

# ZAR9



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## Cross-Axle Helical Gear

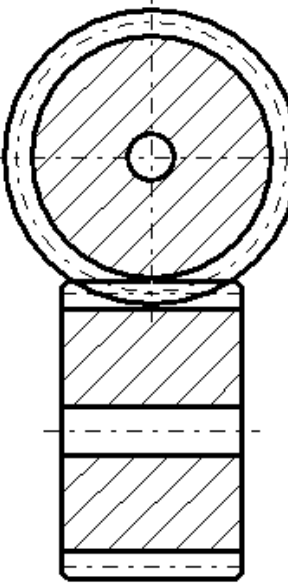
Software for Windows

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ZAR9 cross-helical gear design - b45.zr9

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Rad 1 z:16-1  
Rad 2 z:16-2  
Gleiche Abmessungen von Schnecke und Schneckenrad



Dimensions		
mn	mm	1,000
a	mm	22,63
alpha	°	20,00
summa	°	90,00

material		
material	Worm	Worm wheel
E	206000	206000
SigHlim	1500	1500
SigFE	800	800

Dimensions		
z	16	16
beta	mm	45,000
beta b	mm	41,641
d	mm	22,627
da	mm	24,627
df	mm	20,127
db	mm	20,119
b	mm	15,00
x	0,0000	0,0000
alpha 1	mm	27,236

efficiency		
mu z	(tan 5,7°)	0,100
eta z		0,818
PVz	kW	0,018
PV0	kW	0,016
PVLP	kW	0,001
PVD	kW	0,000
PV	kW	0,034
eta		0,649

power		
PN	kW	0,100
TN	Nm	1,27
n	1/min	750,0
FN	N	113

safety	
SV (Sig.HV= 20)	0,02
SS	1,55
SF	3,53

ZAR9 calculates dimensions and load-bearing capacity of helical gears with crossed axis. Axis angle may be 90 degrees or any other input value. can ZAR9 calculates efficiency, forces and safety against sliding abrasion, tooth root breakage and seizure.

### Pre-Dimensioning

In Pre-dimensioning you enter axis angle, transmission ratio, input or output speed and power or torque. Recommendations are made for center distance, module and teeth numbers. The recommendations can be used or modified in the following geometry and strength calculations.

Rot.speed, Torque, Rated power 1

Gear ratio  $u=n_1/n_2$  19,5

application factor KA 1 KA ?

gear axis angle summa [deg] 90

worm  worm wheel

n Rot.speed n 18000 923,0769 1/min

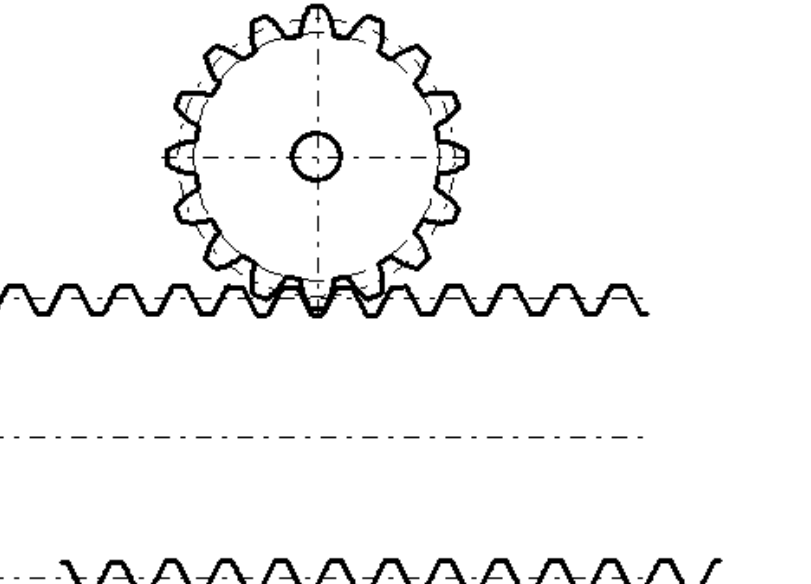
T Rated torque T 0,557 Nm

P Rated power P 1,05 kW

OK Cancel Help mm <-> inch Calc

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### Dimensioning

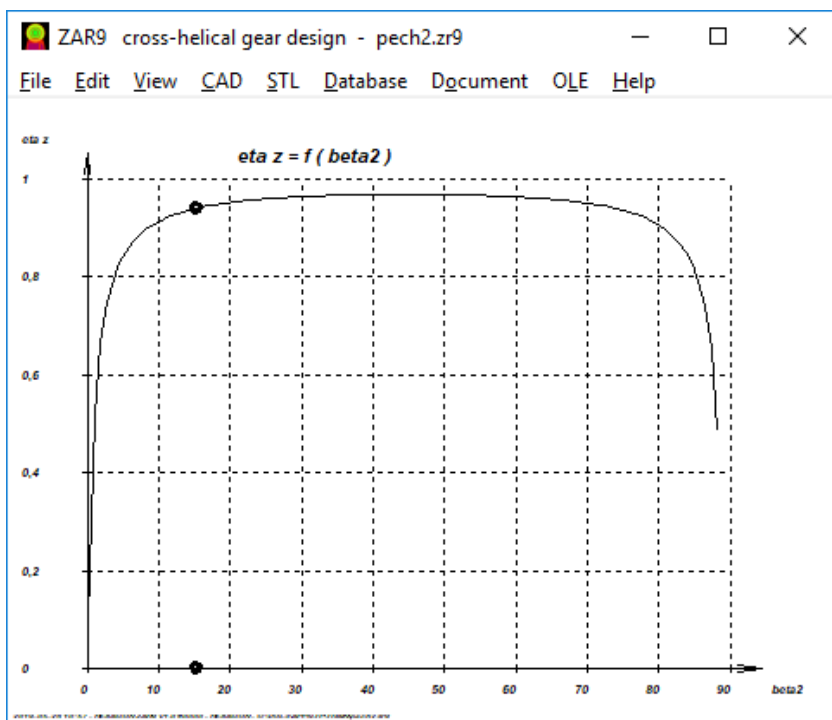
In Dimensioning input, you enter center distance and number of teeth, and ZAR9 calculates normal module and helix angles.

### Recalculation

In Recalculation input you enter number of teeth, module and helix angle, and ZAR9 calculates center distance.

### Load-bearing capacity

ZAR9 calculates safety against sliding abrasion, tooth root breakage and seizure accord. to Niemann.



### Efficiency

ZAR9 calculates efficiency and loss of power by tooth friction, idling, bearing and seals. The program provides a diagram with tooth friction efficiency as function of helix angles.

### Material Data Base

The program includes a data base containing the most important gear materials and their properties. Database can be modified by the user.

### Drawings and Tables

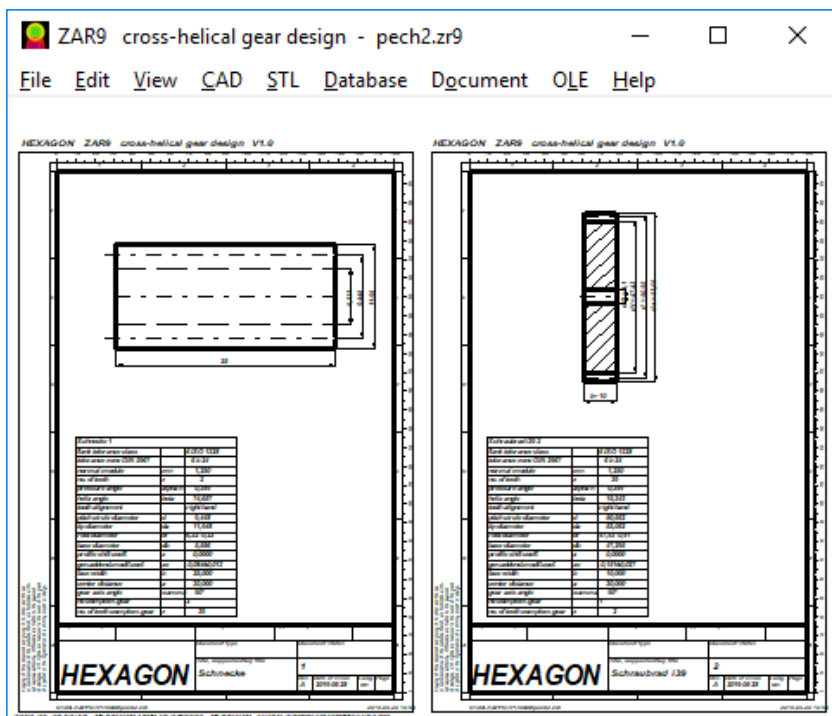
ZAR9 generates drawings and tables of the gear pair, ready to be used with CAD.

### Tooth profile and tooth contact

True-scale tooth profile and tooth contact can be shown in various views on screen.

### Tooth flank tolerance and measurement

ZAR9 calculates tooth thickness and over pin/ball diameters. You can input flank tolerances, or select from DIN 3967 tolerance zone.



### Animation

ZAR9 animates rotation of gear wheels on screen in axial or radial cross section.

### Production Drawing

ZAR9 generates a production drawing of worm and worm wheel with ISO 7200 data field.

### Produce a model gear with your 3D printer

ZAR9 generates STL files for printing the gears together with a carrier or case to build a true-size model gear.

### Data Exchange

Interface to ZAR3+ (worm gear) and ZAR1+ (helical gear) allows import/export of gear dimensions.

### CAD Interface

Drawings and diagrams can be saved as DXF or IGES file to be loaded into CAD.

### Units

ZAR9 can be switched between metric units (mm, N, MPa) and imperial units (inch, lbf, psi).

### System Requirements

ZAR9 is available as 32-bit app or as 64-bit app for Windows 7, 8, Windows 10.

### Scope of Delivery

Software with perpetual license with update rights and user manual (pdf).

### Guarantee

HEXAGON gives a 24 month guarantee on full functionality of the software.

