

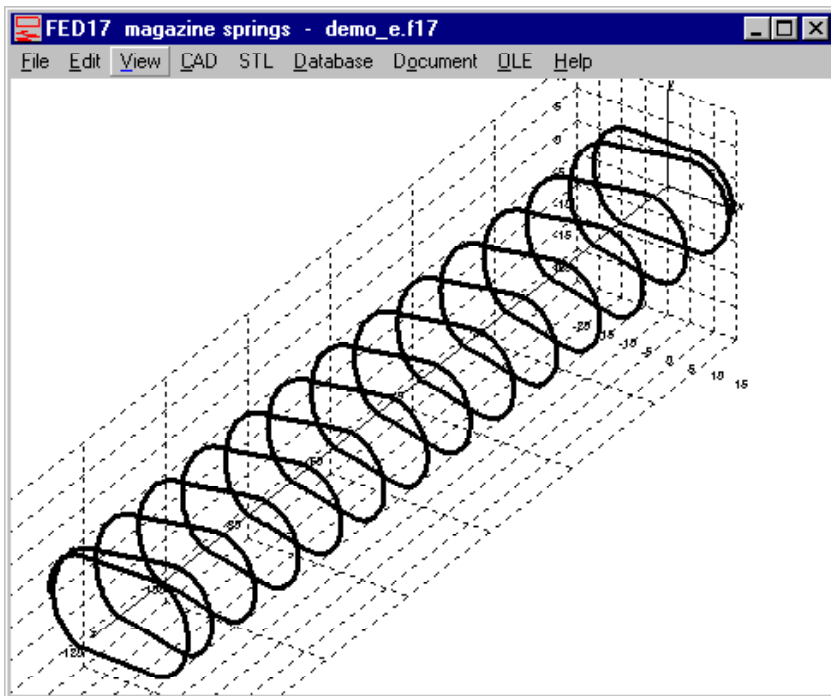
# FED17



www.hexagon.de

## Software for Calculation of Magazine Springs (rectangular, oval, elliptic) for Windows

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### Calculation

FED17 calculates magazine springs, helical compression springs of rectangular, oval or elliptic coil shape. If you select oval or elliptic coil shape and set coil length = coil width, even cylindrical compression springs can be calculated by FED17. Magazine springs are calculated according to the formulas of EN 13906-1, where applicable. Spring loads, deflections, spring rate, spring energy, stress, wire length, buckling length, natural frequency and weight are calculated.

In **pre-dimensioning**, enter only 2 loads, stroke, coil shape and ratio of length to width, and FED17 calculates magazine spring dimensions.

In **dimensioning**, magazine spring dimensions are calculated from the spring loads, stroke, coil length and width and clamping length.

In **recalculation**, existing springs can be calculated by input of spring dimensions.

### Wire shape

On default, FED17 calculates magazine springs of round wire. But even springs made of square, rectangular and elliptic wire can be calculated

### Input

Enter data for wire shape, base data, material, description, production, tolerances, application altogether in Quick input, or in separate input windows.

### Spring Material Database

The software obtains the material properties from the integrated material database (tensile strength, admissible shearing stress in relation to wire diameter, shearing modulus, modulus of elasticity, density).

### Spring Tolerances

The program calculates the tolerances for the wire diameter  $d$  according to EN 10218, EN 10270, DIN 2077, and for  $D_m$ ,  $L_0$ ,  $F_1$  and  $F_2$  according to EN 15800 or DIN 2096.

$$R = \frac{F}{s} = \frac{G \cdot I_t}{r^2 \cdot U \cdot n}$$

$$\tau = \frac{F \cdot r_{max}}{W_t}$$

$$I_t = \frac{\pi}{32} \cdot d^4$$

$$W_t = \frac{\pi}{16} \cdot d^3$$

$$r_{max} = D_{ma}/2 \text{ (oval, ellipt.)}$$

$$U = 2 \cdot D_{ma} + (\pi - 2) \cdot D_{mb} \text{ (oval)}$$

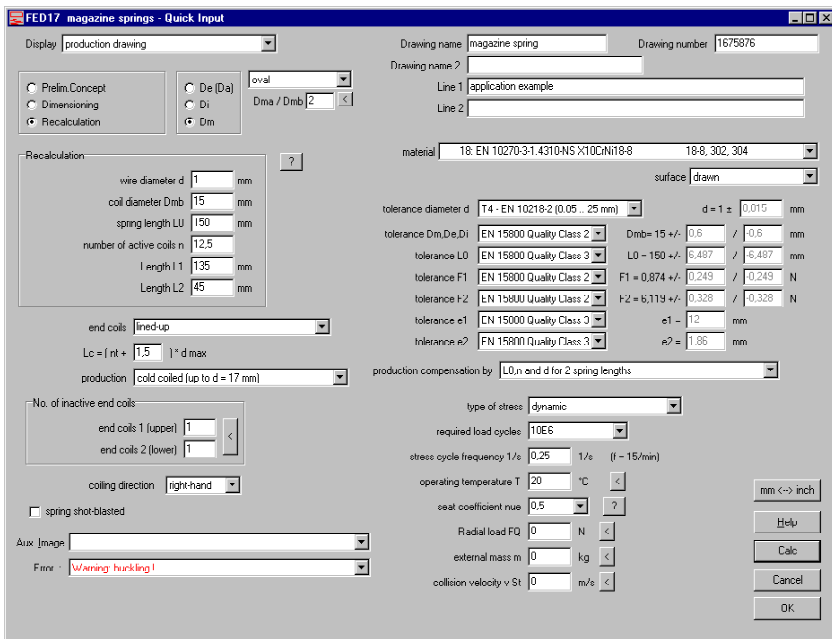
$$r = f(\phi)$$

R spring rate in N/mm  
 F spring load in N  
 s deflection in mm  
 G shear module in N/mm<sup>2</sup>  
 d wire diameter in mm  
 D coil diameter in mm  
 n no. of active coils  
 tau shear stress in MPa  
 r lever arm of F  
 U coil periphery in mm

r = f(phi)

CALCI

**FED17** Calculation of Magazine Springs



## Goodman Diagram

You can watch 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.

As alternative to Goodman diagram, FED17 also generates S-N diagram, Smith diagram or Goodman-Haigh diagram.

## Relaxation

FED17 calculates relaxation of the spring depending on material, load, temperature and time.

## Spring Drawing (2D)

You can display a scale drawing on screen in any clamping length between L0 and Lc. The spring drawing can be exported to CAD via DXF/IGES file.

## 3D centerline

You can draw a 3D centerline of the magazine spring on screen or generate as 3D DXF or IGES file.

## STL Model

FED17 generates a 3D STL file of the magazine spring which may be used with 3D printer or viewer.

## Production Drawing

FED17 generates a complete production drawing according to EN 15800, which can be printed or exported to CAD.

## Animation

FED17 animation simulates the motion of the spring between two specified points on screen.

## Quick View

Quick View shows drawings, diagrams and tables altogether on one screen, ready to be printed. Various Quick view screens for different screen resolutions and paper sizes can be printed.

## Help System

Help text and auxiliary images are available in the input windows. Manual can be displayed on screen or printed.

## Hard and Software Requirements

FED17 is available as 32-bit app or 64-bit app for Windows 10, 8, 7, Vista, XP.

## Scope of Delivery

Program with user manual (pdf), database files, example applications and help images, non-expiring license for unlimited time use with update rights.

## Guarantee

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

## Software Maintenance

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

