

# FED 13

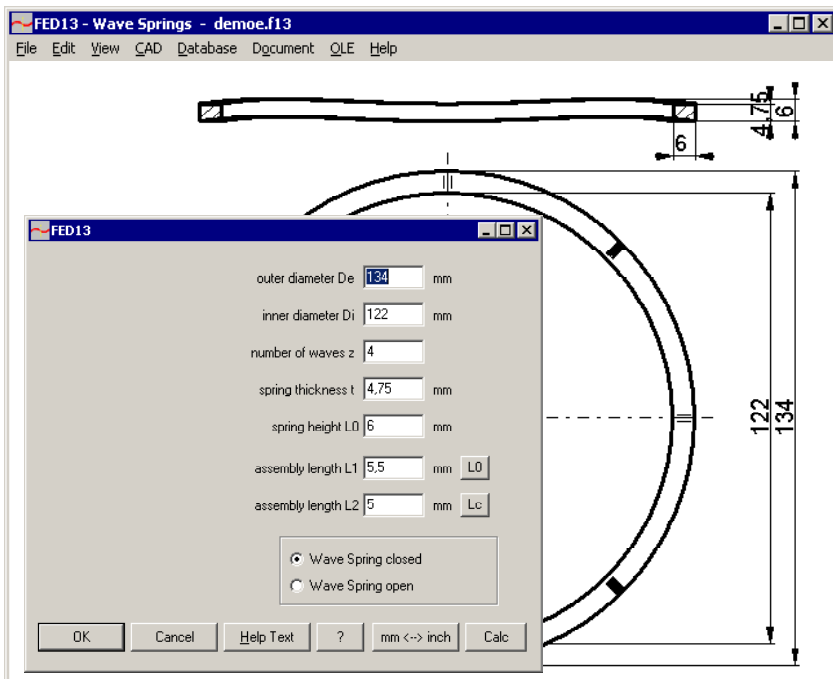


www.hexagon.de

## Software for Wave Spring Washers

for Windows

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### Calculation of Wave Spring

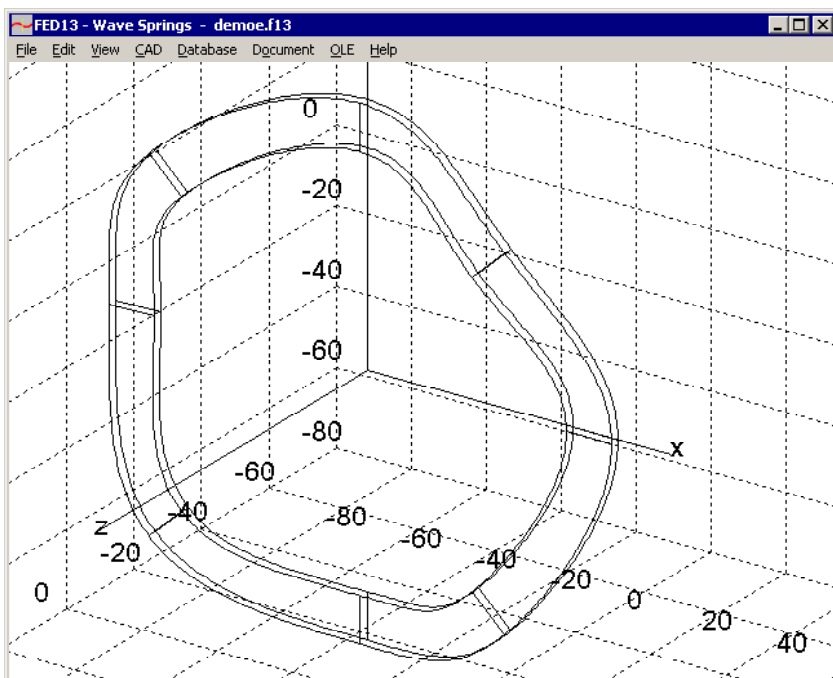
FED13 calculates characteristic line of spring and stresses of wave spring washers. Input data are external and internal ring diameter, flat thickness, number of waves, height of wave spring L0. The program calculates spring load and stress for assembly length L1 and L2. Material properties can be selected from the integrated material database. Wave spring can be closed (washer) or open (made from strip).

### Units

FED13 can be switched between metric units (mm, N, MPa) and imperial units (inch, lbf, psi).

### Spring Drawing 2D and 3D

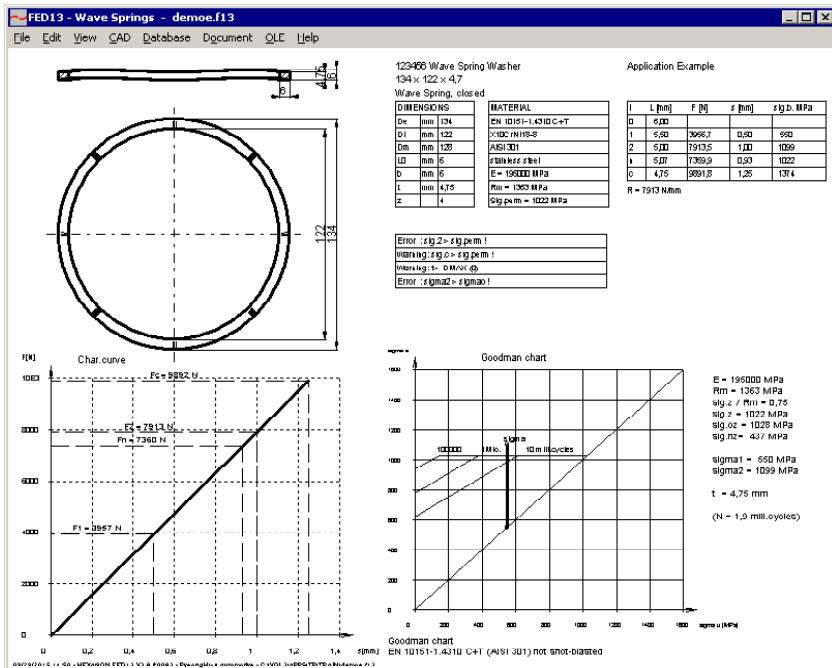
FED13 generates a true-scale drawing of the wave spring washer (2D or 3D) that can be exported to your CAD system as DXF or IGES file.



### 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 at the integrated material database. The dbf file may be extended and modified by the user.

NAME1	NAME2	NAME3	NAME4	E
EN 10132-4 1.25C2+QT	Kalband aus Stahl	1.2002		206000
EN 10132-4 4657 +QT	Kalband aus Stahl	1.5021		206000
EN 10132-4 51C14+QT	Kalband aus Stahl	1.8159		206000
EN 10132-4 6957 +QT	Kalband aus Stahl	1.5025		206000
EN 10132-4 79N6 +QT	Kalband aus Stahl	1.5634		206000
EN 10132-4 60CA2+QT	Kalband aus Stahl	1.2235		206000
EN 10132-4 C1005 +QT	Kalband aus Stahl	1.1274		206000
EN 10132-4 C1255 +QT	Kalband aus Stahl	1.1224		206000
EN 10132-4 C555 +QT	Kalband aus Stahl	1.1204		206000
EN 10132-4 C605 +QT	Kalband aus Stahl	1.1211		206000
EN 10132-4 C675 +QT	Kalband aus Stahl	1.1231		206000
EN 10132-4 C755 +QT	Kalband aus Stahl	1.1248		206000
EN 10132-4 C855 +QT	Kalband aus Stahl	1.1269		206000
EN 10132-4 C905 +QT	Kalband aus Stahl	1.1217		206000
EN 10151 1.4310 C+T	X10CrNi8 8	AISI 301	Federband Nitrosta	196000
EN 10151 1.4401 C+T	X5CrNiMo17.12.2	AISI 316	Federband Nitrosta	196000
EN 10151 1.4568 C+T	X7CrNiAl7.7	17-7 PH	Federband Nitrosta	200000
EN 1654 CuBe2 R1310	Cv101Cr1310	DIN 17682 2.1247.97		135000
EN 1654 CuCo28e R820	Cv104CrR820	DIN 17682 2.1285.97		140000



## Diagrams

FED13 calculates characteristic line of spring (load-extension diagram) as function of spring travel and spring length.

## Goodman Diagram

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

## Quick View

Load-extension diagram together with tables of the essential spring data and results are printed on one page.

## Printout

Input data and calculation results with deflection, spring length, spring load and stresses for different spring positions may be printed, saved as text or HTML file, or exported to MS Excel via OLE interface.

## Production Drawing

FED13 generates a production drawing of the wave spring washer with all dimensions.

## HEXAGON Help System

Auxiliary text and images are available in 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, F13.

## Import Formats

TXT, DBF, Excel, F13.

## System Requirements

FED13 is available as 32-bit and 64-bit application for Windows XP, Vista, Windows 7, 8, 10.

## Scope of Delivery

FED13 program with database files, example applications and help images, user manual (pdf), license granting unrestricted rights of use.

## Software Maintenance

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

## 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.

