F E D 1 4

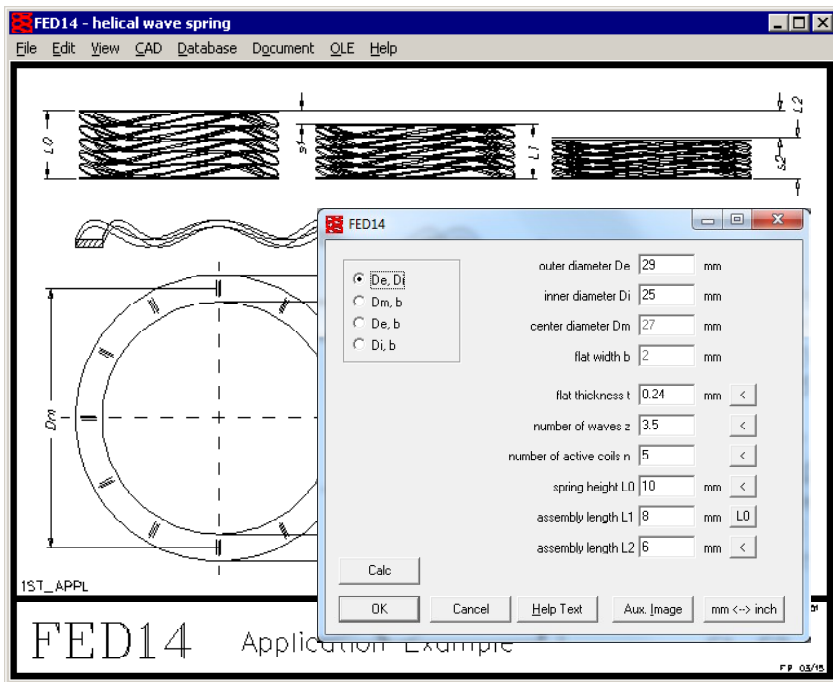**Software for**

Helical Wave Springs

for Windows

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www.hexagon.de

Calculation of Helical Compression Springs

FED14 calculates helical coiled wave springs of flat spring material. Crests of the coiled waves must lay exactly on each other, therefore the number of waves per turn must always be x.5, preferred 2.5 or 3.5 or 4.5 waves. FED14 calculates spring rate, load-deflection diagram, and bending stress for axial load of the helical wave spring Input data are inner and outer coil diameter, flat thickness, number of waves per turn, number of turns (coils), and spring length L0. FED14 calculates load and bending stress for operating length L1 and L2. Inactive end coils (unwaved) may also be considered.

Pre-Dimensioning

In Pre-Dimension, you can calculate dimensions of a helical wave spring by input of only one or two spring loads and spring deflection or stroke. By means of coil ratio, stress safety sigmaz/sigma2, block safety sc/s2 and number of waves you can modify the calculated dimensions.
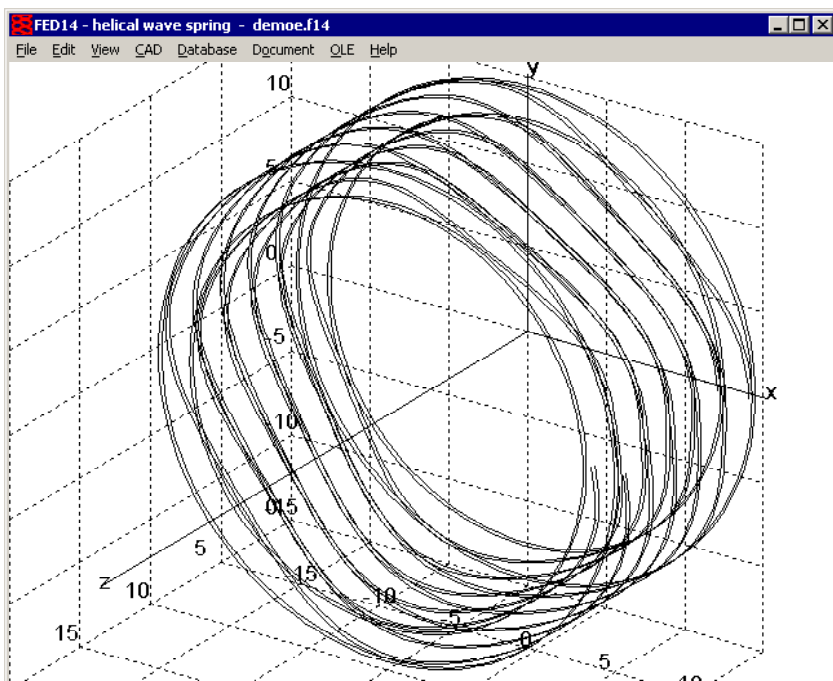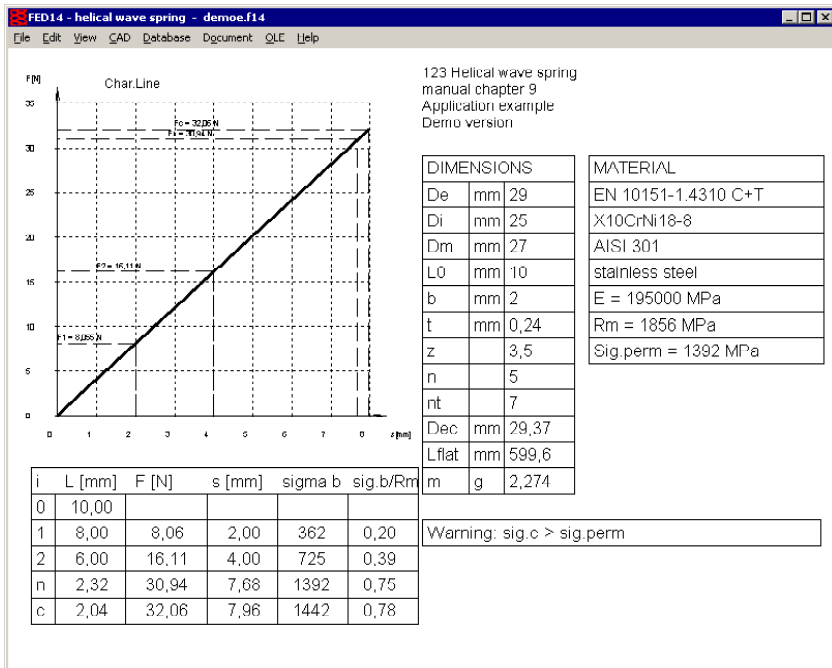
Material Database

Material properties of the most important flat spring materials (tensile strength, permissible shear stress and bending stress as function of material thickness, modulus of elasticity, density) are stored in the integrated material database. The dbf file may be extended and modified by the user.

FED14 - helical wave spring - demoe.f14

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Application example
Demo version

DIMENSIONS		
De	mm	29
Di	mm	25
Dm	mm	27
L0	mm	10
b	mm	2
t	mm	0,24
z		3,5
n		5
nt		7
Dec	mm	29,37
Lflat	mm	599,6
m	g	2,274

MATERIAL
EN 10151-1.4310 C+T
X10CrNi18-8
AISI 301
stainless steel
E = 195000 MPa
Rm = 1856 MPa
Sig.perm = 1392 MPa

i	L [mm]	F [N]	s [mm]	sigma b	sig.b/Rm
0	10,00				
1	8,00	8,06	2,00	362	0,20
2	6,00	16,11	4,00	725	0,39
n	2,32	30,94	7,68	1392	0,75
c	2,04	32,06	7,96	1442	0,78

Warning: sig.c > sig.perm

number of waves/coil: z = 3,5
number of active coils: n = 5
inactive end coils: nE = 2

material: EN 10151-1.4310 C+T X10CrNi18-8
AISI 301   stainless steel

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Load-deflection diagram
FED14 calculates characteristic line of spring (load-deflection diagram) as function of spring travel and spring length.

Goodman-Diagram
If dynamically loaded, Goodman diagram is useful to calculate fatigue strength safety and bearable load cycles of the spring.

Quick View
In Quick View, spring data and calculation results, drawings and diagrams are printed altogether on one screen.

Text Printout
Input data and calculation results with spring travel, spring length, spring load and stresses for different spring positions may be printed, saved as text or HTML file, or exported to Microsoft Excel.

Production Drawing
FED14 generates a production drawing of the helical wave spring with all dimensions. Drawing header according to ISO 7200 contains description and modifications as entered in FED14.

Spring Drawing 3D
FED14 generates a true-scale drawing of the helical wave spring that can be exported to your CAD system as DXF or IGES 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.
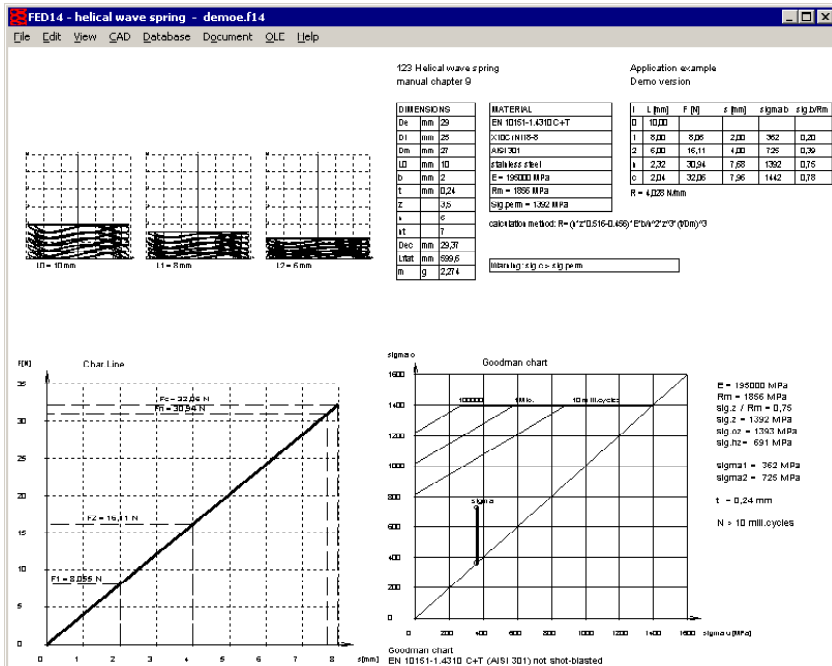
Export Formats
DXF, IGES, HTML, TXT, DBF, Excel, F14.

System Requirements
FED14 is available as 32-bit app or as 64-bit app for Windows 7, Windows 8, Windows 10.

Scope of Delivery
FED14 program with database files, example applications and help images, user manual (pdf), license contract for unlimited time use.

Software Maintenance
FED14 is constantly being 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. We provide help and support by email and hotline without extra charge.