# FED14

## *Software for Helical Wave Springs*

*for Windows*

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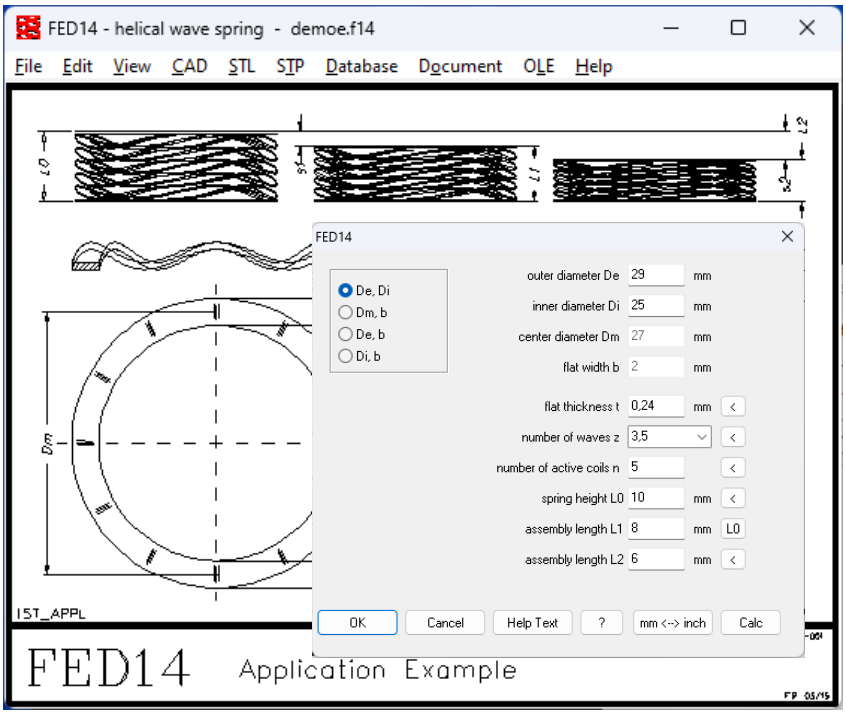
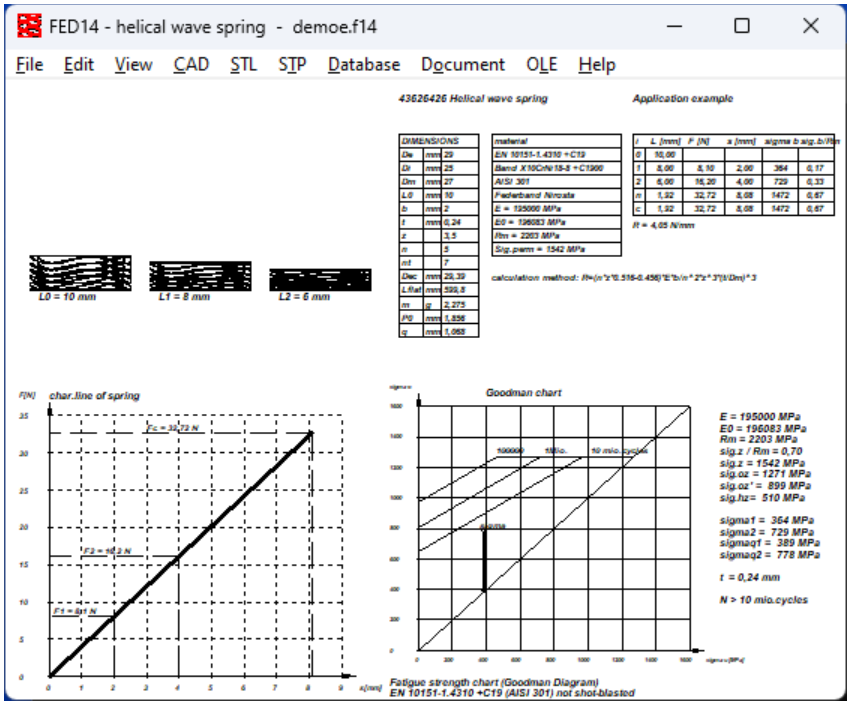



### Calculation of Helical Wave Springs

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.

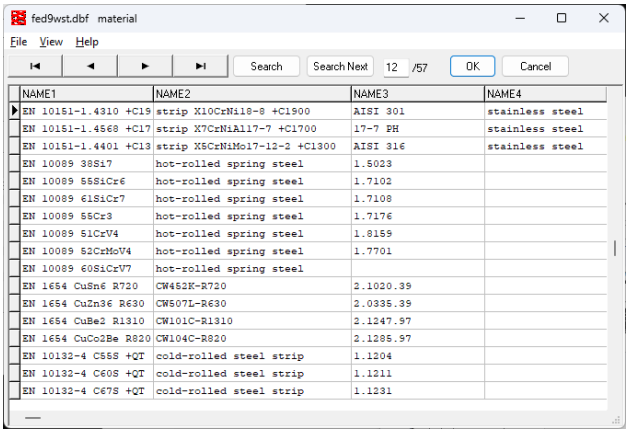
### Pre-Dimensioning

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.

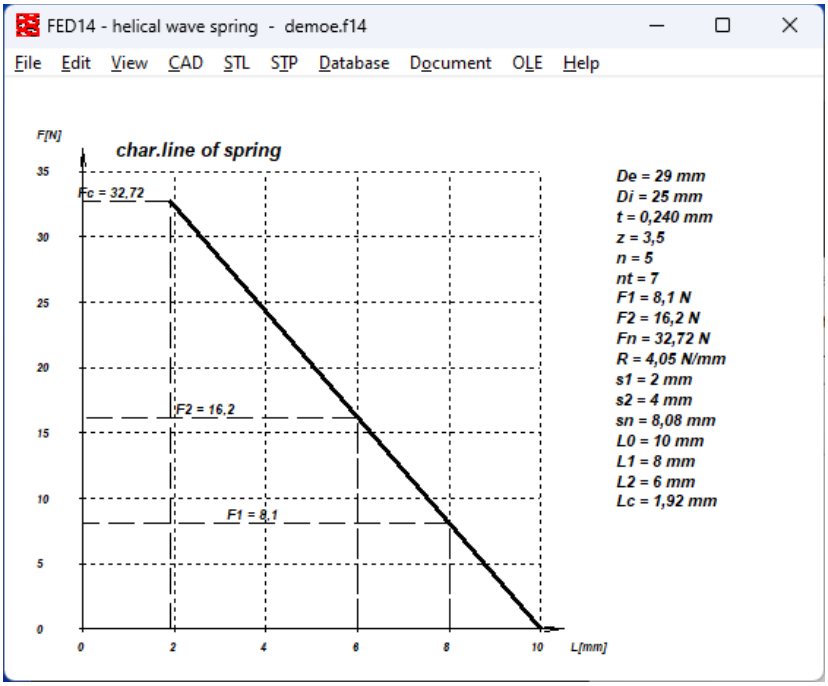


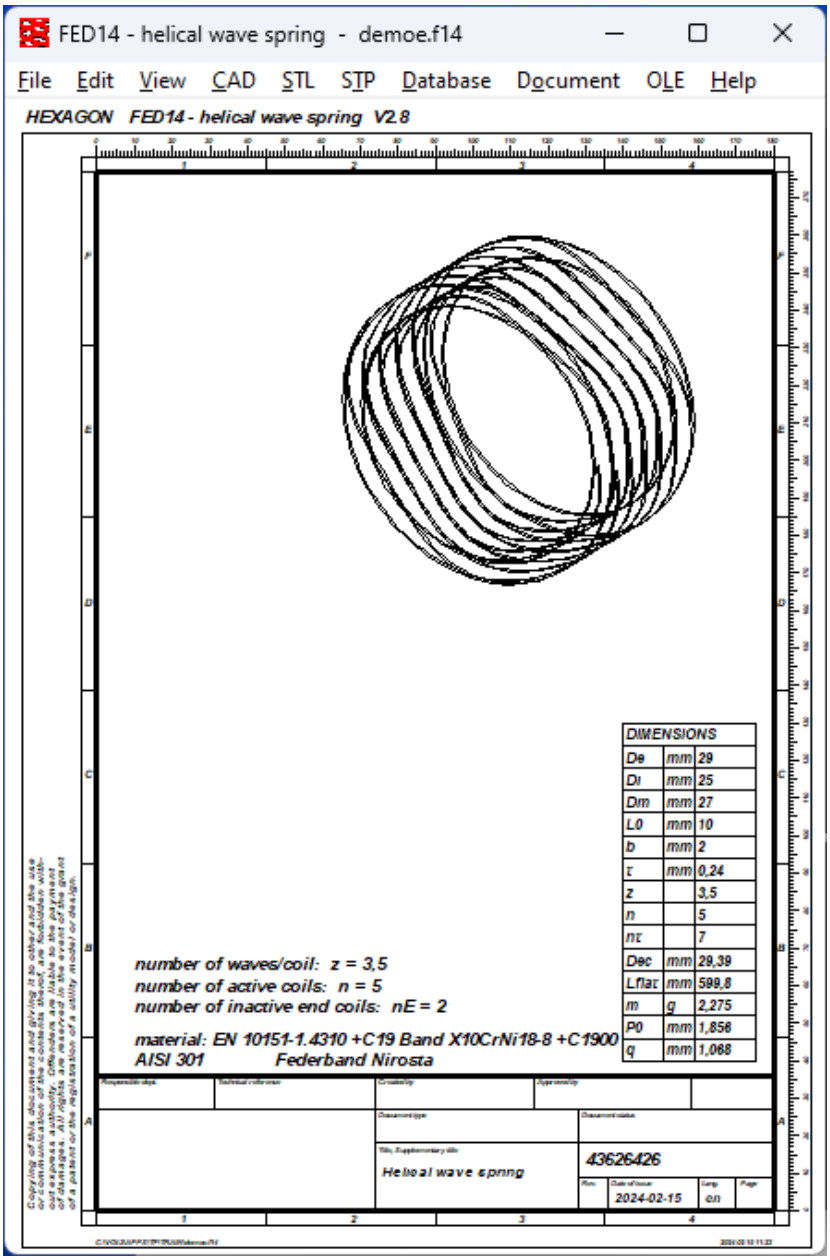

### Material Database

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.




| NAME1 | NAME2 | NAME3 | NAME4 |
|---|---|---|---|
| EN 10151-1.4310 +C19 | strip X10CrNi18-8 +C1900 | AISI 301 | stainless steel |
| EN 10151-1.4568 +C17 | strip X7CrNiAl17-7 +C1700 | 17-7 PH | stainless steel |
| EN 10151-1.4401 +C13 | strip X5CrNiMo17-12-2 +C1300 | AISI 316 | stainless steel |
| EN 10089 38Si7 | hot-rolled spring steel | 1.5023 | |
| EN 10089 55SiCr6 | hot-rolled spring steel | 1.7102 | |
| EN 10089 61SiCr7 | hot-rolled spring steel | 1.7108 | |
| EN 10089 55Cr3 | hot-rolled spring steel | 1.7176 | |
| EN 10089 51CrV4 | hot-rolled spring steel | 1.8159 | |
| EN 10089 52CrMoV4 | hot-rolled spring steel | 1.7701 | |
| EN 10089 60SiCrV7 | hot-rolled spring steel | | |
| EN 1654 CuSn6 R720 | CW452K-R720 | 2.1020.39 | |
| EN 1654 CuZn36 R630 | CW507L-R630 | 2.0335.39 | |
| EN 1654 CuBe2 R1310 | CW101C-R1310 | 2.1247.97 | |
| EN 1654 CuCo2Be R820 | CW104C-R820 | 2.1285.97 | |
| EN 10132-4 C55S +QT | cold-rolled steel strip | 1.1204 | |
| EN 10132-4 C60S +QT | cold-rolled steel strip | 1.1211 | |
| EN 10132-4 C67S +QT | cold-rolled steel strip | 1.1231 | |




**Load-deflection diagram**
FED14 calculates characteristic line of spring (loaddeflection 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**
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 11, Windows 10, Windows 7.

**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 without extra charge.