

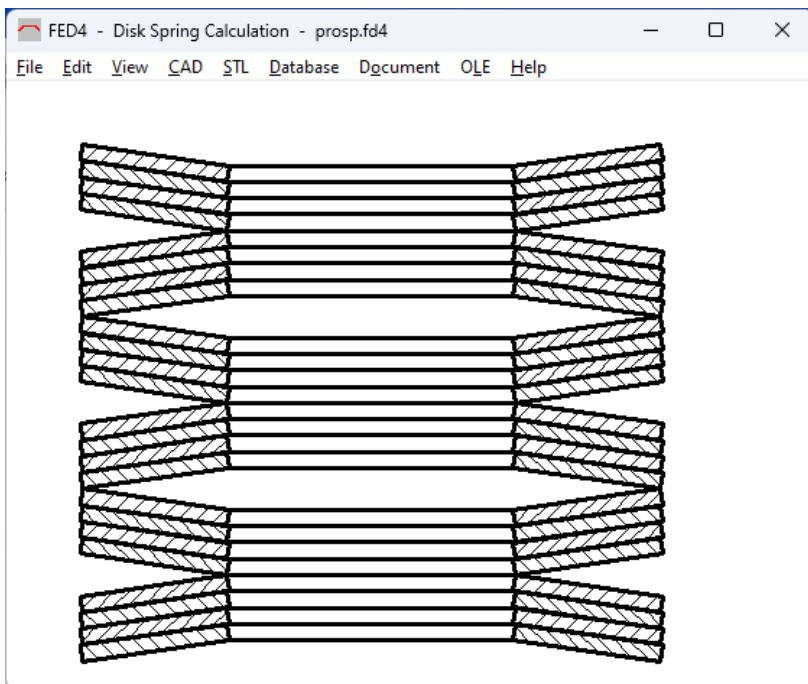
FED4



Software for Calculation of Disk Springs

for Windows

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Calculation Basis

The FED4 software calculates cup springs and cup spring packages in accordance with DIN 2092. Two calculation methods are supported:

- ~ Dimensioning: A disk spring package is calculated after input of load and stroke as close as possible to the required starting data
- ~ Re-calculation: By entering the dimensions, number of springs per package and number of spring packages the software calculates the loads and stresses for the defined spring height.

Disk Springs in accordance with DIN 2093

The program provides the dimensions and characteristic values for all disk springs in accordance with DIN 2093.

Friction

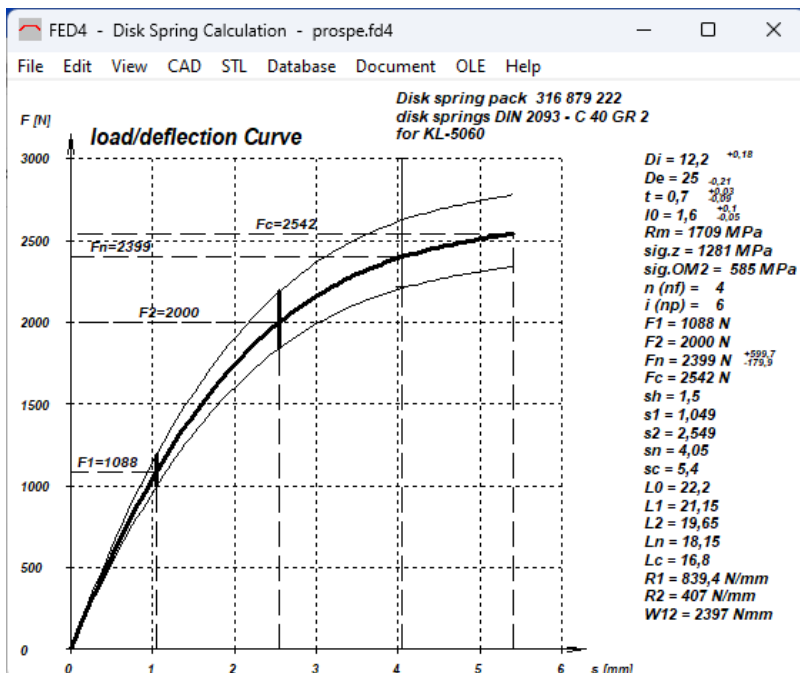
If you enter friction coefficients, FED4 calculates hysteresis and adds friction limit curve in load-deflection diagram.

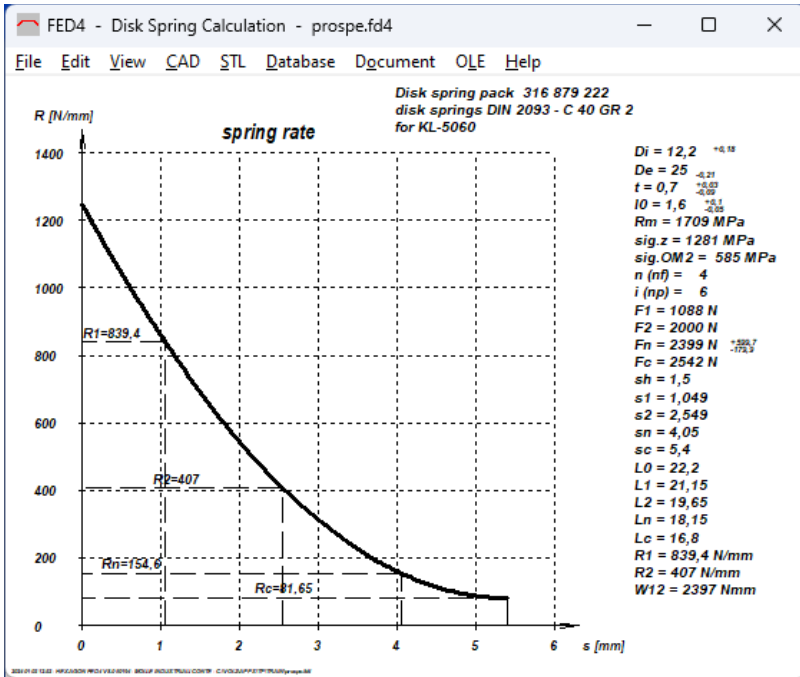
Material Data

The data for all materials in accordance with DIN 2093 are included in the program. In addition, you can define further materials by entering elasticity modulus, cross-number, density and tensile strength. Or you can use the integrated material database with flat spring steel materials.

Diagrams

The load-deflection diagram can be displayed on screen showing the degressive spring characteristic line of the disk spring. The spring rate diagram shows the decreasing spring rate as function of the deflection. The stress diagram shows the stress curve through the critical points on the disk spring. The Goodman diagram provides important information about tensile strength and life expectancy with dynamic load. All diagrams can be printed out or used in your documentation via DXF files or the clipboard in Windows.





Tolerances

You can either enter tolerances, or let FED4 calculate it according to DIN 2093.

On-Line Input

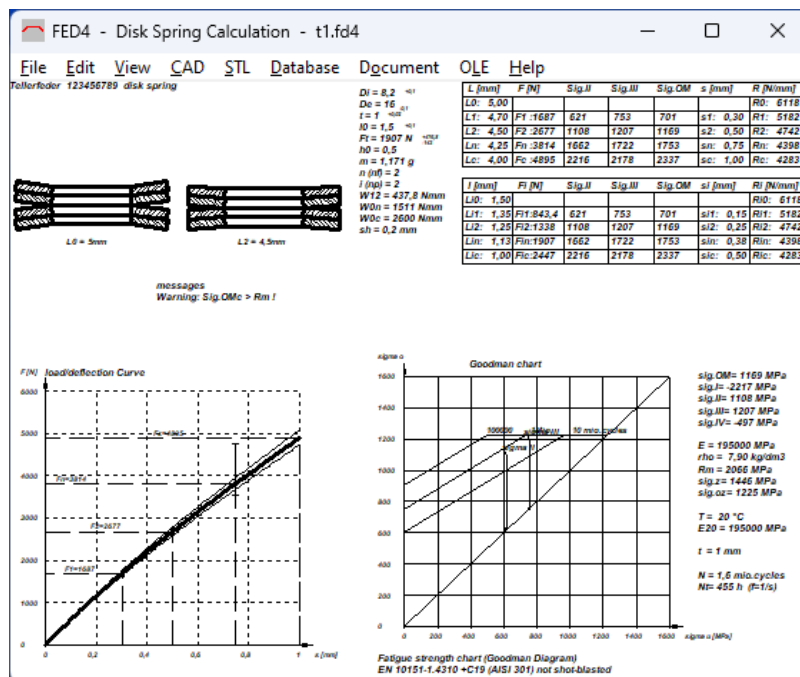
On-line input provides the advantage of having the most important entries and results together on the screen with possible warnings and error messages. After each entry, a new calculation is carried out in a split second and you can see how changing the input values effects the results.

Goodman Diagram

You can see in the fatigue strength diagram whether or not the permissible variation of stress has been adhered to for dynamically stressed springs. The curves for fatigue strength safety (>10 million) as well as for 1 million and 100,000 load cycles are shown.

Spring Energy

Spring energy as function of deflection is drawn as Diagram.



Production Drawing

FED4 generates a production drawing of the disk spring completely with ISO 7200 drawing header.

Printout

Text printout with all input data and results can also be saved as text file, exported to Excel, or saved as HTML file.

HEXAGON Help System

Auxiliary text and images are available for all dialogue windows. If error messages occur, you can get description and remedy suggestion.

Interfaces

All drawings and diagrams can be saved as DXF or IGES file to be loaded with CAD programs. The OLE interface lets you import/export data from/to Excel.

SINGLE DISK SPRING

Inside diameter	D_i	mm	12,2 +0,18
Outside diameter	D_e	mm	25 -0,21
Thickness	t	mm	0,7 +0,03/-0,09
length	l_0	mm	1,6 +0,1/-0,05
weight	m	g	2,055
Usable deflection $sn=0.75 \cdot h_0$	sn	mm	0,675
Max. deflection $h_0=sc$	sc	mm	0,9
Spring load at $sn=0.75 \cdot sc$	F_n	N	599,7+150/-45,0
No. of springs per package	n		4
No. of spring packages	i		6

Length mm	deflection mm	Load N	Sigma III MPa	Sigma OM MPa
$L_0 = 22,20$				
$L_1 = 21,15$	$s_1 = 1,05$	$F_1 = 1087,58$	$\text{sigma}1 = 395$	$\text{sigma}1 = 241$
	$sh = 1,50$	$F_h = 912,29$	$\text{sigma}h = 481$	$\text{sigma}h = 344$
$L_2 = 19,65$	$s_2 = 2,55$	$F_2 = 1999,87$	$\text{sigma}2 = 876$	$\text{sigma}2 = 585$
$Ln = 18,15$	$sn = 4,05$	$F_n = 2398,79$	$\text{sigma}n = 1259$	$\text{sigma}n = 929$
$Lc = 16,80$	$sc = 5,40$	$F_c = 2541,85$	$\text{sigma}c = 1519$	$\text{sigma}c = 1238$

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System Requirements

FED4 is available as 32-bit app or as 64-bit app for Windows 7, 10, Windows 11.

Scope of Delivery

FED4 program with database files, example applications and help images, user manual (pdf), perpetual license.

Software Maintenance

HEXAGON Software is continuously improved and updated. Registered users will be informed about news, and can get new versions at a reasonable update price.

Guarantee

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