.16 Dynamic factor	KV	1.075	
9.17 Number of cycles	NK	1.20E+09	4.75E+08

### 9.18 For pitting safety calculation

9.19 Face load factor (contact stress)	K <sub>Hβ</sub>	1.497		
9.20 Transverse load factor (contact stress)	K <sub>Hα</sub>	1.000		
9.21 Total factor of additional loads	KH	1.610		
9.22 Elasticity factor	ZE	189.81		
9.23 Zone factor	ZH	2.495		
9.24 Helix angle factor	Z <sub>β</sub>	1.000		
9.25 Contact ratio factor	Z <sub>ε</sub>	0.886		
9.26 Work hardening factor	ZW	0.955	1.000	
9.27 Size factor	ZX	1.000	1.000	
9.28 Lubricant factor	ZL	1.154	1.154	
9.29 Peripheral speed factor	ZV	0.984	0.984	
9.30 Roughness factor affecting surface durability	ZR	0.968	0.968	
9.31 Life factor for contact stress	ZNT	0.916	0.946	n=∞; ZNT=0.85 ▼
9.32 Single pair tooth contact factor	ZB/ZD	1.080	1.000	

### 9.33 For bending safety calculation

9.34 Face load factor (root stress)	K <sub>Fβ</sub>	1.426		
9.35 Transverse load factor (root stress)	K <sub>Fα</sub>	1.000		
9.36 Total factor of additional loads	KF	1.534		
9.37 Helix angle factor	Y <sub>β</sub>	1.000		
9.38 Rim thickness factor	YB	1.000	1.000	
9.39 Deep tooth factor	YDT	1.000	1.000	
9.40 Notch sensitivity factor	Y <sub>δ</sub>	0.992	0.996	
9.41 Size factor	YX	0.990	0.990	
9.42 Tooth-root surface factor	YR	1.004	1.004	
9.43 Alternating load factor	YA	1.000		
9.44 Production technology factor	YT	1.000		
9.45 Life factor for bending stress	YNT	0.887	0.904	n=∞; YNT=0.85 ▼
9.46 Stress correction factor	YST	1.000	1.000	
9.47 Form factor (bending)	YF	1.606	1.344	
9.48 Stress correction factor	YS	1.807	2.018	
9.49 Stress correction factor for gears with notches in fillets	YSg	2.015	2.363	

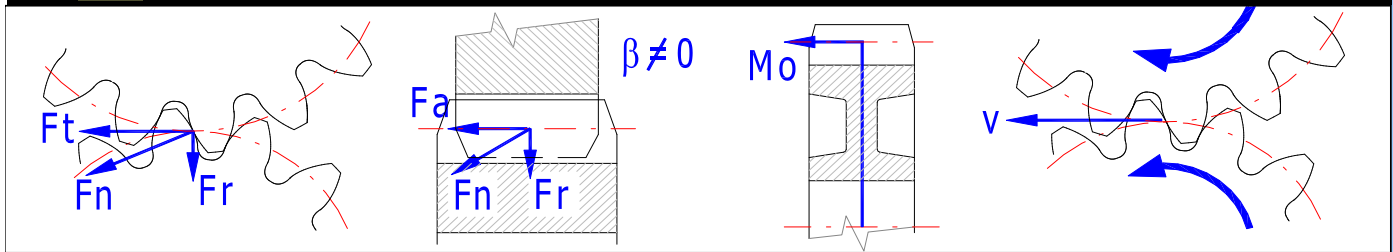
**10.0  Stress and safety coefficients**

10.1	Safety coefficient for surface durability	SH	1.40	1.64	
10.2	Safety coefficient for bending durability	SF	3.61	3.85	
10.3	Safety in contact in one-time overloading	SHst	2.17	2.35	
10.4	Safety in bending in one-time overloading	SFst	7.24	7.54	
10.5	Variability coefficient for calculation of probability of a failure	vH/vF	0.06	0.1	
10.6	Probability of a failure	P	1.37		[%]
10.7	Nominal contact stress	SigmaH0	570.25		[MPa]
10.8	Contact stress	SigmaH	781.25	723.56	[MPa]
10.9	Pitting stress limit	SigmaHG	1095.62	1184.77	[MPa]
10.10	Permissible contact stress	SigmaHP	842.79	911.36	[MPa]
10.11	Nominal tooth-root stress	SigmaF0	71.10	68.25	[MPa]
10.12	Tooth-root stress	SigmaF	109.06	104.69	[MPa]
10.13	Tooth-root stress limit	SigmaFG	393.40	402.57	[MPa]
10.14	Permissible bending stress	SigmaFP	245.87	251.61	[MPa]

**11.0  Check dimensions of gearing, ISO 1328 system of accuracy**

<b>11.1 Check dimensions of gearing</b>					
11.2	Number of measured teeth	zw	3	6	
11.3	Number of measured teeth	zw	3	6	<input checked="" type="checkbox"/>
11.4	Chordal dimension	W	45.8786	101.4539	[mm]
11.5	Pin/Ball diameter	dt	10.5000	10.5000	[mm]
11.6	Pin/Ball diameter	dt	10.5000	10.5000	<input checked="" type="checkbox"/> [mm]
11.7	Dimension over pins/balls	M	128.3642	303.0482	[mm]
<b>11.8 Achieve the requested W and M with change the addendum modification coefficient x1 and sumX</b>					
11.9	Chordal dimension can be varied from-to	Wmin/max	44.8/52.03	98.5/107.6	[mm]
11.10	Requested chordal dimension	W req	<b>77.000</b>	<b>260.000</b>	
11.11	Dimension over pins/balls can be varied from-to	Mmin/max	125.7/140.5	294.6/317.4	[mm]
11.12	Requested dimension over pins/balls	M req	<b>240.000</b>	<b>760.000</b>	
<b>11.13 Cylindrical gears - ISO 1328 system of accuracy - Part 1</b>					
11.14	Accuracy grade	Q	6.....(Ra max.= 0.8 / v max.= 15)		<input checked="" type="checkbox"/>
11.15	Module	mn	6.000		[mm]
11.16	Reference diameter	d	114.000	288.000	[mm]
11.17	Face width	b	114.000	111.000	[mm]
11.18	Total contact ratio	$\epsilon\gamma$	1.6456		
11.19	Single pitch deviation	fpt	9.0	11.0	[ $\mu$ m]
11.20	Number of teeth for cumulative pitch deviation (1...z1,z2)	k	2	2	
11.21	Cumulative pitch deviation	Fpk	18.0	20.0	[ $\mu$ m]
11.22	Total cumulative pitch deviation	Fp	28.0	47.0	[ $\mu$ m]
11.23	Total profile deviation	F $\alpha$	13.0	17.0	[ $\mu$ m]
11.24	Total helix deviation	F $\beta$	17.0	18.0	[ $\mu$ m]
11.25	Tooth-to-tooth tangential composite deviation	f'i	20.0	23.0	[ $\mu$ m]
11.26	Total tangential composite deviation	F'i	47.0	70.0	[ $\mu$ m]
11.27	Profile form deviation	ff $\alpha$	10.0	13.0	[ $\mu$ m]
11.28	Profile slope deviation	fH $\alpha$	8.5	11.0	[ $\mu$ m]
11.29	Helix form deviation	ff $\beta$	12.0	13.0	[ $\mu$ m]
11.30	Helix slope deviation	fH $\beta$	12.0	13.0	[ $\mu$ m]
<b>11.31 Cylindrical gears ISO1328 - 2 system of accuracy</b>					
11.32	Tooth-to-tooth radial composite deviation	f''i	22.0	22.0	[ $\mu$ m]
11.33	Total radial composite deviation	F''i	44.0	60.0	[ $\mu$ m]
11.34	Run out tolerance	Fr	22.0	38.0	[ $\mu$ m]

## 12.0 Force conditions (forces acting on the toothing)



12.1 Tangential force	Ft	16754.39	[N]	
12.2 Normal force	Fn	17829.65	[N]	
12.3 Axial force	Fa	0.00	[N]	
12.4 Radial force	Fr	6098.10	[N]	
12.5 Bending moment	Mo	0.00	0.00	[Nm]
12.6 Peripheral speed on the pitch diameter	v   vmax	5.97	< 15	[m/s]
12.7 Tangential load per unit tooth width / Unit load	wt   wt*	150.94	25.16	[N/mm   MPa]

## 13.0 Parameters of the chosen material

13.1 Density	Ro	7870	7870	[kg/m <sup>3</sup> ]
13.2 Young's Modulus (Modulus of Elasticity)	E	206	206	[GPa]
13.3 Tensile Strength, Ultimate	Rm	785	785	[MPa]
13.4 Tensile Strength, Yield	Rp0.2	539	539	[MPa]
13.5 Poison's Ratio		0.3	0.3	
13.6 Contact Fatigue Limit	SHlim	1140	1140	[MPa]
13.7 Bending Fatigue Limit	SFlim	450	450	[MPa]
13.8 Tooth Hardness - Side	VHV	600	600	[HV]
13.9 Tooth Hardness - Core	JHV	250	250	[HV]
13.10 Base Number of Load Cycles in Contact	NHlim	1.00E+08	1.00E+08	
13.11 Wohler Curve Exponent for Contact	qH	10	10	
13.12 Base Number of Load Cycles in Bend	NFlim	3.00E+06	3.00E+06	
13.13 Wohler Curve Exponent for Bend	qF	6	6	
13.14 Abbreviation for material designation		IF	IF	

## Additions section

## 14.0 Calculation of gearing for the given axis distance

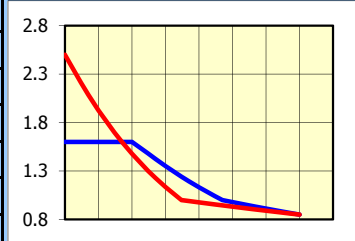
14.1 Required axis distance / Standardized	aw [mm]	315	201.00				
14.2 <b>List of solutions</b>		ID.	z1	z2	i	$\beta$	Sum X
14.3 Combination of the teeth number		4.	29	74	2.552	11.201	1.0688
14.4 Number of teeth Pinion / Gear	z1/z2	29	74				
14.5 Transmission ratio / Deviation	i	2.5517	2.03%				
14.6 <b>A. Change of the addendum modification</b>							
14.7 Base helix angle	$\beta$	0.0000				[°]	
14.8 Total unit correction	Sum x	1.06878				[modul]	
14.9 Distribution of correction		In reverse	transmission ratio				
14.10 Type of distribution of corrections to the pinion and gear	x	0.3009	0.7679			[modul]	
14.11 Press the button for transmitting values in to calculation							
14.12 <b>B. By a change of the helix angle</b>							
14.13 Base helix angle	$\beta$	11.2008				[°]	
14.14 Total unit correction	Sum x	0.0000				[modul]	
14.15 Press the button for transmitting values in to calculation							



15.0 <input checked="" type="checkbox"/> Power, warming-up, gearbox surface				
15.1	Ambient air temperature		20.00	[°C]
15.2	Maximum oil temperature		60.00	[°C]
15.3	Coefficient of heat dissipation		10.00	[W/m <sup>2</sup> /K]
15.4	Power losses		0.95	[kW]
15.5	Gearbox surface (min.)		2.37	[m <sup>2</sup> ]
16.0 <input checked="" type="checkbox"/> Preliminary design of shaft diameters (steel)				
16.1	<b>Recommended shaft diameter for:</b>		A...Common structural steel (Rm = 500) ▼	
16.2	- Main power-transmitting shafts	DA	77.50	104.80 [mm]
16.3	- Small, short shafts	DB	63.80	86.30 [mm]
17.0 <input checked="" type="checkbox"/> Approximate module calculation from the existing gear				
17.1	Number of teeth	z	20	
17.2	Tip diameter	da	34.00	[mm]
17.3	Distance between teeth edges	u	0.00	[mm]
17.4	Helix angle	β	10.00	[°]
17.5	Module of tooth	mn	1.52	[mm]
18.0 <input checked="" type="checkbox"/> Auxiliary calculations, calculation KHbeta, calculation YSg				
18.1	Transmission ratio calculation using the number of teeth	z1,z2 = i	17	18 = 1.059
18.2	Transmission ratio calculation using the speed	n1,n2 = i	700.0	350.0 = 2.000
18.3	Power calculation using the pinion speed and torque moment	Mk1,n1=Pw1	1600.0	760.0 = 127.33
18.4	<b>Definition of the factor KHbeta (method C)</b>			
18.5	Mean transverse tangential load at the reference circle	Fm	18018.97	[N]
18.6	Shaft diameter (pinion)	dsh	74.80	<input checked="" type="checkbox"/> [mm]
18.7	Gear type		Spur and single helical gears ▼	
18.8	Constant of the pinion position (with/without stiffening)	K'	-0.48	B. with stiffening ▼
18.9	Pitch of bearings	l	159.6	<input checked="" type="checkbox"/> [mm]
18.10	Center of pinion distance (s/l < 0.3)	s	0.0	[mm]
18.11	Component of equivalent misatignment (pinion)	fsh	3.6	<input checked="" type="checkbox"/> [μm]
18.12	Component of equivalent misatignment (wheel)	fsh2	0.0	[μm]
18.13	Mesh misalignment	fma	17.6	<input checked="" type="checkbox"/> [μm]
18.14	Deformation of the gear case	fca	0.0	[μm]
18.15	Displacements of the bearings	fbe	0.0	[μm]
18.16	Helix modification	B1,B2	5. Helix correction+central crowning ▼	
18.17	Initial equivalent misalignment (before running-in)	Fβx	11.4	3. Favourable position of the contact pr: ▼
18.18	Running-in allowance (equivalent misalignment)	yβ	1.7	<input checked="" type="checkbox"/> [μm]
18.19	Effective equivalent misalignment (after running-in)	Fβy	9.7	[μm]
18.20	Face load factor (contact stress)	K <sub>Hβ</sub>	<b>1.497</b>	
18.21	<b>Stress correction factor for gears with notches in fillets YSg</b>			
18.22	Maximum depth of grinding notch	tg	0.200	0.300 [mm]
18.23	Radius of grinding notch	rg	4.000	3.000 [mm]
18.24	Valid for ... (tg/rg) <sup>0.5</sup> < 2.0	(tg/rg) <sup>0.5</sup>	0.224	0.316
18.25	Stress correction factor for gears with notches in fillets	YSg	<b>2.015</b>	<b>2.363</b>

**19.0**  **Calculation of SHlim and SFlim based on ISO 6336-5, proposal of material properties**

19.1	Material type	
19.2	11. Flame or induction hardened wrought and cast steels () [IF]	
19.3	Requirements for material quality and heat treatment	ML
19.4	Surface hardness of calculated material (hardness range from - to)	552 HV 485 - 615
19.5	Contact Fatigue Limit	SHlim 1011 [MPa] <input checked="" type="checkbox"/>
19.6	Bending Fatigue Limit	SFlim 244 [MPa]
19.7	Density	Ro 7870 [kg/m <sup>3</sup> ]
19.8	Young's Modulus (Modulus of Elasticity)	E 206 [GPa]
19.9	Tensile Strength, Ultimate	Rm 762 [MPa]
19.10	Tensile Strength, Yield	Rp(0.2) 419 [MPa]
19.11	Poisson's Ratio	0.30
19.12	Base Number of Load Cycles in Contact	NHlim 5.00E+07
19.13	Wohler Curve Exponent for Contact	qH 13.00
19.14	Maximum value	ZNT 1.60
19.15	Base Number of Load Cycles in Bend	NFlim 3.00E+06
19.16	Wohler Curve Exponent for Bend	qF 8.70
19.17	Maximum value	YNT 2.50
19.18	Abbreviation for material designation	IF
19.19	Material name in the material table	Flame or induction hardened wrought and cast steels (Rm=762 MPa)
19.20	Transfer to a table of materials, to line number:	1



**20.0**  **Graphical output, CAD systems**

20.1	2D drawing output to:	DXF File		
20.2	2D Drawing scale	Automatic		
20.3	Detail:	Pinion		
		$\alpha$ [°]...	30	$\beta$ [°]...
				a [modul]...
				1
20.4	<b>Detailed drawing of tooth and wheel</b>			
20.5	Number of drawn teeth	4		
20.6	Number of points of tooth tip	20		
20.7	Number of points of tooth flank	100		
20.8	Rolling (turning) of a tool between the bite	0.5		<input type="checkbox"/> Drawing without axes
20.9	Number of tooth copies in the picture of engagement check	20		
20.10	<b>Text description (Information for BOM)</b>			
		<b>Pinion</b>		
	Row 1 (BOM attribute 1)	Spur gear - Pinion	<input checked="" type="checkbox"/>	
	Row 2 (BOM attribute 2)	z1=19, mn=6, beta=0		
	Row 3 (BOM attribute 3)	Material: T2(683/7-70)		
		<b>Gear</b>		
	Row 1 (BOM attribute 1)	Spur gear - Gear	<input checked="" type="checkbox"/>	
	Row 2 (BOM attribute 2)	z2=48, mn=6, beta=0		
	Row 3 (BOM attribute 3)	Material: T2(683/7-70)		
20.11	Table of parameters	Table of pinion parameters		