

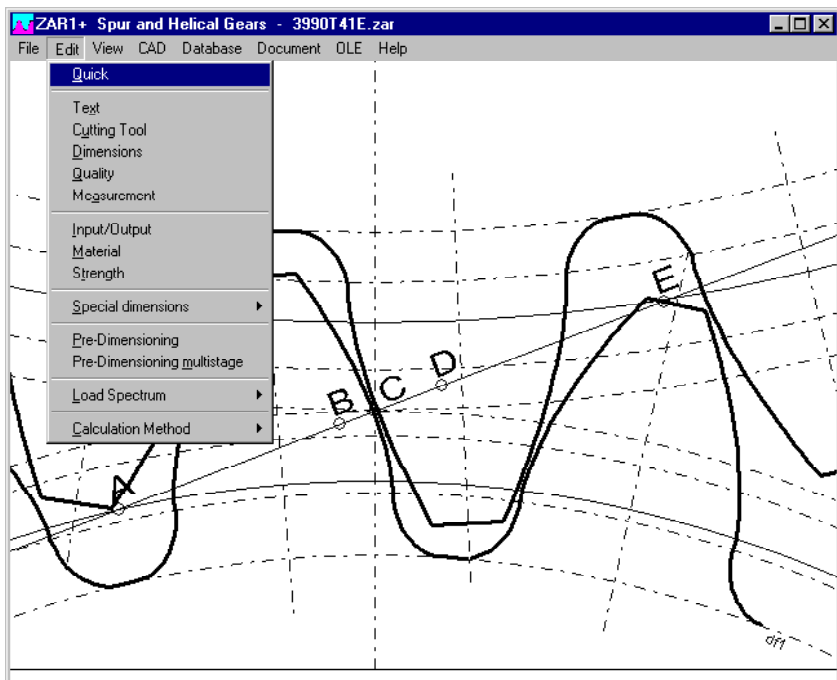
# ZAR1+



www.hexagon.de

## Gear Design Software Spur and Helical Gears for Windows

© Copyright 1988-2015 by HEXAGON Software, Berlin, Kirchheim, Neidlingen

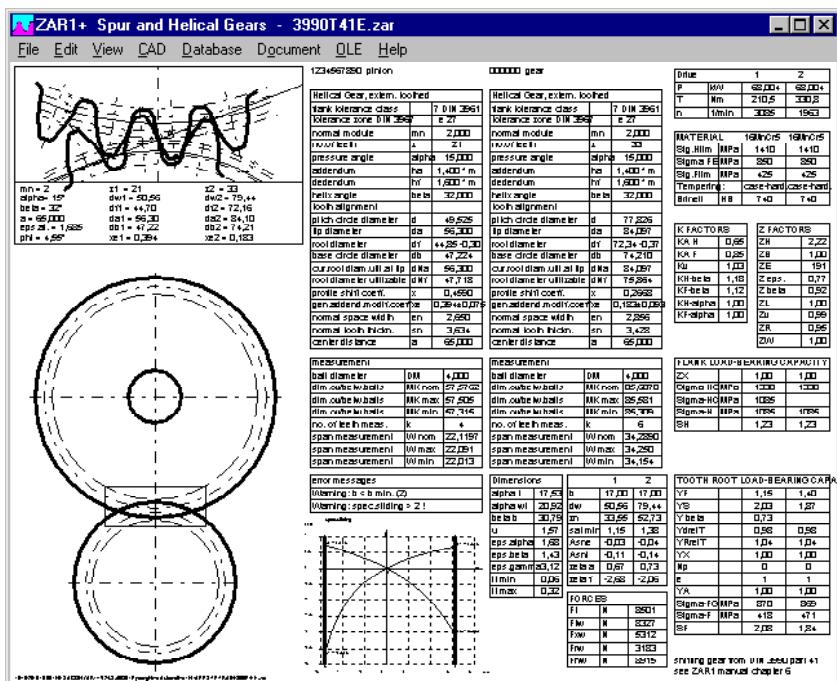


### Bases for Calculation

The ZAR1+ gear calculation program calculates geometry and strength of spur and helical gears with involute toothing (external or internal) in conformance to industrial standards DIN 3960, ISO 1328 or DIN 3961, DIN 3967, ISO 6336 or DIN 3990. Calculation method can be configured. The program contains appropriate interfaces for linking it to CAD systems and databases.

### Geometry Calculation

Once the user has entered pressure angle, helix angle, normal module, number of teeth, facewidth and addendum modification coefficients or center distance, ZAR1+ calculates dimensions of gear, gear teeth, tool, and contact ratio factors. On entering gear quality and tolerance zone, the program calculates tooth flank tolerances, tooth thickness, backlash, span width, diametral dimensions over or between balls and pins, and permissible errors according to ISO 1328 or DIN 3961.



### Pre-Dimensioning

By input of transmission ratio, rotational speed, power or torque and center distance, ZAR1+ suggests possible combinations with different number of teeth, transmission ratio, and profile shift..

### Strength Calculation

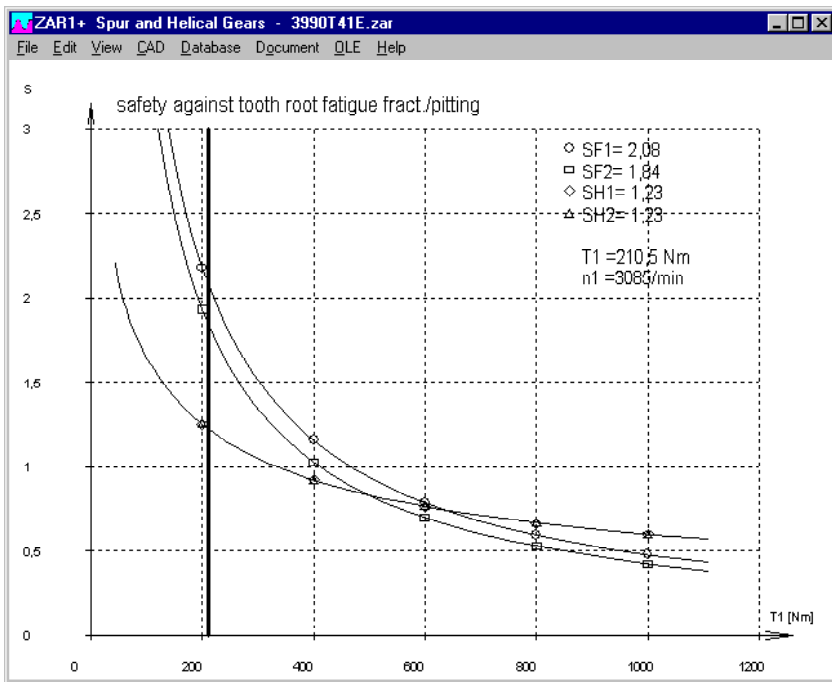
The load capacity with respect to tooth root fatigue fracture and pitting can be calculated in conformance with either ISO 6336 or DIN 3990-1,2,3 or DIN 3990-41 (Vehicle transmission).

### Life expectation

If safety factors are less than 1, ZAR1+ calculates time and load cycles until pitting and tooth breakage.

### Special Profiles

To enable users to optimize gear pairs with extra-depth teeth, the program allows the tool dimensions of normal and protuberance profiles to be defined freely, even with chamfer.



## Material Database

ZAR1+ is delivered with an integrated material database (may be modified by the user).

## Animation

ZAR1+ provides animation with rotation of the gear wheels to observe tooth contact on screen. You can define start angle, end angle, and number of steps.

## Production drawing

ZAR1+ generates gear drawings with tables of gear data, dimensions and tolerances with ISO 7200 data field.

## Diagrams

Safety factors and life expectation as function of input torque and gear quality can be displayed as diagram. Another diagram shows specific sliding along the tooth contact line.

## Quick View

Quick View of ZAR1+ displays drawings, diagrams and tables altogether on one screen.

## Multistage Gears

For large transmission ratio, ZAR1+ calculates module, number of teeth and center distances of multistage gears.

## Load Spectrum

ZAR1+ allows you to define and calculate a load spectrum, with output of a life expectancy diagram.

## CAD Interface

Gear drawings, tables and diagrams, true-scale drawings of gear profile, single tooth or reference profile can be generated as DXF or IGES file.

## User Interface

The dialogue windows of ZAR1+ allow even the less experienced PC user to find his way around the program quickly. ZAR1 provides users with a relevant help text wherever they are in the program. When the demo mode is selected, ZAR1 runs through a demo program in which an example calculation is performed. ZAR1+ contains more than 50 auxiliary pictures with geometrical signs and formulas used.

## Units

ZAR1+ can be switched between metric units (mm, N,MPa) and imperial units (inch, lbf, psi).

## System Requirements

ZAR1+ 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. HEXAGON Software is continuously improved and updated. Registered users are regularly kept informed of updates and new editions.

MAT_NAME	M	MAT_TYP	T	TREATMENT	HB_FLANK	SIGMA_HLIM
31CrMoV9V (1.8519)	2	Case-hardening Steel	5	gas-nitrided	700	1230
14CrMoV6-9V (1.7735)	2	Case-hardening Steel	5	gas-nitrided	770	1270
C45N (1.0503)	3	Heat-treatable Steel	5	nitrocarborized	420	710
16MnCr5N (1.7131)	2	Case-hardening Steel	5	nitrocarborized	560	770
42CrMo4V (1.7225)	3	Heat-treatable Steel	5	carbonitrided	610	830
34Cr4V (1.7033)	3	Heat-treatable Steel	5	carbonitrided	650	1350
16MnCr5 (1.7131)	2	Case-hardening Steel	2	case-hardened	720	1470
15CrNi6 (1.5919)	2	Case-hardening Steel	2	case-hardened	730	1490
17CrNiMo6 (1.6587)	2	Case-hardening Steel	2	case-hardened	740	1510
20MnCr5 (1.7147)	2	Case-hardening Steel	2	case-hardened	720	1500
E360 (St 70)	1	Structural steel	0	none	210	460
Ti6Al4V	0	Titan	0	titan	420	660
AlZnMgCu0.5	0	Aluminium	0	none	160	240
Sint-40C+Cu	0	Sintermet.Fe+1.5%Cu+0.4%C	0	none	90	400
SCM415	2	Case hardening Steel	2	case hardened	730	1490
SCM415	2	Case-hardening Steel	5	gas-nitrided	550	1110
SCM415	2	Case-hardening Steel	5	nitrocarborized	560	770
SCM440	3	Heat-treatable Steel	4	flame-hardened	610	1170
SCM440	3	Heat-treatable Steel	5	gas-nitrided	550	1070
SCM440	3	Heat-treatable Steel	5	carbonitrided	610	830
SCM440	3	Heat-treatable Steel	1	heat-treated	300	600
SCM420	3	Heat-treatable Steel	1	heat-treated	270	530

