

# ZAR6

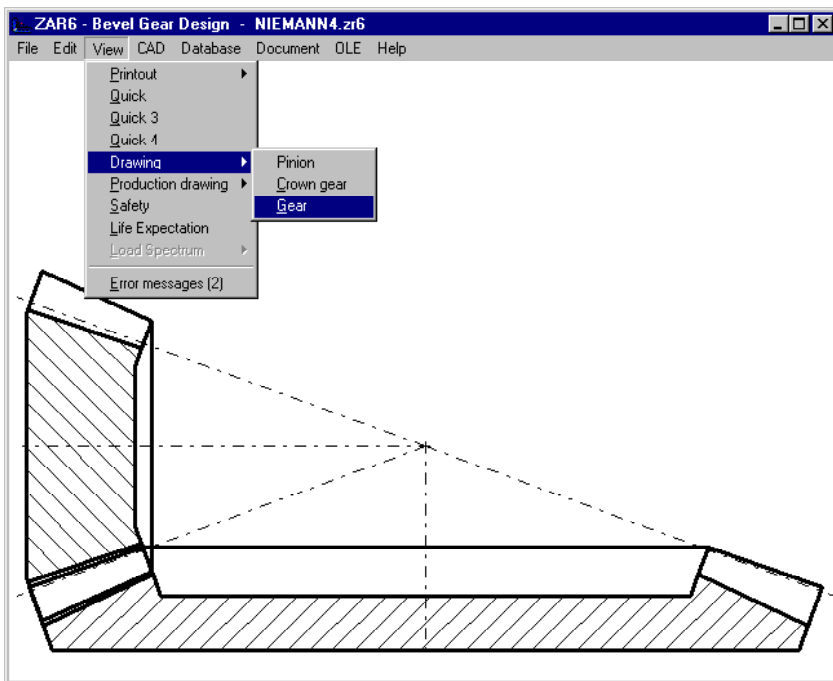


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## Bevel Gear Design (straight, helical, spiral)

Software for Windows

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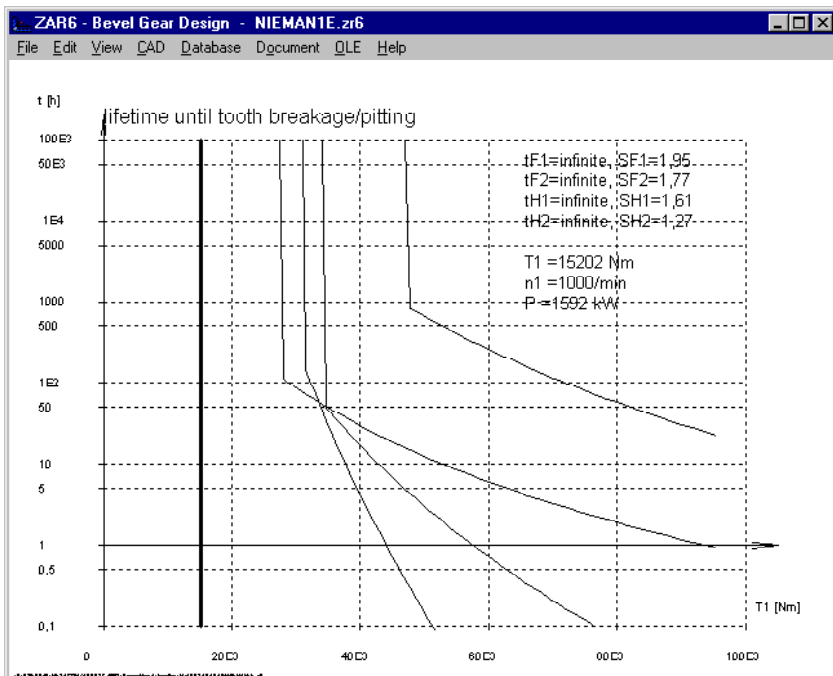
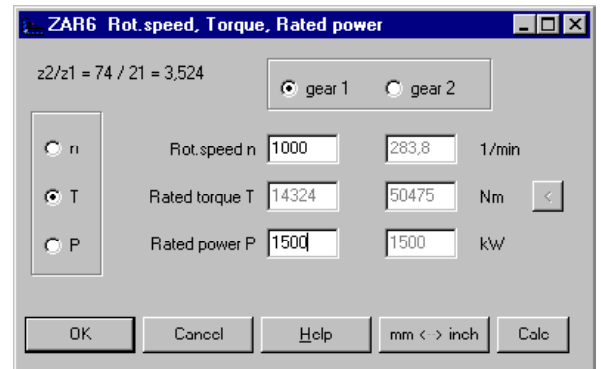


### Calculation Base

ZAR6 calculates dimensions of bevel gears (straight, helical and spiral) with decreasing tooth height due to cone center. Load-bearing capacity with safety against tooth breakage, pitting and seizure for bevel gear pairs is calculated according to DIN 3991.

### Pre-dimensioning

In pre-dimensioning ZAR6 makes recommendations for the dimensions of bevel gear by input of gear ratio, rotational speed and power or torque. Gear materials can be selected from database.



### Calculation

The pre-dimensioned values can be used in the next dialogue window for gear geometry. The program suggests values for tooth thickness modification  $x_s$  and profile shift coefficient  $x$ .

### Tooth Flank Tolerances

You can select tolerance zone to DIN 3967, and ZAR6 calculates min and max dimensions of inner and outer tooth thickness, flank clearance and backlash. And ZAR6 calculates pitch tolerances, flank tolerances and permissible runout according to DIN 3965.

### Material Database

ZAR6 includes a material database with gear materials. Database may be extended by the user with new materials.

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The screenshot displays the main interface of the ZAR6 software. It features several data tables on the left and right sides, and technical drawings of a bevel gear in the center. The tables include parameters such as gear geometry, material properties, and calculation results. The drawings show the gear's profile from different perspectives, including a cross-section and a side view.

### Tooth Forces

Axial and radial forces for push/pull operation are calculated. These values can be transferred to the shaft calculation programs WL1+.

### Strength Calculation

ZAR6 calculates virtual cylindrical gear and factors for calculation of load-bearing capacity and safety factors for tooth breakage, pitting and seizure. If not strength-safe, ZAR6 calculates life expectation until fatigue breakage or pitting.

Safety factors and life expectation as function of nominal torque are displayed in a diagram.

### Load spectrum

If you define a load spectrum by input of torques and load cycle shares, ZAR6 calculates safety factors and life expectation.

### Quick View

Quick view shows calculation results with drawings and diagrams altogether on one screen.

### Text Printout

Input data and results of geometry and strength calculation can be printed to screen or printer, saved as TXT file or HTML file, or loaded in MS-Excel.

### CAD Interface

Drawings and diagrams can be exported to CAD via the DXF or IGES interfaces.

### Production Drawing

ZAR6 generates complete drawings with manufacturing data for straight and helical bevel gears. Drawing info and modifications can be entered in the program. The drawings may be printed directly, or loaded into CAD via DXF or IGES interface.

### HEXAGON Help System

As with all HEXAGON programs ZAR6 can provide you with a help text and auxiliary picture for each input. Help texts and auxiliary pictures can be modified and appended by the user as required. When error messages appear you can have a description and remedy suggestion displayed.

### Units

ZAR6 can be switched between metric units (mm, N,MPa) and imperial units (inch, lbf, psi).

### System Requirements

ZAR6 is available as 32-bit app or as 64-bit app for Windows XP, Vista, Windows 7, 8, Windows 10.

### Scope of Delivery

Software with user manual (pdf), non-expiring license for unlimited time use with update rights.

### Guarantee

HEXAGON gives a 24 month guarantee on full functionality of the software. We provide help and support by email and hotline without extra charge. HEXAGON Software is continuously improved and updated. Registered users are regularly kept informed of updates and new editions.

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This screenshot shows a detailed production drawing of a bevel gear. The drawing includes dimensions such as  $tH = 153$ ,  $tR = 612$ , and  $Re = 630,874$ . A scale of  $M 1:5$  is indicated. Below the drawing is a technical data table for the gear.

Bevel gear: spiral geared		
modulus	mp	15,64
no. of teeth	z	21
gen. pitch cone angle	delta	15,84°
pitch circle diameter ext.	de1	344,5
gen. pitch cone length ext.	Re	630,874
face gear tooth no.	zp	76,92204
Dedendum angle	theta f	1,242°
Profile angle	alpha	20°
helix angle center	beta m	17,5°
flank tolerance class		7
Tooth thickness chord	s'm	25,20
Height above chord	h'am	19,3
part number complem.gear		000002
no. of teeth complem.gear		74
Gear axis angle	summa	90°

material: 15CrNi6

The bottom part of the screenshot shows a metadata table with fields for Responsible dept., Technical reference, Created by (Ruoss), Approved by, Document type, and Document status. It also includes a title block with the title 'bevel gear', author 'Nieman1 - gear 1', and document number '000001'.

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